Audit Committee

Friday, September 9, 2016 at 8:00 a.m.

5th Floor Board Room, Water Board Building
735 Randolph Street, Detroit, Michigan 48226
GLWater.org

AGENDA

Note: This binder contains an updated Page 32 which was distributed at the Audit Committee Meeting

1. CALL TO ORDER
2. ROLL CALL
3. APPROVAL OF AGENDA
4. APPROVAL OF MINUTES
   A. August 5, 2016 (Page 1)
5. PUBLIC PARTICIPATION

6. OLD BUSINESS
   A. Proposed Parameters for the Water & Sewer Refunding Transaction Structure Resolution (Appendix A)
      Proposed Action: Audit Committee recommends that the Great Lakes Water Authority Board approve the resolution related to potential refunding savings amended structure parameters for the inaugural 2016 water and sewer system bond refunding as presented.
   B. Proposed Revenue Requirement Policy (Appendix A)
      Proposed Action: Audit Committee considers the Revenue Requirement policy.

7. NEW BUSINESS
   A. Verbal Update: FY 2016 Bond Transaction
      Proposed Action: None.
   B. Proposed Amendment to the Great Lakes Water Authority Investment Policy (Page 6)
      Proposed Action: Audit Committee recommends that the Great Lakes Water Authority Board approve the amended Investment Policy as presented.
   C. Proposed List of Qualified Financial Institutions (Page 26)
      Proposed Action: The Audit Committee recommends that the Great Lakes Water Authority Board approve the proposed List of Qualified Financial Institutions as presented.

8. REPORTS (Proposed action is to receive and file for each report)
   A. Monthly Revenue & Collections Report for August 2016 (Page 30)
   B. Banking and Investment Update – Operating Funds (Page 51)

C. Monthly Transfers Related to DWSD Pursuant to Lease and Master Bond Ordinance (Page 72)
D. CFO Update (Appendix B)

9. LOOK AHEAD

Next Audit Committee Meeting

October 7, 2016 at 8 am Regular Meeting

10. INFORMATION
    A. None

11. Closed Session
    A. 2016-07-08 Resolution regarding Closed Session request from William M. Wolfson pursuant to Section 8(h) of the Michigan Open meetings Act, MCL 15.268 (h) to consider matters exempt from discussion or disclosure pursuant to state or federal statute.

12. OTHER MATTERS

13. ADJOURNMENT

Audit Committee

Friday, August 5, 2016 at 8:00 a.m.

5th Floor Board Room, Water Board Building
735 Randolph Street, Detroit, Michigan 48226
GLWater.org

MINUTES

1. CALL TO ORDER

Chairman Baker called the meeting to order at 8:01 a.m.

2. ROLL CALL

Chairman Brian Baker, Director Robert Daddow and Director Joseph Nardone

3. APPROVAL OF AGENDA

Chairman Baker requested approval of the Agenda.

MOTION BY:	JOSEPH NARDONE
SUPPORT:	ROBERT DADDOW
ACTION:	APPROVED

4. APPROVAL OF MINUTES

Chairman Baker requested approval of the Minutes of July 1, 2016.

MOTION BY:	JOSEPH NARDONE
SUPPORT:	ROBERT DADDOW
ACTION:	APPROVED

5. PUBLIC PARTICIPATION

Raphael Chirolla, Oakland County Water Resources Commissioner's Office, came before the Committee and asked that the $1.2 Million that was assigned to Highland Park's Bad Debt in Water be strictly allocated to the City of Detroit, as stated in the Water and Sewer Services Agreement between the City of Detroit and Great Lakes Water Authority.

6. OLD BUSINESS

A. Presentation by Joe Kowalski, Partner, KPMG, Related to FY 2015 Audited Financial Report for the City of Detroit Water & Sewerage Department
(Note: Audited Financial Reports presented at the GLWA Audit Committee meeting of June 17, 2016 are available online at: http://www.glwater.org/finances/audit-committee-documents/)
Action: None

7. NEW BUSINESS

A. Proposed Approval of Ordinances Amending Master Water and Sewer Bond Ordinances. Presented by: Jonathan Wheatley, Public Finance Manager and Terence Donnelly, Dickinson Wright
Action: Audit Committee recommends that the Great Lakes Water Authority Board approve the resolutions and ordinance amendments as presented.

MOTION BY: ROBERT DADDOW
SUPPORT: JOSEPH NARDONE
ACTION: APPROVED

B. Proposed Approval of Series Ordinance Authorizing Issuance and Sale of Sewage Disposal System Revenue Refunding Bonds in an Amount Not to Exceed $600,000,000 (Ordinance 2016-09). Presented by Jonathan Wheatley, Public Finance Manager and Dan Hartman of PFM (via telephone)
Action: Audit Committee recommends that the Great Lakes Water Authority Board approve the resolution and ordinance as presented.

MOTION BY: ROBERT DADDOW
SUPPORT: JOSEPH NARDONE
ACTION: APPROVED

C. Proposed Approval of Series Ordinance Authorizing Issuance and Sale of Water Supply System Revenue and Revenue Refunding Bonds in an Amount not to Exceed $1,134,000,000 (Ordinance 2016-08). Presented by: Jonathan Wheatley, Public Finance Manager
Action: Audit Committee recommends that the Great Lakes Water Authority Board approve the resolution and ordinance as presented.
Director Daddow stated that this motion is with the understanding that the matter on the local water system component of the new money debt, would be adjusted going forward.

MOTION BY: ROBERT DADDOW
SUPPORT: JOSEPH NARDONE
ACTION: APPROVED

OLD BUSINESS: (continued)

(6)B. Discussion: System Optimization Guidelines
Presented by Suzanne Coffey, Chief Operating Officer-Wastewater Operations/ Chief Systems Planning Officer
Action: Receive and file report. Item is scheduled for discussion at the GLWA Board Workshop on August 10, 2016.

MOTION BY: ROBERT DADDOW
SUPPORT: JOSEPH NARDONE
ACTION: APPROVED

NEW BUSINESS (continued)

D. Discussion: 4% Revenue Requirement Policy
Presented by: Nicolette Bateson, Chief Financial Officer/Treasurer
Action: Receive and file report. Schedule consideration of a board policy at the September 2016 Audit Committee meeting.

MOTION BY: ROBERT DADDOW
SUPPORT: JOSEPH NARDONE
ACTION: APPROVED

Director Joseph Nardone excused himself from the meeting at 9:56 a.m.

8. REPORTS

G. Master Bond Ordinance and Lease Agreement Transfers to DWSD

A. Financial System Implementation Update.
Presenters: Jennifer Casler, Finance Applications Analyst and Mike Huber, Finance Director
Chairman Baker requested a Motion to Receive and File.

MOTION BY: ROBERT DADDOW
SUPPORT: BRIAN BAKER
ACTION: APPROVED

B. FY 2016 Retail and Wholesale Sewer Revenue Report- Variance Analysis
Chairman Baker requested a Motion to Receive and File.

MOTION BY: ROBERT DADDOW
SUPPORT: BRIAN BAKER
ACTION: APPROVED

C. FY 2016 Retail and Wholesale Water Revenue Report - Variance Analysis
Chairman Baker requested a Motion to Receive and File.

MOTION BY: ROBERT DADDOW
SUPPORT: BRIAN BAKER
ACTION: APPROVED

D. Wholesale Accounts Receivable Aging Report as of July 31, 2016
Chairman Baker requested a Motion to Receive and File.

MOTION BY: ROBERT DADDOW
SUPPORT: BRIAN BAKER
ACTION: APPROVED

E. City of Highland Park Billings and Collections
Chairman Baker requested a Motion to Receive and File.

MOTION BY: ROBERT DADDOW
SUPPORT: BRIAN BAKER
ACTION: APPROVED

F. City of Flint Billings and Collections
Chairman Baker requested a Motion to Receive and File.

MOTION BY: ROBERT DADDOW
SUPPORT: BRIAN BAKER
ACTION: APPROVED

9. CLOSED SESSION

None

10. LOOK AHEAD

The September 2, 2016, 8:00 a.m. Audit Committee Meeting has been rescheduled to September 9, 2016 at 8:00 a.m.

11. INFORMATION

None

12. OTHER MATTERS

13. ADJOURNMENT

Chairman Baker requested a motion to adjourn.

MOTION BY:	ROBERT DADDOW
SUPPORT:	BRIAN BAKER
ACTION:	APPROVED

There being no further business, the meeting was adjourned at 10:25 a.m.

GLWA
Great Lakes Water Authority

Financial Services Group
Audit Committee Communication

Date: September 9, 2016

To: Great Lakes Water Authority Audit Committee

From: Deirdre Henry, Treasury Manager

Re: Proposed Amendments to the Great Lakes Water Authority Investment Policy

Background: The current Investment Policy for the Great Lakes Water Authority was approved by the GLWA Board on October 22, 2015. A periodic review of the policy is required to ensure the policies governing the management of the portfolio continue to be relevant and are implemented and monitored as stated.

Analysis: The following amendments are proposed to the investment policy, to emphasize the importance of matching investments to cash flow activities, to add language related to maximum maturities and competitive bid process for investment purchases, and to define evaluation process for approved financial institutions and broker/dealers. The attached, proposed policy is shown in "redline" format to highlight the recommended revisions in addition to the description below.

1. Section 1 has been amended to add a reference to Michigan Public Act 20.
2. Section 2 has been amended to add language to specifically state that the Chief Financial Officer/Treasurer has delegated authority to open and close accounts.
3. Section 7(A2) has been amended to add language to emphasize the importance of matching investments to cash flows and monitoring maturity dates.
4. Section 7(B) has been edited to remove investment time horizons for specific types of cash flows. The investment time horizons will be determined by the specific short term and long term cash flows and cannot exceed the weighted average maturity guidelines.

5. Section 7(C) has been edited to remove language about specific investment strategies and benchmarks that will be addressed as a part of the quarterly reporting.

6. Section 8 had been added to provide guidelines for maximum maturity dates for investments.

7. Section 9(A) has been amended to clarify the evaluation process for authorized financial institutions and broker/dealers.

8. Section 9(B) has been added to give authority to designated investment advisors to use their list of approved broker/dealers. The list must be submitted to the treasury manager quarterly and will be included in the list of "Qualified Institutions".

9. Section 9(C) has been added to include the requirement of a competitive bid process for making investment decisions.

10. Section 10(I)(6) has been amended to clarify that audited financial statements will be used as a part of the monitoring process of investment pools.

11. Section 10(I)11 has been edited to clarify language about the review of retain earnings as a part of the monitoring process of investment pools.

12. Section 11(E) has been amended to clarify that audited financial statements will be reviewed as a part of the monitoring process for mutual/collective investment funds.

13. Section 12 has been amended to include language that requires all securities be in the name of Great Lakes Water Authority.

14. Section 14 has been amended to include discussion of investment strategy and performance reporting as compared to benchmark as a part of the quarterly reporting.

15. Addendum B has been added to include the Investment Policy Certification form that all authorized dealer/brokers will be required to submit.

16. Addendum C has been amended to include the definition for Financial Institution on page 12.

Proposed Action: The Audit Committee recommends that the Great Lakes Water Authority Board approve the proposed amendments to the Investment Policy as presented.

INVESTMENT POLICY

SECTION 1 – PURPOSE

The purpose of this Investment Policy Statement is to establish a clear understanding of the philosophy and the investment objectives for Financial Assets (the Assets) (defined under section, "Scope") of the Great Lakes Water Authority (the GLWA). This document will further describe the standards that will be utilized by the GLWA's Board in monitoring investment performance of the Assets, as well as, serve as a guideline for the GLWA's Finance Officers, any investment manager retained by the GLWA, or financial institution(s) utilized by the GLWA in its routine financial activities.

The investment purpose of the GLWA is to endeavor to accumulate a pool of assets sufficient to build capital for future use with the corresponding obligations to support near-term and long- term needs of the GLWA. The Assets are to be invested consistent with the policies of the GLWA's Board and this policy document, as amended from time to time and in accordance with Michigan Public Act 20 of 1943 Investment of Surplus Funds of Political Subdivisions (the Act).

SECTION 2 – GLWA CHIEF FINANCIAL OFFICER

The Great Lakes Water Authority Board hereby delegates to the Chief Financial Officer/Treasurer (the CFO), and such delegates as the CFO may designate from time-to-time, primary responsibility for recommending investment policies and strategies, trustees, investment managers and/or advisors, and other fiduciaries, and monitoring the performance of the Financial Services Group's Managers, including but not limited to the Treasury Manager and Finance Director, advisors and other fiduciaries of the GLWA. This delegation includes the authority to open and close approved investment and depository accounts as noted in Section 10. This delegation is not intended to conflict with the Great Lakes Water Authority Board's ultimate authority and responsibility for the Financial Assets of the GLWA. The Great Lakes Water Authority Board may at its discretion set policy and practices for periodic reporting of the results of investment performance, review of market conditions, and other such information as it may require.

This Investment Policy Statement and the policies and guidance herein are not intended to substitute or conflict with routine treasury reporting duties and practices of the Financial Services Group and the Chief Financial Officer as managed for the Great Lakes Water

Authority.

SECTION 3 – DELEGATION OF AUTHORITY

The Chief Financial Officer delegates management responsibility for the day to day or routine activities of the investment program to the Treasury Manager, under the supervision of the Chief Financial Officer. The Treasury Manager shall be responsible for all transactions undertaken and shall establish a system of controls to regulate the activities of subordinate officials, and their procedures in the absence of the Treasury Manager with the approval of the Chief Financial Officer.

The Treasury Manager shall establish written investment policy procedures for the operation of the investment program consistent with this Investment Policy Statement. No person may engage in an investment transaction except as provided under the terms of this policy and the procedures established by the Treasury Manager.

SECTION 4 – SCOPE

This Investment Policy Statement applies to the Financial Assets, all transactions and investment decisions and practices for which the Treasury Manager has authority and oversight. Such assets shall include funds classified in the audited financial statements of the GLWA as Current Assets and Long Term Assets.

This policy does not cover investment activities of pension fund or deferred compensation programs.

SECTION 5 – THE PRUDENT INVESTOR STANDARD

The Assets are to be invested and managed with judgment and care; under circumstances then prevailing; which persons of prudence, discretion and intelligence exercise in the management of their own affairs, not for speculation, but for investment, considering the probable safety of their capital as well as the probable income to be derived.

The standard of prudence to be used by the GLWA's Treasury Manager will be the "prudent person" and / or "prudent investor" standard and shall be applied in the context of managing the overall portfolio of assets. The Treasury Manager acting in accordance with written procedures and this investment policy and exercising due diligence shall be relieved of personal responsibility for an individual security's credit risk or market price changes, provided deviations from expectations are reported in a timely fashion and appropriate action is taken to control adverse developments.

SECTION 6 – ETHICS

Officers and employees involved in the investment process shall refrain from personal business activity that would conflict with the proper execution and management of the investment program, or that could impair their ability to make impartial decisions. Employees and investment officials shall disclose any material interests in financial

institutions with which they conduct business. They shall further disclose any personal financial/investment positions that could be related to the performance of the investment portfolio. Employees and officers shall refrain from undertaking personal investment transactions with the same individual with which business is conducted on behalf of GLWA.

SECTION 7 – INVESTMENT OBJECTIVES

The investment policies of the GLWA will be carried out by means of investment strategies that reflect continuous evaluation of changing investment environments, judgment regarding the allocation of the GLWA's assets among different kinds of investment opportunities, identification of appropriate investment vehicles, and the making of specific investment decisions.

The objective of the investments will be to provide for the GLWA's continued operations on a reasonably consistent basis and to achieve income and growth of principal without undue exposure to risk. Therefore, the primary focus will be preservation of principal, income generation and capital appreciation a secondary consideration together with the current spending requirements and short and intermediate term capital requirements of GLWA. The Assets of GLWA will be managed in accordance with the following objectives, in priority order:

A. Safety – Safety of principal is the foremost objective of the GLWA's investment program. Investments shall be undertaken in a manner that seeks to ensure the preservation of capital in the overall portfolio. The objective will be to mitigate risk.

1. Credit Risk – The GLWA will minimize credit risk, the risk of loss due to the failure of the security issuer or backer, by:
   i. Limiting investments to the safest types of securities, and
   ii. Pre-qualifying the financial institutions, broker/dealers, and intermediaries with which the GLWA will do business, and
   iii. Diversifying the portfolio so that the potential losses on individual securities will be minimized.

2. Interest Rate Risk - The GLWA will minimize the risk that market value of the securities in the portfolio will fall due to changes in the general interest rates, by:
   i. Matching investment with anticipated short and long term cash flow requirements, and ~~Structuring maturities of the portfolio to meet cash requirements of ongoing operations, thereby minimizing the need to liquidate securities prior to maturity~~
   ii. Minimizing the need to liquidate securities prior to maturity, and~~Investing operating funds primarily in short-term securities or investment pools~~
   iii. Monitoring maturity dates of individual securities and weighted average maturity of investment portfolio to ensure duration is commensurate with the cash flow characteristics of the GLWA.~~Purchasing securities with the intent to hold until maturity and matched to mature with consideration for capital improvement plans~~

3. Custodial credit risk – The GLWA will minimize custodial risk by:
    i. Using only financial institutions and brokers meeting pre-established criteria and
    ii. Holding all securities in the name of Great Lakes Water Authority.

B. Liquidity – The investment portfolio of the GLWA will remain sufficiently liquid to enable the GLWA to meet all operating requirements that may be reasonably anticipated. Investment maturities for operating funds shall be scheduled to coincide with projected cash flow needs, taking into account large routine expenditures (such as payroll and debt service), as well as considering sizable blocks of anticipated revenue (water and sewerage fee collections).

~~1. Time horizon for operating cash investments average life shall not exceed 270 days.~~
~~2. Time horizon for long-term capital investments average life shall not exceed 36 months~~
~~3. Time horizon for long-term debt service reserves average life shall not exceed 60 months~~

C. Return on Investments – The investment portfolio of the GLWA shall be designed and managed with the objective of attaining a benchmark rate of return throughout the budgetary and economic cycles, commensurate with GLWA's investment risk constraints, operating cash flow and long-term capital needs. Portfolio performance will be measured against appropriate U.S. Treasury benchmarks as noted in Section 14. ~~The predominant investment strategy of the GLWA is passive. Performance standards for:~~

~~1. Short-term assets: yields of the portfolio will be the average of U.S. Treasury Bills most closely commensurate with the average life of the portfolio.~~
~~2. Long-term assets: yields of the portfolio will be the average of U.S. Treasury Bills and Notes most closely commensurate with the average life of the portfolio.~~

D. Diversification - It is the policy of the GLWA to maintain a diversified investment portfolio. Assets held in a common fund or concentration account and other investment funds will be diversified to reduce the risk of loss resulting from over concentration of assets in a specific maturity, individual financial institution(s) or a specific class of securities. Diversification strategies will be determined and revised by the Treasury Manager, from time to time to meet diversification objectives while seeking to attain market rates of return or the benchmark index standards, set out herein.

It is also understood that temporary deviations from this objective may be necessary from time to time in order to accommodate certain financial goals and obligations.

SECTION 8 – MAXIMUM MATURITIES

To the extent possible, investments should match anticipated short term and long term cash flow requirements. The weighted average maturity of the portfolio should not exceed five years. Unless matched to a particular cash flow need, funds will not be directly invested in securities that exceed five years maximum maturity period. Any longer duration investments must be matched to a particular cash flow and must fall within the weighted average maturity guidelines for the portfolio.

SECTION 9 – AUTHORIZED FINANCIAL INSTITUTIONS AND BROKER/DEALERS

A. The Treasury Manager shall maintain a listing of financial institutions and broker/dealers authorized to provide investment services. The Treasury Manager will actively monitor and will conduct an annual evaluation of each financial institution and broker/dealer for credit worthiness to determine whether it should be on the "Qualified Institutions" listing.

i. For broker/dealers, the evaluation will include review of audited financial statements, ~~the financial conditions and registrations of each financial entity using~~ audited financial statements, proof of FINRA registration ~~of NASD certification~~, proof of approval to do business in Michigan, evidence of adequate insurance coverage, review of bank ratings by at least two independent sources, and certification of having read, understood, and agreeing to comply with the GLWA investment policy. ~~a signed investment policy certification~~. The authorized listing of financial institutions, and / or broker/dealers shall be approved periodically by the Great Lakes Water Authority Audit Committee or as may be amended.

ii. For financial institutions, the evaluation will include review of audited financial statements, proof of Michigan registration, evidence of adequate insurance coverage, and review of bank ratings by at least two independent sources.

B. Any designated investment advisors assisting the GLWA in the management of its overall portfolio may utilize their own approved list of broker/dealers to buy and sell investments in accordance with this policy. The advisor's list must be submitted to the Treasury Manager on a quarterly basis in advance of utilization of those broker/dealers.

C. Whenever possible, all investment decisions should be made using a competitive bid process. A competitive bid can be executed through a bidding process involving at least three separate broker/dealers or financial institutions or through the use of a nationally recognized trading platform.

SECTION 10 – AUTHORIZED INVESTMENTS

In accordance with Michigan Public Act 20 of 1943, as it is currently written and as it

automatically incorporates future amendments to the Act, and consistent with GLWA's bond indentures, State authorizing bond statutes and ordinances, the surplus funds of GLWA will be invested as follows:

A. Bonds, securities, and other obligations of the United States or an agency or instrumentality of the United States.

B. Certificates of deposit, savings accounts, deposit accounts, or depository receipts of a bank or a savings and loan association which is a member of the Federal Deposit Insurance Corporation or a credit union which is insured by the National Credit Union Administration. The bank, savings and loan association or credit union must be eligible to be a depository of surplus funds belonging to the State.

C. Commercial paper rated at the time of purchase within the highest classifications established by not less than two standard rating services and which matures not more than 270 days after the date of purchase.

D. United States government or federal agency obligation repurchase agreements. Repurchase agreements shall be negotiated only with dealers or financial institutions with which GLWA has negotiated a Master Repurchase Agreement. Repurchase Agreements must be signed with the bank or dealer and must contain provisions similar to those outlined in the Public Security Association's (or successor Association) model Master Repurchase Agreement.

E. Bankers' acceptances of United States banks.

F. Obligations of the state of Michigan or any of its political subdivisions that at the time of purchase are rated no lower than a single-A rating category and by not less than one (1) rating agency, see Addendum A.

G. Mutual funds registered under the investment company act of 1940, title I of Michigan chapter 686, 54 Stat. 789, 15 U.S.C. 80a-1 to 80a-3 and 80a-4 to 80a-64, with authority to purchase only investment vehicles that are legal for direct investment by a public corporation. Included in this authorization are mutual funds that have net asset values (NAV) that fluctuate or can fluctuate on a periodic basis. A mutual fund is not disqualified as a permissible investment solely by reason of either of the following:
   1. The purchase of securities on a when-issued or delayed delivery basis;
   2. The ability to lend portfolio securities as long as the mutual fund receives collateral at all times equal to at least 100% of the value of the securities loaned;
   3. The limited ability to borrow and pledge a like portion of the portfolio's assets for temporary or emergency purposes; and,
   4. Investment pools organized under the surplus funds investment pool act, 1982 PA 367, 129.111 to 129.118.

H. Obligations described in (A) through (G) if purchased through an inter-local agreement under the urban cooperation act of 1967, 1967(Ex Sess) P.A. 7, MCL 124.501 to 124.512. For purposes of this section, the objectives listed in Section 7 shall be altered in that the return on investment shall be of primary concern, followed by safety of capital and liquidity.

Although permitted under state law, collateralization will not be required on all investments with the exception of repurchase or reverse repurchase agreements. Repurchase and reverse repurchase agreements must be collateralized at not less than 102% of the market value of principal and accrued interest. All other investments will be looked at on a case-by-case basis taking into account liquidity, safety and yield.

I. Investment Pools -Any investment into a pooled type account can only be made after the Treasury Manager has completed a thorough investigation. After the initial investment has been approved, the Treasury Manager must continue to monitor the account, at least annually, by reviewing the account's suitability as an investment vehicle. When reviewing the pooled account, the Treasury Manager shall take into account the following:

1. Detailed description of eligible investments made by the pool or fund;
2. A written statement of the investment policy and the pool or fund objectives;
3. A description of interest calculations and how interest is distributed;
4. An explanation on how the fund will handle gains and losses within the fund;
5. A description on how the funds will be safeguarded, and how often the underlying securities will be marked-to-market;
6. Audited Financial Statements, ~~Who will audit the fund or pool and how often~~;
7. An explanation of who will be able to invest in the fund, how often investments can be made, and what size limitations, if any, will be in effect for the fund;
8. A schedule for receiving statements and portfolio listings;
9. A fee schedule, explaining how and when the fees will be assessed;
10. Whether the fund will be able to receive bond proceeds, and whether they will accept bond proceeds; and,
11. Whether ~~Does~~ the pool or fund utilizes any type of reserves or a retained earnings account; and, if so, ~~?~~
~~If so, how does this~~whether it affects the interest earnings of the participants.~~?~~

SECTION 11 – MUTUAL / COLLECTIVE INVESTMENT FUNDS

The Treasury Manager is authorized to invest in mutual / collective investment funds (for purposes of investing in bonds, money market instruments, and other securities) after investigation of the prospectus and the following:

A. The investment policy and objectives of the fund
B. A description of Authorized Investment securities
C. A description of interest calculation and distribution of income or dividends
D. A description of how funds are safeguarded and securities priced
E. Audited Financial Statements ~~How often the fund is audited and by who~~

F. A description of any limitations on the size and frequency of deposits or withdrawals

G. A fee schedule, break points, including assessments of such

H. Frequency and delivery of statements and portfolio of securities in the fund

After the initial investment has been approved, the Treasury Manager must continue to monitor the account, at least annually, by reviewing the account's suitability as an investment vehicle.

SECTION 12 – SAFE KEEPING AND CUSTODY

All securities purchased by the GLWA under this section will be properly designated as an asset of the GLWA and shall be conducted on a delivery versus payment (DVP) basis. Certificates of Deposit purchased from financial institutions or brokers shall be held in a safe keeping account and evidenced by safe keeping receipt. Securities purchased from broker – dealers will be held in the name of the Great Lakes Water Authority by a third party custodian in a safe keeping account designated by the GLWA Treasury Manager and evidenced by safekeeping receipts.

For purposes of this Policy, third party custodians shall be defined as a separate financial institution or a separate and distinct division or department of the same institution whose function is safe keeping and / or trust services. No withdrawal of such securities, in whole or in part, shall be made from safe keeping except by the GLWA Finance Officers as authorized herein, or by its designee.

The GLWA will execute third party custodial agreement(s) with its bank(s) and depository institution(s). Such agreements will include letters of authority from the GLWA, details as to responsibilities of each party, notification of securities purchases, sales, delivery, repurchase agreements, wire transfers, safe keeping and transaction costs, procedures in case of wire failure or other unforeseen mishaps including the liability of each party.

SECTION 13 – INTERNAL CONTROLS & PRACTICES

The Treasury Manager shall maintain a system of internal controls and practices which shall be designed, in addition to conforming to generally accepted accounting principles, to minimize losses of funds arising from fraud, employee error, misrepresentation by third parties, unanticipated changes in financial markets, or imprudent actions by employees and officers of GLWA.

SECTION 14 – REPORTING

The Treasury Manager shall generate a quarterly investment report that provides a clear picture of the status of the current investment portfolio. Each quarterly report will indicate any areas of policy concern and suggested or planned revisions of investment strategies. The report shall include:

A. Discussion of investment strategy

B. A summary of investments by type

C. A summary of available funds and percentage invested
D. A summary of interest income and average invested balances by financial asset classifications
E. An analysis of investments by maturity dates
F. A detailed report of all investments by type including fund, investment amount, rate, purchase date and maturity date and market price
G. Performance Reporting of portfolio as compared to the average U.S. Treasury Bills or U.S. Treasury Notes that most closely commensurate with the average life of the portfolio.

SECTION 15 -INVESTMENT POLICY ADOPTION

The GLWA's Investment Policy shall be adopted by resolution of the Great Lakes Water Authority Board. The Policy shall be reviewed periodically by the Great Lakes Water Authority Audit Committee. Any modifications made to the Investment Policy must be approved by the Great Lakes Water Authority Board.

Addendum A - Investment Grade Classifications

Long-Term Ratings

	Standard & Poor's	Moody's Investors Service	Fitch Investors Service	Capacity to repay debt
	AAA	Aaa	AAA	Extremely strong capacity
	AA+	Aa1	AA+	Very strong capacity
	AA	Aa2	AA	
	AA-	Aa3	AA-	
Investment Grade Debt	A+	A1	A+	Strong capacity; some susceptibility to adverse economic circumstances or effects
	A	A2	A	
	A-	A3	A-	
	BBB+	Baa1	BBB+	Adequate capacity; however *more likely* to be weakened due to adverse economic circumstances or effects
	BBB	Baa2	BBB	
	BBB-	Baa3	BBB-	
Non-Investment Grade or Speculative	BB+	Ba1	BB+	Vulnerable to default; faces *major* ongoing uncertainties or exposure
	BB	Ba2	BB	
	BB-	Ba3	BB-	

Short Term Note Ratings

S & P	Moody's (Moody's investment grade)
SP-1+	MIG-1
SP-1	-
SP-2	MIG-2
SP-3	MIG-3

Commercial Paper Ratings

An Issuer's ability to honor its' short term obligations

S&P	Moody's (Prime)
A1	P1
A2	P2
A3	P3

Addendum B

Investment Policy

CERTIFICATION

I, hereby certify that I have received a copy of the Investment Policy of the Great Lakes Water Authority "GLWA". I have read and fully understand the State of Michigan Public Act 20 of Public Acts of 1943, as amended. I have personally read the Investment Policy, and agree to have all personnel involved with investing GLWA proceeds to comply with the terms of the Investment Policy, and Public Act 20, regarding the investment of GLWA funds. Any investment not conforming to GLWA Investment Policy will be disclosed promptly. We also pledge to exercise due diligence in informing GLWA in writing of all foreseeable risks associated with financial transactions conducted with the Great Lakes Water Authority.

Sign Name: _____
Print Name: _____
Title: _____
Institution: _____
Address: _____
City/State/Zip: _____
Date: _____

INVESTMENT POLICY – GREAT LAKES AUTHORITY
BOARD APPROVAL DATE: October 22, 2015
(See Attachment Page – Great Lakes Water Authority Investment Policy)
(See Attachment Public Act 20 of 1943")

Addendum C
Glossary of Terms

Average Life

An estimate of the number of terms to maturity, taking the possibility of early payments into account. Average life is calculated using the weighted average time to the receipt of all future cash flows.

Agency Bond

A bond issued by a government sponsored enterprise (GSE) or agency. These bonds are not fully guaranteed in the same way as U.S. Treasury and municipal bonds. Examples include Fannie Mae, (FNMA) Federal National Mortgage Association; Freddie Mac (FHLMC) Federal Home Loan Mortgage Corporation, Sallie Mae Student Loan Marketing Association; Ginnie Mae (GNMA) Government National Mortgage Association.

Asked

The price at which securities are offered.

Banker's Acceptance (BA)

A draft or bill or exchange accepted by a bank or trust company. The accepting institution guarantees payment of the bill, as well as the issuer. Acceptances are traded at a discount from face value on the secondary market. Banker's acceptances are very similar to T-bills and are often used in money market funds.

Benchmark

A comparative base for measuring the performance of risk tolerance of the investment portfolio. A benchmark should represent a close correlation to the level of risk and the average duration of the portfolio's investments.

Bid

The price offered by a buyer of securities. (When you are selling securities, you ask for a bid.)

Bond

A debt investment in which an investor loans money to an entity (corporate or governmental) that borrows the funds for a defined period of time at a fixed interest rate. Bonds are used by companies, municipalities, states and U.S. and foreign governments to finance a variety of projects and activities.

Broker

A Broker brings buyers and sellers together for a commission.

Certificate of Deposit
A time deposit with a specific maturity evidenced by a Certificate. Large denomination CDs are typically negotiable.

Collateral
Securities, evidence of deposit or other property, which a borrower pledges to secure repayment of a loan. Also refers to securities pledged by a bank to secure deposits.

Collective Investment Fund
A fund that is operated by a trust company or a bank and handles a pooled group of trust accounts. Collective investment funds combine the assets of various individuals and organizations to create a larger, well-diversified portfolio.

Commercial Paper
An unsecured, short-term debt instrument issued by a corporation, typically for the financing of accounts receivable, inventories and meeting short-term liabilities. Maturities on commercial paper rarely range any longer than 270 days. The debt is usually issued at a discount, reflecting prevailing market interest rates.

Commercial paper is not usually backed by any form of collateral, so only firms with high-quality debt ratings will easily find buyers without having to offer a substantial discount (higher cost) for the debt issue.

A major benefit of commercial paper is that it does not need to be registered with the Securities and Exchange Commission (SEC) as long as it matures before nine months (270 days), making it a very cost effective means of financing. The proceeds from this type of financing can only be used on current assets (inventories) and are not allowed to be used on fixed assets, such as a new plant, without SEC involvement.

Coupon
The annual rate of interest that a bond's issuer promises to pay the bondholder on the bond's face value. Also a certificate attached to a bond evidencing interest due on a payment.

Dealer
A dealer, as opposed to a broker, acts as a principal in all transactions, buying and selling for their own account.

Discount
The difference between the cost price of a security and its maturity when quoted at lower than face value. A security selling below original offering price shortly after sale also is considered to be at a discount.

Discount securities
Non-interest bearing money market instruments that are issued at a discount and redeemed at maturity for full face value, e.g. US Treasury Bills.

Diversification
Dividing investment funds among a variety of securities offering independent returns.

Delivery versus Payment – DVP
A securities industry procedure in which the buyer's payment for securities is due at the time of delivery. Security delivery and payment are simultaneous. Also known as delivery against payment, delivery against cash, or from the sell side.

Federal Deposit Insurance Corporation (FDIC)
A federal agency that insure bank deposits, currently up to $250,000 per deposit account. (If a depositor wants an FDIC insured account, the desired bank must be a participant in the FDIC program. Banks that are participants of the FDIC are required to display an official sign at each teller window or station where deposits are regularly received. The maximum dollar amount that is insured in a qualified account is $250,000 per bank. In other words, it is possible for a depositor to deposit $1 million in four different banks and each account will be fully insured.) (The different accounts that can be FDIC insured are NOW, checking, savings, Certificate of Deposits (CD) and money market deposit accounts.)

Federal Funds Rate
The rate of interest at which Fed Funds are traded. The Federal Reserve through open-market operations currently pegs this rate.

Federal Open Market Committee
The branch of the Federal Reserve Board that determines the direction of monetary policy. The FOMC is composed of the board of governors, which has seven members, and five reserve bank presidents. The president of the Federal Reserve Bank of New York serves continuously, while the presidents of the other reserve banks rotate their service of one-year terms.

Federal Reserve System
The central bank of the United States created by Congress and consisting of a seven member Board of Governors in Washington, D.C., twelve regional banks in major cities around the country.

Financial Institution
A state of nationally chartered bank or a state or federally chartered savings and loan association, savings bank, or credit union whose deposits are insured by an agency of the United State government that maintains a principal office or branch office located in this state under the laws of this state of the United States.

Commented [A1]: Add definition for Financial Institution

Government-Sponsored Enterprise - GSE

Privately held corporations with public purposes created by the U.S. Congress to reduce the cost of capital for certain borrowing sectors of the economy. Members of these sectors include students, farmers and homeowners. GSEs carry the implicit backing of the U.S. Government, but they are not direct obligations of the U.S. Government. For this reason, these securities will offer a yield premium over Treasuries. Examples of GSEs include: Federal Home Loan Bank, Federal Home Loan Mortgage Corporation (Freddie Mac), Federal Farm Credit Bank and the Resolution Funding Corporation.

Investment Grade

A rating that indicates that a municipal or corporate bond has a relatively low risk of default. Bond rating firms, such as Moody's, use different designations consisting of upper- and lower- case letters 'A' and 'B' to identify a bond's credit quality rating. 'AAA' and 'AA' (high credit quality) and 'A' and 'BBB' (medium credit quality) are considered investment grade. Credit ratings for bonds below these designations ('BB', 'B', 'CCC', etc.) are considered low credit quality, and are commonly referred to as "junk bonds".

Liquidity

1. The degree to which an asset or security can be bought or sold in the market without affecting the asset's price. Liquidity is characterized by a high level of trading activity. Assets that can be easily bought or sold are known as liquid assets. 2.) The ability to convert an asset to cash quickly, also known as, "marketability".

Market Value

The price at which a security is trading and could presumably be purchased or sold.

Master Trust

A collection of funds from individual investors that are pooled together in order to obtain wholesale prices and rates unavailable for regular investors.

Master Repurchase Agreement

A written contract covering all future transactions between the parties to a repurchase – reverse repurchase agreements that establishes each party's rights in the transactions. A master agreement will often specify, among other things, the right of the buyer-lender to liquidate the underlying securities in the event of default by the seller-borrower.

Maturity

The date upon which the principal or stated value of an investment becomes due and payable.

Money Market
A segment of the financial market in which financial instruments with high liquidity and very short maturities are traded. The money market is used by participants as a means for borrowing and lending in the short term, from several days to just under a year. Money market securities consist of negotiable certificates of deposit (CDs), bankers' acceptances, U.S. Treasury bills, commercial paper, municipal notes, federal funds and repurchase agreements (repos).

Municipal Bond
A debt security issued by a state, municipality or county to finance its capital expenditures. Municipal bonds are exempt from federal taxes and from most state and local taxes, especially if you live in the state in which the bond is issued. At times taxable municipal bonds are issued to finance a project or activity that does not provide a major benefit to the public. In such cases, the federal government will not permit the tax-exemption that is a prominent feature of most municipal bonds.

Mutual Fund
An investment vehicle that is made up of a pool of funds collected from many investors for the purpose of investing in securities such as, bonds, money market instruments and similar assets. Mutual funds are operated by money managers, who invest the fund's capital and attempt to produce capital gains and income for the fund's investors. A mutual fund's portfolio is structured and maintained to match the investment objectives stated in its prospectus.

Each shareholder participates proportionally in the gain or loss of the fund. Mutual fund units, or shares, are issued and can typically be purchased or redeemed as needed at the fund's current net asset value (NAV) per share.

Offer
The price asked by a seller of securities. (When you are buying securities, you ask for an offer.)

Open Market Operations
Purchases and sales of government and certain other securities in the open market by the New York Federal Reserve Bank, as directed by the FOMC in order to influence the volume of money and credit in the economy. Purchases inject reserves into the bank system and stimulate growth of money and credit; sales have the opposite effect. Open market operations are the Federal Reserve's most important and most flexible monetary policy tool.

Portfolio
Collection of securities held by an investor.

Rate of return
The gain or loss on an investment over a specified period, expressed as a percentage increase over the initial investment cost. Gains on investments are considered to be any income received from the security plus realized capital gains.

Repurchase Agreement - Repo
A form of short-term borrowing for dealers in government securities. The dealer sells the government securities to investors, usually on an overnight basis, and buys them back the following day. For the party selling the security (and agreeing to repurchase it in the future) it is a repo; for the party on the other end of the transaction, (buying the security and agreeing to sell in the future) it is a reverse repurchase agreement.

Securities & Exchange Commission (SEC)
An agency created by Congress to protect investors in securities transactions by administering securities legislation.

SEC Rule 15C3-1
Requirement that member firms as well as nonmember broker-dealers in securities maintain a maximum ratio of indebtedness to liquid capital of 15 to 1; also called the net capital ratio.

Structured Notes
Notes issued by Government Sponsored Enterprises (FHLB, FNMA, SLMA, etc.) and corporations, which have imbedded options (e.g. call features, step-up coupons, floating rate coupons, derivative-based returns) into their debt structure.

Total Return
When measuring performance, the actual rate of return of an investment or a pool of investments over a given evaluation period. Total return includes interest, capital gains, dividends and distributions realized over a given period of time.

Total return accounts for two categories of return: income and capital appreciation.
Income includes interest paid by fixed-income investments, distributions or dividends.
Capital appreciation represents the change in the market price of an asset.

Treasury Bills
A non-interest bearing deposit security issued by the U.S. Treasury to finance national debt. Most bills are issued to mature in three months, six months or one-year.

Treasury Bonds
Long-term coupon bearing U.S. Treasury securities issued as direct obligations of the U.S. Government and having final maturities of more than ten years.

Treasury Notes
Medium-term coupon bearing U.S. Treasury securities issued as direct obligations of the U.S. Government and having initial maturities from two to ten years.

Yield

The rate of annual income return on an investment, expressed as a percentage. 1.) Income yield is obtained by dividing the current dollar income by the current market price for the security. 2.) Net yield or Yield to Maturity is the current income yield minus any premium above par plus any discount from par in purchase price, with the adjustment spread over the period from the date of purchase to the date of maturity of the bond.

GLWA
Great Lakes Water Authority

Financial Services Group
Audit Committee Communication

Date: September 9, 2016

To: Great Lakes Water Authority Audit Committee

From: Deirdre Henry, Treasury Manager

Re: Proposed List of Qualified Financial Institutions

Background: One of the ways that a public entity manages risk is to actively monitor and evaluate each financial institution and broker/dealer for credit worthiness with whom it may conduct business for managing public funds. This approach is in alignment with the Great Lakes Water Authority Investment Policy (the "Policy") and Michigan Public Act 20, "Investment of Surplus Funds of Political Subdivisions" (the "Act"). In accordance with that Policy, the Treasury Manager shall maintain a listing of "Qualified Institutions" that encompasses financial institutions and broker/dealers authorized to provide investment services as well as depository accounts. The final Qualified Institutions list is subject to approval by the Great Lakes Water Authority (GLWA) board.

Analysis: A list of financial institutions that currently provide service to GLWA was developed and then expanded to include financial institutions we may consider for future relationships. A review of these entities was conducted following the evaluation procedures defined in the GLWA Investment Policy. Before GLWA conducts business with a Qualified Institution, the firm must provide a signed certification that will be maintained on file for each financial institution or broker/dealer that provides services to GLWA.

<u>For Broker/Dealers, the following documents were reviewed:</u>

- Audited financial statements
- Financial Industry Regulatory Authority (FINRA) registration
- Registration with the Michigan Department of Licensing and Regulatory Affairs (LARA)
- Federal Deposit Insurance Corporation (FDIC) insurance coverage
- Bank ratings service provider reports

<u>For Financial Institutions, the following documents were reviewed:</u>

- Audited financial statements
- Registration with the Michigan Department of Licensing and Regulatory Affairs (LARA)

- FDIC insurance coverage
- Bank ratings service provider reports

For the Local Government Investment Pools:

- Information Statement which explains the investment objectives of the investment pool
- Audited financial statements for investment pool
- Audited financial statements for investment advisor
- Credit rating

PFM Asset Management LLC (PFM), the Investment Advisor for GLWA, has also provided a list of their approved broker/dealers. This list has been evaluated for credit worthiness by PFM. Reliance on the investment advisor's analysis of qualified institutions is provided for in the GLWA investment policy.

Based upon the above analysis, the proposed GLWA qualified list of financial institutions is attached. For reference, a list of PFM's qualified broker/dealer list is also attached.

Proposed Action: The Audit Committee recommends that the Great Lakes Water Authority Board approve the proposed List of Qualified Financial Institutions as presented.

Great Lakes Water Authority

Proposed List of Qualified Institutions

Presented to the Audit Committee on September 9, 2016

Financial Institutions

Bank of America
Comerica
Fifth Third Bank
First Independence Bank
Flagstar Bank
Huntington Bank
J.P. Morgan Chase
Morgan Stanley
PNC Bank
US Bank
Wells Fargo

Broker / Dealers

Bank of America Securities Corporation
Comerica Securities Corporation
Fifth Third Securities
J.P. Morgan Securities
Morgan Stanley
PNC Securities Corporation
U.S. Bancorp Investments
Wells Fargo Securities

Local Government Investment Pools

Michigan Liquid Asset Fund Plus
Michigan Class

PFM Asset Management LLC

Approved Broker/Dealer List

First Quarter 2016

* Barclays Capital Inc.
BB&T Capital Markets
† Blaylock Robert Van LLC
* BMO Capital Markets Corp
* BNP Paribas Securities Corp.
BNY Capital Markets LLC
BOSC, Inc.
† Cabrera Capital Markets LLC
* Cantor Fitzgerald & Co.
† CastleOak Securities
* Citigroup Global Markets Inc.
† C.L. King & Associates, Inc.
Commerz Markets LLC
Credit Agricole Securities (USA), Inc.
* Credit Suisse Securities (USA) LLC
* Daiwa Capital Markets America Inc.
* Deutsche Bank Securities Inc.
† Drexel Hamilton LLC
Fifth Third Securities, Inc.
FTN Financial
* Goldman, Sachs & Co.
* HSBC Securities (USA) Inc.
INTL FCStone Partners L.P.
Incapital LLC
* Jefferies & Company, Inc.
* J.P. Morgan Securities LLC
Keybanc Capital Markets
† Loop Capital Markets LLC
MarketAxess Corporation
* Merrill Lynch, Pierce, Fenner & Smith Inc.
Mesirow Financial, Inc.
Mitsubishi UFJ Securities (USA), Inc.
* Mizuho Securities (USA), Inc.
* Morgan Stanley & Co. LLC
† Muriel Siebert & Co., Inc.
* Nomura Securities International, Inc.
PNC Capital Markets LLC
* RBC Capital Markets LLC
* RBS Securities Inc.
Scotia Capital (USA), Inc.
† Siebert Brandford Shank & Co. LLC
* SG Americas Securities LLC
Southwest Securities Inc.
Stifel, Nicolaus & Company, Incorporated
SunTrust Robinson Humphrey, Inc.
Susquehanna Financial Group, LP
* TD Securities (USA) LLC
Tradition Asiel Securities, Inc.
† The Williams Capital Group, LP
* UBS Securities LLC
U.S. Bancorp Investments, Inc.
Vining Sparks IBG, L.P.
* Wells Fargo Securities LLC
Zions Direct, Inc.

* *Primary Government Securities Dealer*
† *Minority or woman owned business enterprise*

Note: <u>Direct issuers</u> of CP and CDs are considered to be approved counterparties if approved as an issuer.

<u>Important Disclosures</u>
This list is current as of the effective date only and is subject to change without notice. This list is for informational purposes only, and may not be relied upon for any other purpose. The list does not imply counterparty approval for deriviatives of any type. This information is confidential and may not be distributed without prior written consent of PFM Asset Management LLC.

GLWA
Great Lakes Water Authority

Financial Services Group
Audit Committee Communication

Date: September 9, 2016

To: Great Lakes Water Authority Audit Committee

From: Jon Wheatley, Public Finance Manager

Re: Monthly Revenue & Collections Report for August 2016

The *Monthly Revenue & Collections Report includes the following.*

1. FY 2017 Wholesale Sewer Revenue Report - Variance Analysis
2. FY 2017 Retail and Wholesale Water Revenue Report - Variance Analysis
3. City of Highland Park Billings and Collections
4. City of Flint Billings and Collections
5. Water & Sewer System Wholesale Accounts Receivable Aging Report

Note: Wholesale customer revenues are billed by the Great Lakes Water Authority (GLWA). Pursuant to the terms of the lease agreement between the City of Detroit and the Great Lakes Water Authority, the Detroit Water & Sewerage Department (DWSD) serves as GLWA's agent for billing activities for the City of Detroit retail customer class. All revenues collected by both GLWA and DWSD are deposited in a trust account in accordance with the GLWA Master Bond Ordinance.

1. FY 2017 Retail/Wholesale Sewer Revenue Report - Variance Analysis

The table below summarizes the unaudited FY 2017 billed revenues and do not reflect collections of those revenues. It should also be noted that the revenues are shown in the month that the billed flow was accrued and not the following month when the bills are usually sent out to customers.

GLWA Wholesale Customer Billings: Table 1 presents the billed revenues for the wholesale customer class for FY 2017 through July 2016. As a result of the sewer rate simplification which was designed to create a more stable revenue stream, the wholesale sewer customers are billed a fixed monthly fee. The results of this effort can be seen as ***the billed revenue is at 100.0% of budget***.

DWSD Retail Billings: These numbers are provided by DWSD staff, however the actual usage and revenue numbers were not available at the time of this report.

Table 1 - FY 2017 Sewer Revenue Report - Variance Analysis

WHOLESALE SEWER CUSTOMERS

	FY 2017 - Goal		FY 2017 - Actual		Variance	
Month	Volume* Mcf	Revenue $	Volume* Mcf	Revenue $	Volume* Mcf	Revenue $
July	N/A	22,206,400	N/A	22,206,400	N/A	0
August	N/A	22,206,400	N/A	22,206,400	N/A	0
September	N/A	22,206,400	N/A	22,206,400	N/A	0
October	N/A	22,206,400	N/A	22,206,400	N/A	0
November	N/A	22,206,400	N/A	22,206,400	N/A	0
December	N/A	22,206,400	N/A	22,206,400	N/A	0
January	N/A	22,206,400	N/A	22,206,400	N/A	0
February	N/A	22,206,400	N/A	22,206,400	N/A	0
March	N/A	22,206,400	N/A	22,206,400	N/A	0
April	N/A	22,206,400	N/A	22,206,400	N/A	0
May	N/A	22,206,400	N/A	22,206,400	N/A	0
June	N/A	22,206,400	N/A	22,206,400	N/A	0
Total		266,476,800		266,476,800		0
Subtotals ytd		*22,206,400*		*22,206,400*		*0*
Achievement of Goal				*100.0%*		

* Monthly sewer billings are based on the Sewer Shares which are assigned to each customer in accordance with the Sewer Rate Simplification Process which was effective July 1, 2014.

2. FY 2017 Retail/Wholesale Water Revenue Report - Variance Analysis

Background: Table 2 summarizes the unaudited FY 2017 wholesale customer water revenues billed by GLWA and the retail water revenues billed by DWSD. Please note these are billed revenues and do not reflect collections of those revenues. It should also be noted that the revenues are shown in the month that the billed flow was accrued and not the following month when the bills are usually sent out.

Wholesale Customer Billings: The table includes the billed volume and revenues for the wholesales customer class for FY 2017 period through July 2016. As can be seen from the table, ***the billed volume is at 128.5% of budget and billed revenue at 116.7% of budget***.

DWSD Retail Billings: These numbers are provided by DWSD staff, however the actual usage and revenue numbers were not available at the time of this report. We will have July 2016 numbers for the October Audit Committee report.

Table 2 - FY 2017 Water Revenue Report - Variance Analysis- REVISED

WHOLESALE WATER CUSTOMERS

	FY 2017 - Goal			FY 2017 - Actual			Variance	
Month	Volume Mcf	Revenue $	Unit Revenue $/Mcf	Volume Mcf	Revenue $	Unit Revenue $/Mcf	Volume Mcf	Revenue $
July	1,460,300	28,995,300	19.86	1,876,004	33,829,577	18.03	415,704	4,834,277
August	1,446,500	28,870,800	19.96	0	0			
September	1,305,800	27,601,300	21.14	0	0			
October	1,095,200	25,701,100	23.47	0	0			
November	947,400	24,367,500	25.72	0	0			
December	1,021,500	25,036,100	24.51	0	0			
January	1,063,000	25,410,600	23.90	0	0			
February	966,200	24,537,200	25.40	0	0			
March	1,072,900	25,499,900	23.77	0	0			
April	990,800	24,759,100	24.99	0	0			
May	1,115,500	25,884,300	23.20	0	0			
June	1,421,500	28,645,300	20.15	0	0			
Total	13,906,600	315,308,500	22.67	1,876,004	33,829,577	18.03	415,704	4,834,277
Subtotals ytd	*1,460,300*	*28,995,300*	*19.86*	*1,876,004*	*33,829,577*	*18.03*	*415,704*	*4,834,277*
Achievement of Goal				*128.5%*	*116.7%*			

3. City of Highland Park Billings and Collections

As of August 31, 2016, Highland Park had a delinquent balance of over $31.3 million, including over $26.06 million for wastewater treatment services, approximately $1.46 million for industrial waste control services, and over $3.80 million for water supply services. Table 3 provides a summary of the billing and collection history for Highland Park from June 30, 2012 to August 31, 2016 is on the table below. **One payment for $951,684.94 was received during the month of August for sewer services.**

Table 3 - City of Highland Park Billings and Collections

	Water	Sewer	IWC
June 30, 2012 Balance	$ -	$ 10,207,956	$ 852,987
FY 2013 Billings	485,887	4,987,635	154,444
FY 2013 Payments	(65,652)	(2,206,211)	-
June 30, 2013 Balance	$ 420,235	$ 12,989,380	$ 1,007,431
FY 2014 Billings	1,004,357	6,980,442	161,951
FY 2014 Payments	-	(1,612,633)	-
June 30, 2014 Balance	$ 1,424,592	$ 18,357,189	$ 1,169,382
FY 2015 Billings	1,008,032	5,553,123	165,739
FY 2015 Payments	-	(1,444,623)	-
June 30, 2015 Balance	$ 2,432,625	$ 22,465,689	$ 1,335,120
FY 2016 Billings	1,157,178	5,612,167	106,431
FY 2016 Payments	-	(2,022,335)	-
June 30, 2016 Balance	$ 3,589,803	$ 26,055,521	$ 1,441,551
FY 2017 Billings (2 Months)	211,136	953,000	17,066
FY 2017 Payments (2 Months)	-	(951,685)	-
Balance as of August 31, 2016	**$ 3,800,939**	**$ 26,056,836**	**$ 1,458,617**

Note: Water billing began in January 2013.

4. City of Flint Billings and Collections

On July 11, 2016, the City of Flint signed a Letter of Agreement with GLWA to extend water services until June 30, 2017. Per this agreement, two transfers are to be deposited into a prepayment fund. The first transfer of $5.9 million, net of a carryover prepayment of $501,964.92, was received on July 13, 2016 and the second deposit of $6.3 million is scheduled for October 16, 2016. Table 4 shows the balance of the prepayment fund through August 31, 2016.

Table 4 - City of Flint Billings and Collections

Invoice Month	Usage	Commodity Charge	Fixed Charge	Total Invoice	Prepayment Fund Balance
					$10,000,000.00
November	26,875.0 *	$8.93	$341,729.00	$581,722.75	$9,418,277.25
December	47,576.9	$8.93	$662,100.00	$1,086,961.72	$8,331,315.53
January	48,067.4	$8.93	$662,100.00	$1,091,341.88	$7,239,973.65
February	52,606.4	$8.93	$662,100.00	$1,131,875.15	$6,108,098.50
March	51,787.4	$8.93	$662,100.00	$1,124,561.84	$4,983,536.66
April	51,490.5	$8.93	$662,100.00	$1,121,910.52	$3,861,626.14
May	48,496.8	$8.93	$662,100.00	$1,095,176.07	$2,766,450.07
June	51,410.7	$8.93	$662,100.00	$1,121,197.82	$1,645,252.25
July	53,884.4	$8.93	$662,100.00	$1,143,287.33	$6,401,964.92 *
August	56,368.7	$8.93	$662,100.00	$1,165,472.22	$5,236,492.70
Total				$9,498,035.08	

* Includes July 13, 2016 deposit to Prepayment Fund of $5,900,000 and carryover amount from initial 2015 deposit of $501,964.92

5. Water & Sewer System Wholesale Accounts Receivable Aging Report

Table 5 is a summary of the total, current and non-current receivables by category as of August 31, 2016. Table 6 is the same summary without the past due balances for the City of Highland Park. The detailed accounts receivable aging is attached to this report. This report reflects the wholesale receivables only and do not include DWSD. (Note: percentages vary from 100% due to rounding.)

Table 5 - Wholesale Accounts Receivable Aging Report

	Total	Current	46-74 Days	75-104 Days	>105 Days
Water	$ 43,467,063.68	$ 39,877,210.27	$ 96,271.65	$ 91,863.45	$ 3,401,718.31
Sewer	$ 47,216,873.10	$ 21,644,937.20	$ 468,100.00	$ 468,100.00	$ 24,635,735.90
IWC	$ 2,346,546.06	$ 868,433.62	$ 42,564.50	$ -	$ 1,435,547.94
Pollutant Surcharge	$ 674,417.04	$368,187.10	$118,784.17	$2,776.53	$184,669.24
Total	$ 93,704,899.88	$ 62,758,768.19	$ 725,720.32	$ 562,739.98	$ 29,657,671.39
	100%	67%	1%	1%	32%

Table 6 - Wholesale Accounts Receivable Aging Report, net of Highland Park

	Total	Current	46-74 Days	75-104 Days	>105 Days
Water	$ 39,666,123.96	$ 39,666,073.96	$ 50.00	$ -	$ -
Sewer	$ 21,160,037.20	$ 21,160,037.20	$ -	$ -	$ -
IWC	$ 887,929.02	$ 859,785.52	$ 25,729.00	$ -	$ 2,414.50
Pollutant Surcharge	$ 674,417.04	$ 368,187.10	$ 118,784.17	$ 2,776.53	$ 184,669.24
Total	$ 62,388,507.22	$ 62,054,083.78	$ 144,563.17	$ 2,776.53	$ 187,083.74
	100%	99%	0%	0%	0%

Proposed Action: Receive and file.

GLWA Aged Accounts Receivable- Water Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
ALLEN PARK	$435,809.67	$435,759.67	$50.00	$0.00	$0.00
ASH TOWNSHIP	$69,115.01	$69,115.01	$0.00	$0.00	$0.00
BELLEVILLE	$26,532.59	$26,532.59	$0.00	$0.00	$0.00
BERLIN TOWNSHIP	$69,200.07	$69,200.07	$0.00	$0.00	$0.00
BROWNSTOWN TOWNSHIP	$375,287.95	$375,287.95	$0.00	$0.00	$0.00
BRUCE TOWNSHIP	$5,045.21	$5,045.21	$0.00	$0.00	$0.00
BURTCHVILLE TOWNSHIP	$30,301.19	$30,301.19	$0.00	$0.00	$0.00
CANTON TOWNSHIP	$1,549,743.84	$1,549,743.84	$0.00	$0.00	$0.00
CENTER LINE	$77,291.92	$77,291.92	$0.00	$0.00	$0.00
CHESTERFIELD TOWNSHIP	$386,308.33	$386,308.33	$0.00	$0.00	$0.00
CLINTON TOWNSHIP	$1,552,403.08	$1,552,403.08	$0.00	$0.00	$0.00
COMMERCE TOWNSHIP	$625,329.28	$625,329.28	$0.00	$0.00	$0.00
DEARBORN	$1,764,787.08	$1,764,787.08	$0.00	$0.00	$0.00
DEARBORN HEIGHTS	$353,822.96	$353,822.96	$0.00	$0.00	$0.00
EASTPOINTE	$274,578.22	$274,578.22	$0.00	$0.00	$0.00
ECORSE	$114,139.49	$114,139.49	$0.00	$0.00	$0.00
FARMINGTON	$96,179.00	$96,179.00	$0.00	$0.00	$0.00
FARMINGTON HILLS	$967,286.11	$967,286.11	$0.00	$0.00	$0.00
FERNDALE	$88,403.46	$88,403.46	$0.00	$0.00	$0.00
FLAT ROCK	$113,222.27	$113,222.27	$0.00	$0.00	$0.00
FLINT	$(5,236,492.70)	$(5,236,492.70)	$0.00	$0.00	$0.00
FRASER	$126,353.54	$126,353.54	$0.00	$0.00	$0.00
GARDEN CITY	$278,619.23	$278,619.23	$0.00	$0.00	$0.00

GLWA Aged Accounts Receivable- Water Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
GENESEE COUNTY DRAIN COMM	$1,821,189.91	$1,821,189.91	$0.00	$0.00	$0.00
GIBRALTAR	$42,681.31	$42,681.31	$0.00	$0.00	$0.00
GREATER LAPEER CUA	$236,000.83	$236,000.83	$0.00	$0.00	$0.00
GREENWOOD TOWNSHIP	$60,457.81	$60,457.81	$0.00	$0.00	$0.00
GROSSE ILE TOWNSHIP	$122,758.21	$122,758.21	$0.00	$0.00	$0.00
GROSSE POINTE PARK	$154,215.14	$154,215.14	$0.00	$0.00	$0.00
GROSSE POINTE SHORES	$80,814.83	$80,814.83	$0.00	$0.00	$0.00
GROSSE POINTE WOODS	$121,090.10	$121,090.10	$0.00	$0.00	$0.00
HAMTRAMCK	$59,851.37	$59,851.37	$0.00	$0.00	$0.00
HARPER WOODS	$154,611.04	$154,611.04	$0.00	$0.00	$0.00
HARRISON TWP	$141,966.62	$141,966.62	$0.00	$0.00	$0.00
HAZEL PARK	$57,246.31	$57,246.31	$0.00	$0.00	$0.00
HIGHLAND PARK	$3,800,939.72	$211,136.31	$96,221.65	$91,863.45	$3,401,718.31
HURON TOWNSHIP	$144,073.57	$144,073.57	$0.00	$0.00	$0.00
IMLAY CITY	$122,036.81	$122,036.81	$0.00	$0.00	$0.00
IMLAY TOWNSHIP	$271.05	$271.05	$0.00	$0.00	$0.00
INKSTER	$146,283.23	$146,283.23	$0.00	$0.00	$0.00
KEEGO HARBOR	$29,852.48	$29,852.48	$0.00	$0.00	$0.00
LAPEER	$121,619.90	$121,619.90	$0.00	$0.00	$0.00
LENOX TOWNSHIP	$46,023.75	$46,023.75	$0.00	$0.00	$0.00
LINCOLN PARK	$197,033.55	$197,033.55	$0.00	$0.00	$0.00
LIVONIA	$1,472,443.59	$1,472,443.59	$0.00	$0.00	$0.00

GLWA Aged Accounts Receivable- Water Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
MACOMB TWP	$1,333,327.43	$1,333,327.43	$0.00	$0.00	$0.00
MADISON HEIGHTS	$175,037.59	$175,037.59	$0.00	$0.00	$0.00
MAYFIELD TOWNSHIP	$4,941.51	$4,941.51	$0.00	$0.00	$0.00
MELVINDALE	$111,122.98	$111,122.98	$0.00	$0.00	$0.00
NEW HAVEN	$65,538.43	$65,538.43	$0.00	$0.00	$0.00
NOCWA	$4,743,091.73	$4,743,091.73	$0.00	$0.00	$0.00
NORTHVILLE	$78,276.63	$78,276.63	$0.00	$0.00	$0.00
NORTHVILLE TOWNSHIP	$1,516,541.34	$1,516,541.34	$0.00	$0.00	$0.00
NOVI	$2,254,955.82	$2,254,955.82	$0.00	$0.00	$0.00
OAK PARK	$113,600.15	$113,600.15	$0.00	$0.00	$0.00
OAKLAND CO DR COM	$6,452.75	$6,452.75	$0.00	$0.00	$0.00
PLYMOUTH	$101,668.47	$101,668.47	$0.00	$0.00	$0.00
PLYMOUTH TOWNSHIP	$475,562.42	$475,562.42	$0.00	$0.00	$0.00
REDFORD TOWNSHIP	$333,838.33	$333,838.33	$0.00	$0.00	$0.00
RIVER ROUGE	$55,475.20	$55,475.20	$0.00	$0.00	$0.00
RIVERVIEW	$77,668.86	$77,668.86	$0.00	$0.00	$0.00
ROCKWOOD	$27,744.64	$27,744.64	$0.00	$0.00	$0.00
ROMEO	$25,200.68	$25,200.68	$0.00	$0.00	$0.00
ROMULUS	$361,886.46	$361,886.46	$0.00	$0.00	$0.00
ROSEVILLE	$226,794.59	$226,794.59	$0.00	$0.00	$0.00
ROYAL OAK TOWNSHIP	$20,960.30	$20,960.30	$0.00	$0.00	$0.00
SHELBY TOWNSHIP	$1,577,322.34	$1,577,322.34	$0.00	$0.00	$0.00
SOCWA	$4,685,138.69	$4,685,138.69	$0.00	$0.00	$0.00

GLWA Aged Accounts Receivable- Water Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
SOUTH ROCKWOOD	$9,475.51	$9,475.51	$0.00	$0.00	$0.00
SOUTHGATE	$207,681.64	$207,681.64	$0.00	$0.00	$0.00
ST. CLAIR SHORES	$239,182.47	$239,182.47	$0.00	$0.00	$0.00
STERLING HEIGHTS	$1,685,858.64	$1,685,858.64	$0.00	$0.00	$0.00
SUMPTER TOWNSHIP	$59,233.74	$59,233.74	$0.00	$0.00	$0.00
SYLVAN LAKE	$45,337.33	$45,337.33	$0.00	$0.00	$0.00
TAYLOR	$447,798.10	$447,798.10	$0.00	$0.00	$0.00
TRENTON	$202,611.29	$202,611.29	$0.00	$0.00	$0.00
TROY (SEOC)	$1,621,524.11	$1,621,524.11	$0.00	$0.00	$0.00
UTICA	$62,782.74	$62,782.74	$0.00	$0.00	$0.00
VAN BUREN TOWNSHIP	$500,547.63	$500,547.63	$0.00	$0.00	$0.00
VILLAGE OF ALMONT	$20,428.11	$20,428.11	$0.00	$0.00	$0.00
WALLED LAKE	$86,780.83	$86,780.83	$0.00	$0.00	$0.00
WARREN	$874,036.93	$874,036.93	$0.00	$0.00	$0.00
WASHINGTON TOWNSHIP	$395,599.16	$395,599.16	$0.00	$0.00	$0.00
WAYNE	$240,713.18	$240,713.18	$0.00	$0.00	$0.00
WEST BLOOMFIELD TWP (C-O)	$2,125,699.85	$2,125,699.85	$0.00	$0.00	$0.00
WESTLAND	$576,029.44	$576,029.44	$0.00	$0.00	$0.00
WIXOM	$286,911.46	$286,911.46	$0.00	$0.00	$0.00
WOODHAVEN	$112,643.89	$112,643.89	$0.00	$0.00	$0.00
YCUA	$2,017,312.36	$2,017,312.36	$0.00	$0.00	$0.00

GLWA Aged Accounts Receivable- Water Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
TOTAL Water Accounts	$43,467,063.68	$39,877,210.27	$96,271.65	$91,863.45	$3,401,718.31

GLWA Aged Accounts Receivable- Sewer Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
ALLEN PARK	$56,000.00	$56,000.00	$0.00	$0.00	$0.00
CENTER LINE	$44,537.20	$44,537.20	$0.00	$0.00	$0.00
DEARBORN	$1,633,600.00	$1,633,600.00	$0.00	$0.00	$0.00
DEARBORN EAST	$0.00	$0.00	$0.00	$0.00	$0.00
DEARBORN N.E.	$0.00	$0.00	$0.00	$0.00	$0.00
EVERGREEN-FARMINGTON	$2,681,600.00	$2,681,600.00	$0.00	$0.00	$0.00
FARMINGTON	$0.00	$0.00	$0.00	$0.00	$0.00
GROSSE POINTE	$0.00	$0.00	$0.00	$0.00	$0.00
GROSSE POINTE FARMS	$0.00	$0.00	$0.00	$0.00	$0.00
GROSSE POINTE PARK	$0.00	$0.00	$0.00	$0.00	$0.00
HAMTRAMCK	$340,500.00	$340,500.00	$0.00	$0.00	$0.00
HARPER WOODS	$20,000.00	$20,000.00	$0.00	$0.00	$0.00
HIGHLAND PARK	$26,056,835.90	$484,900.00	$468,100.00	$468,100.00	$24,635,735.90
MELVINDALE	$115,100.00	$115,100.00	$0.00	$0.00	$0.00
OAKLAND COUNTY GWK DD	$3,806,900.00	$3,806,900.00	$0.00	$0.00	$0.00
OMID	$5,802,300.00	$5,802,300.00	$0.00	$0.00	$0.00
REDFORD TOWNSHIP	$21,700.00	$21,700.00	$0.00	$0.00	$0.00
REDFORD TOWNSHIP - AREA #6	$0.00	$0.00	$0.00	$0.00	$0.00
ROUGE VALLEY	$4,623,900.00	$4,623,900.00	$0.00	$0.00	$0.00
WAYNE COUNTY N.E.	$2,010,000.00	$2,010,000.00	$0.00	$0.00	$0.00
WAYNE COUNTY-AREA #3	$3,900.00	$3,900.00	$0.00	$0.00	$0.00
TOTAL Sewer Accounts	**$47,216,873.10**	**$21,644,937.20**	**$468,100.00**	**$468,100.00**	**$24,635,735.90**

GLWA Aged Accounts Receivable- IWC Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
ALLEN PARK	$2,562.43	$2,562.43	$0.00	$0.00	$0.00
AUBURN HILLS (C-O)	$29,356.78	$29,356.78	$0.00	$0.00	$0.00
AUBURN HILLS (E-F)	$567.95	$567.95	$0.00	$0.00	$0.00
BERKLEY	$4,609.21	$4,609.21	$0.00	$0.00	$0.00
BEVERLY HILLS	$1,587.92	$1,587.92	$0.00	$0.00	$0.00
BINGHAM FARMS	$1,785.82	$1,695.07	$90.75	$0.00	$0.00
BIRMINGHAM (E-F)	$5,856.98	$5,856.98	$0.00	$0.00	$0.00
BIRMINGHAM (SEOC)	$18,984.13	$6,427.63	$12,512.50	$0.00	$44.00
BLOOMFIELD HILLS	$2,401.37	$2,401.37	$0.00	$0.00	$0.00
BLOOMFIELD TOWNSHIP	$10,715.19	$10,715.19	$0.00	$0.00	$0.00
CANTON TOWNSHIP	$29,997.26	$29,997.26	$0.00	$0.00	$0.00
CENTER LINE	$5,854.18	$5,854.18	$0.00	$0.00	$0.00
CHESTERFIELD TOWNSHIP	$18,599.74	$18,599.74	$0.00	$0.00	$0.00
CITY OF FARMINGTON (E-F)	$443.60	$443.60	$0.00	$0.00	$0.00
CITY OF ROCHESTER	$5,919.69	$5,919.69	$0.00	$0.00	$0.00
CLARKSTON	$488.89	$488.89	$0.00	$0.00	$0.00
CLAWSON	$4,391.13	$4,391.13	$0.00	$0.00	$0.00
CLINTON TOWNSHIP	$39,503.20	$39,503.20	$0.00	$0.00	$0.00
DEARBORN	$58,056.56	$58,056.56	$0.00	$0.00	$0.00
DEARBORN HEIGHTS	$0.00	$0.00	$0.00	$0.00	$0.00
DETROIT METRO WC AIRPORT	$169.50	$169.50	$0.00	$0.00	$0.00
EASTPOINTE	$10,200.49	$10,200.49	$0.00	$0.00	$0.00
FARMINGTON	$5,243.05	$5,243.05	$0.00	$0.00	$0.00

GLWA Aged Accounts Receivable- IWC Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
FARMINGTON HILLS	$38,056.26	$37,445.76	$610.50	$0.00	$0.00
FERNDALE	$14,154.87	$14,154.87	$0.00	$0.00	$0.00
FRASER	$7,883.66	$7,883.66	$0.00	$0.00	$0.00
GARDEN CITY	$19,012.00	$9,634.50	$9,377.50	$0.00	$0.00
GROSSE POINTE	$0.00	$0.00	$0.00	$0.00	$0.00
GROSSE POINTE FARMS	$4,769.14	$4,769.14	$0.00	$0.00	$0.00
GROSSE POINTE PARK	$1,879.15	$1,879.15	$0.00	$0.00	$0.00
GROSSE POINTE SHORES	$0.00	$0.00	$0.00	$0.00	$0.00
GROSSE POINTE WOODS	$5,057.64	$5,057.64	$0.00	$0.00	$0.00
HAMTRAMCK	$7,069.93	$7,069.93	$0.00	$0.00	$0.00
HARPER WOODS	$2,867.60	$2,867.60	$0.00	$0.00	$0.00
HARRISON TWP	$8,996.88	$4,987.38	$1,639.00	$0.00	$2,370.50
HAZEL PARK	$5,105.44	$5,105.44	$0.00	$0.00	$0.00
HIGHLAND PARK	$1,458,617.04	$8,648.10	$16,835.50	$0.00	$1,433,133.44
HUNTINGTON WOODS	$454.88	$454.88	$0.00	$0.00	$0.00
INDEPENDENCE	$3,910.77	$3,910.77	$0.00	$0.00	$0.00
INKSTER	$8,837.55	$8,837.55	$0.00	$0.00	$0.00
KEEGO HARBOR	$1,090.57	$1,090.57	$0.00	$0.00	$0.00
LAKE ORION	$1,296.85	$1,296.85	$0.00	$0.00	$0.00
LATHRUP	$2,235.33	$2,235.33	$0.00	$0.00	$0.00
LENOX TOWNSHIP	$282.50	$282.50	$0.00	$0.00	$0.00
LIVONIA	$63,176.83	$63,176.83	$0.00	$0.00	$0.00

GLWA Aged Accounts Receivable- IWC Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
MACOMB TWP	$327.83	$327.83	$0.00	$0.00	$0.00
MADISON HEIGHTS	$(1,119.10)	$(1,119.10)	$0.00	$0.00	$0.00
MELVINDALE	$5,890.80	$5,890.80	$0.00	$0.00	$0.00
NEW HAVEN	$635.86	$635.86	$0.00	$0.00	$0.00
NORTHVILLE	$3,119.87	$2,836.62	$283.25	$0.00	$0.00
NORTHVILLE TOWNSHIP	$7,252.25	$7,252.25	$0.00	$0.00	$0.00
NOVI	$26,867.28	$26,867.28	$0.00	$0.00	$0.00
OAK PARK	$10,095.28	$10,095.28	$0.00	$0.00	$0.00
OAKLAND TOWNSHIP	$723.25	$723.25	$0.00	$0.00	$0.00
ORCHARD LAKE VILLAGE	$677.16	$644.16	$33.00	$0.00	$0.00
ORION TOWNSHIP (C-O)	$8,044.39	$8,044.39	$0.00	$0.00	$0.00
OXFORD TOWNSHIP	$1,576.50	$1,576.50	$0.00	$0.00	$0.00
OXFORD VILLAGE	$2,000.70	$2,000.70	$0.00	$0.00	$0.00
PLEASANT RIDGE	$429.48	$429.48	$0.00	$0.00	$0.00
PLYMOUTH	$0.00	$0.00	$0.00	$0.00	$0.00
PLYMOUTH TOWNSHIP	$20,109.60	$20,109.60	$0.00	$0.00	$0.00
REDFORD TOWNSHIP	$19,912.90	$19,602.15	$310.75	$0.00	$0.00
ROCHESTER HILLS	$28,012.77	$28,012.77	$0.00	$0.00	$0.00
ROMULUS	$1,471.85	$1,471.85	$0.00	$0.00	$0.00
ROSEVILLE	$22,804.69	$22,804.69	$0.00	$0.00	$0.00
ROYAL OAK	$22,693.16	$22,354.91	$338.25	$0.00	$0.00
ROYAL OAK TOWNSHIP	$1,539.78	$1,539.78	$0.00	$0.00	$0.00
SHELBY TOWNSHIP	$18,052.34	$18,052.34	$0.00	$0.00	$0.00

GLWA Aged Accounts Receivable- IWC Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
SOUTHFIELD (E-F)	$44,520.65	$44,520.65	$0.00	$0.00	$0.00
SOUTHFIELD (SEOC)	$5,523.55	$5,523.55	$0.00	$0.00	$0.00
ST. CLAIR SHORES	$19,210.73	$19,210.73	$0.00	$0.00	$0.00
STERLING HEIGHTS	$23,372.02	$23,372.02	$0.00	$0.00	$0.00
TROY (E-F)	$610.31	$610.31	$0.00	$0.00	$0.00
TROY (SEOC)	$57,147.75	$57,147.75	$0.00	$0.00	$0.00
UTICA	$3,319.79	$3,319.79	$0.00	$0.00	$0.00
VAN BUREN TOWNSHIP	$1,081.63	$548.13	$533.50	$0.00	$0.00
VILLAGE OF FRANKLIN	$104.53	$104.53	$0.00	$0.00	$0.00
WASHINGTON TOWNSHIP	$2,240.48	$2,240.48	$0.00	$0.00	$0.00
WATERFORD TOWNSHIP	$19,443.82	$19,443.82	$0.00	$0.00	$0.00
WAYNE	$7,975.55	$7,975.55	$0.00	$0.00	$0.00
WEST BLOOMFIELD TWP (C-O)	$1,486.13	$1,486.13	$0.00	$0.00	$0.00
WEST BLOOMFIELD TWP (E-F)	$9,877.47	$9,877.47	$0.00	$0.00	$0.00
WESTLAND	$37,463.05	$37,463.05	$0.00	$0.00	$0.00
TOTAL IWC Accounts	**$2,346,546.06**	**$868,433.62**	**$42,564.50**	**$0.00**	**$1,435,547.94**

GLWA Aged Accounts Receivable- Pollutant Surcharge Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
A & R PACKING	$4,217.75	$4,217.75	$0.00	$0.00	$0.00
AACTRON	$2,219.71	$0.00	$1,088.15	$1,131.56	$0.00
ACME RUSTPROOF	$27.19	$27.19	$0.00	$0.00	$0.00
ADVANCE ENGINEERING COMPANY	$(574.43)	$0.00	$0.00	$0.00	$(574.43)
ADVANCE RESOURCE RECOVERY	$361.06	$361.06	$0.00	$0.00	$0.00
AEVITAS SPECIALITY SERVICES	$20,440.88	$12,863.64	$5,031.32	$2,545.92	$0.00
ALEXANDER & HORNUNG	$4,004.54	$0.00	$4,004.54	$0.00	$0.00
ALEXANDER & HORNUNG	$16,922.95	$0.00	$16,922.95	$0.00	$0.00
ALEXANDER & HORNUNG	$720.48	$0.00	$720.48	$0.00	$0.00
ALGAL SCIENTIFIC CORPORATION	$270.31	$270.31	$0.00	$0.00	$0.00
ALL CHEM CORP	$27.16	$0.00	$0.00	$0.00	$27.16
ALLWASTE CONTAINER SERVICE	$2,070.19	$2,070.19	$0.00	$0.00	$0.00
AMERICAN WASTE TECH INC.	$1,393.97	$0.00	$0.00	$0.00	$1,393.97
BAYS MICHIGAN CORPORATION	$635.36	$635.36	$0.00	$0.00	$0.00
BEIRUT BAKERY, INC.	$128.14	$0.00	$53.13	$0.00	$75.01
BETTER MADE SNACK FOOD	$18,070.21	$18,070.21	$0.00	$0.00	$0.00
BOZEK'S MARKET	$119.44	$119.44	$0.00	$0.00	$0.00
BROADWAY MKT CORNED BEEF	$34.12	$34.12	$0.00	$0.00	$0.00
CAPITAL REPRODUCTIONS	$5.07	$0.00	$2.40	$2.67	$0.00
CF BURGER CREAMERY	$13,556.88	$13,556.88	$0.00	$0.00	$0.00
CHILANGO'S BAKERY	$1,885.87	$0.00	$0.00	$0.00	$1,885.87
CINTAS CORP. - MACOMB TWP.	$47,709.57	$0.00	$47,709.57	$0.00	$0.00
CITY LAUNDRY, INC.	$57.58	$20.92	$10.02	$8.31	$18.33

GLWA Aged Accounts Receivable- Pollutant Surcharge Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
COTSCO WHOLESALE STORE	$6,560.30	$6,560.30	$0.00	$0.00	$0.00
COTSCO WHOLESALE STORE	$541.26	$541.26	$0.00	$0.00	$0.00
COTSCO WHOLESALE STORE	$5,171.99	$5,171.99	$0.00	$0.00	$0.00
COUNTRY FRESH DAIRY CO.	$16,186.32	$16,186.32	$0.00	$0.00	$0.00
DA STUART COMPANY	$1,190.89	$1,190.89	$0.00	$0.00	$0.00
DA STUART COMPANY	$1,160.56	$1,160.56	$0.00	$0.00	$0.00
DA STUART COMPANY	$2,844.49	$2,844.49	$0.00	$0.00	$0.00
DARLING & CO.	$6,080.22	$6,080.22	$0.00	$0.00	$0.00
DETROIT COCO-COLA BOTT	$2,676.14	$2,676.14	$0.00	$0.00	$0.00
DETROIT SAUSAGES CO INC	$83.57	$53.21	$13.80	$8.28	$8.28
DIFCO LABORATORIES	$32,262.28	$32,262.28	$0.00	$0.00	$0.00
DIVERSIFIED CHEM TECH. INC.	$77.78	$77.78	$0.00	$0.00	$0.00
DOMESTIC LINEN SUPPLY	$1,039.59	$1,039.59	$0.00	$0.00	$0.00
DOMESTIC LINEN SUPPLY	$1,567.76	$1,567.76	$0.00	$0.00	$0.00
E.W. GROBBEL'S SONS, INC.	$2,454.14	$2,454.14	$0.00	$0.00	$0.00
ENVIROSOLIDS, L.L.C.	$36,783.48	$0.00	$36,783.48	$0.00	$0.00
EQ DETROIT, INC.	$7,850.35	$7,850.35	$0.00	$0.00	$0.00
EQ DETROIT, INC.	$4,636.21	$4,636.21	$0.00	$0.00	$0.00
EQ DETROIT, INC.	$(3,849.81)	$0.00	$0.00	$(3,849.81)	$0.00
EQ DETROIT, INC.	$0.42	$0.42	$0.00	$0.00	$0.00
EQ DETROIT, INC.	$1,417.24	$1,417.24	$0.00	$0.00	$0.00
FAYGO BEVERAGES, INC.	$25,296.96	$25,296.96	$0.00	$0.00	$0.00

GLWA Aged Accounts Receivable- Pollutant Surcharge Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
FITZGERALD PLATING	$71.95	$71.95	$0.00	$0.00	$0.00
FORD NEW MODEL PROGRAM	$186.66	$186.66	$0.00	$0.00	$0.00
FRESH-PAK	$6,023.68	$6,023.68	$0.00	$0.00	$0.00
FRESH-PAK	$561.03	$561.03	$0.00	$0.00	$0.00
GENERAL LINEN SUPPLY CO.	$7,525.53	$7,055.66	$469.87	$0.00	$0.00
GLOBAL TITANIUM, INC.	$604.31	$604.31	$0.00	$0.00	$0.00
GLOBAL TITANIUM, INC.	$208.00	$208.00	$0.00	$0.00	$0.00
HACIENDA MEXICAN FOODS	$4,115.00	$1,699.01	$1,068.25	$949.87	$397.87
HENKEL CORPORATION	$289.09	$0.00	$180.82	$108.27	$0.00
HOME STYLE	$2,251.45	$2,251.45	$0.00	$0.00	$0.00
HOOD CLEANERS	$40.42	$19.38	$10.52	$10.52	$0.00
ISLAMIC SLAUGHTERHOUSE	$2,098.96	$856.77	$1,242.19	$0.00	$0.00
ITALIAN BUTTER BREAD STICKS	$8.04	$8.04	$0.00	$0.00	$0.00
J & G FOOD PRODUCTS, INC.	$177.24	$113.75	$63.49	$0.00	$0.00
KAR NUT PRODUCTS	$4,455.85	$0.00	$2,915.14	$1,540.71	$0.00
KOWALSKI SAUSAGES, CO.	$3,654.19	$3,654.19	$0.00	$0.00	$0.00
KVF TROY CORPORATION	$(6,749.52)	$0.00	$0.00	$0.00	$(6,749.52)
LA JALISCIENSE, INC.	$34.85	$34.85	$0.00	$0.00	$0.00
LA MICHICOANA TORTILLA	$1,219.68	$1,219.68	$0.00	$0.00	$0.00
LA MICHOACANA FLOUR TORTILLA	$65.03	$65.03	$0.00	$0.00	$0.00
MACDERMID WESTERN	$756.31	$756.31	$0.00	$0.00	$0.00
MCNICHOLS POLISHING & ANODIZ	$60.50	$0.00	$32.03	$0.00	$28.47
METROPOLITAN BAKERY	$439.12	$439.12	$0.00	$0.00	$0.00

GLWA Aged Accounts Receivable- Pollutant Surcharge Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
MICHIGAN DAIRY	$50,225.65	$50,225.65	$0.00	$0.00	$0.00
MILANO BAKERY	$5,209.92	$5,209.92	$0.00	$0.00	$0.00
MILTON CHILI CO.	$(17.51)	$0.00	$(17.51)	$0.00	$0.00
MINNIE MARIE BAKERS, INC	$1,790.76	$1,790.76	$0.00	$0.00	$0.00
MISTER UNIFORM & MAT RENTALS	$78.10	$49.04	$29.06	$0.00	$0.00
NATIONAL CHILI COMPANY	$361.12	$361.12	$0.00	$0.00	$0.00
NATIONAL CHILI COMPANY	$90.28	$90.28	$0.00	$0.00	$0.00
NORTHERN LAKES SEAFOOD	$69.42	$69.42	$0.00	$0.00	$0.00
NUCOTE, INC.	$93.30	$93.30	$0.00	$0.00	$0.00
OAKWOOD BAKERY	$335.38	$335.38	$0.00	$0.00	$0.00
PELLERITO FOODS INC.	$(160.32)	$(160.32)	$0.00	$0.00	$0.00
PEPSI COLA, INC.	$36,274.27	$36,274.27	$0.00	$0.00	$0.00
PETRO ENVIRON TECH, INC.	$185,454.35	$0.00	$0.00	$0.00	$185,454.35
PLATING SPEC	$229.55	$0.00	$114.33	$115.22	$0.00
RAY'S ICE CREAM CO.	$79.23	$0.00	$79.23	$0.00	$0.00
RED SPOT PAINT #409139	$(23.97)	$0.00	$0.00	$0.00	$(23.97)
RTT	$2,727.85	$0.00	$0.00	$0.00	$2,727.85
SEAFARE FOODS, INC.	$102.06	$102.06	$0.00	$0.00	$0.00
SPRAYTEK, INC.	$(163.33)	$(163.33)	$0.00	$0.00	$0.00
SWEETHEART BAKERY, INC.	$345.86	$127.18	$104.40	$114.28	$0.00
U-METCO, INC.	$1,262.69	$1,262.69	$0.00	$0.00	$0.00
UNCLE RAYS SNACKS, LLC	$31,292.88	$31,292.88	$0.00	$0.00	$0.00

GLWA Aged Accounts Receivable- Pollutant Surcharge Accounts

Balances as of 8/31/2016

Customer Name	Total Due	Current	46 - 74 Days	75 - 104 Days	>105 Days
UNCLE RAYS SNACKS, LLC	$1,218.09	$1,218.09	$0.00	$0.00	$0.00
UNIQUE LINEN SERVICES, INC.	$392.37	$149.13	$152.51	$90.73	$0.00
UNITED FISH DISTRIBUTORS	$17.03	$17.03	$0.00	$0.00	$0.00
UNITED MEAT & DELI	$509.03	$509.03	$0.00	$0.00	$0.00
US ECOLOGY MICHIGAN	$9,135.13	$9,135.13	$0.00	$0.00	$0.00
USHER OIL SERVICES	$12,506.10	$12,506.10	$0.00	$0.00	$0.00
VERN DALE PRODUCTS, INC.	$(3,172.24)	$(3,172.24)	$0.00	$0.00	$0.00
VERNE DALE PRODUCTS	$11,731.30	$11,731.30	$0.00	$0.00	$0.00
VERNOR FOOD PRODUCTS	$39.70	$39.70	$0.00	$0.00	$0.00
WIGLEY'S MEAT PROCESS	$579.94	$579.94	$0.00	$0.00	$0.00
WINTER SAUSAGE	$992.45	$992.45	$0.00	$0.00	$0.00
WINTER SAUSAGE	$193.38	$193.38	$0.00	$0.00	$0.00
WOLVERINE PACKING CO	$6,970.31	$6,970.31	$0.00	$0.00	$0.00
WOLVERINE PACKING CO.	$3,213.40	$3,213.40	$0.00	$0.00	$0.00
TOTAL Pollutant Surcharge Accounts	**$674,417.04**	**$368,187.10**	**$118,784.17**	**$2,776.53**	**$184,669.24**

GLWA
Great Lakes Water Authority

Financial Services Group
Audit Committee Communication

Date: September 9, 2016

To: Great Lakes Water Authority Audit Committee

From: Deirdre Henry, Treasury Manager

Re: Banking and Investment Update – Operating Funds

Background: On March 4, 2016, PFM Asset Management LLC (PFM) presented an overall strategy for investing debt service funds and operating funds to the Audit Committee. The goal is to match short term and long term cash flow requirements while maximizing the return. By April 2016, PFM had begun to actively invest the debt service funds. We are now ready to execute strategies to invest operating funds.

Analysis: The attached report is an update on the banking and investment strategy for the operating funds prepared by PFM. Staff has conducted additional due diligence on the proposed Local Government Investment Pool options and is in concurrence with this investment strategy.

Proposed Action: Receive and file report.

Great Lakes Water Authority

Banking and Investment Update
Operating Funds

September 9, 2016

PFM Asset Management LLC
305 E. Eisenhower Parkway, Suite 112
Ann Arbor, MI 48108
(734) 794-2520
www.pfm.com

GLWA Investment Steps – Operating Funds

Step 1 - Completed

JP Morgan Earnings Credit Rate (ECR) and Interest Rate Negotiation

- ECR 35 bps
- Interest 25 bps

Step 2

Utlization of Money Market Funds for Short-term needs

- Fee Reduction
- Interest +50 bps
- Reduce credit exposure
- Invest in AAAm fund

Step 3

Investment of Operating / Construction funds based on Cash Flows

- Diversified portfolio matched to cash flow needs
- Higher return for investing longer

Utilized a methodical approach to enhance earnings, diversify holdings and match investments to cash flow needs.

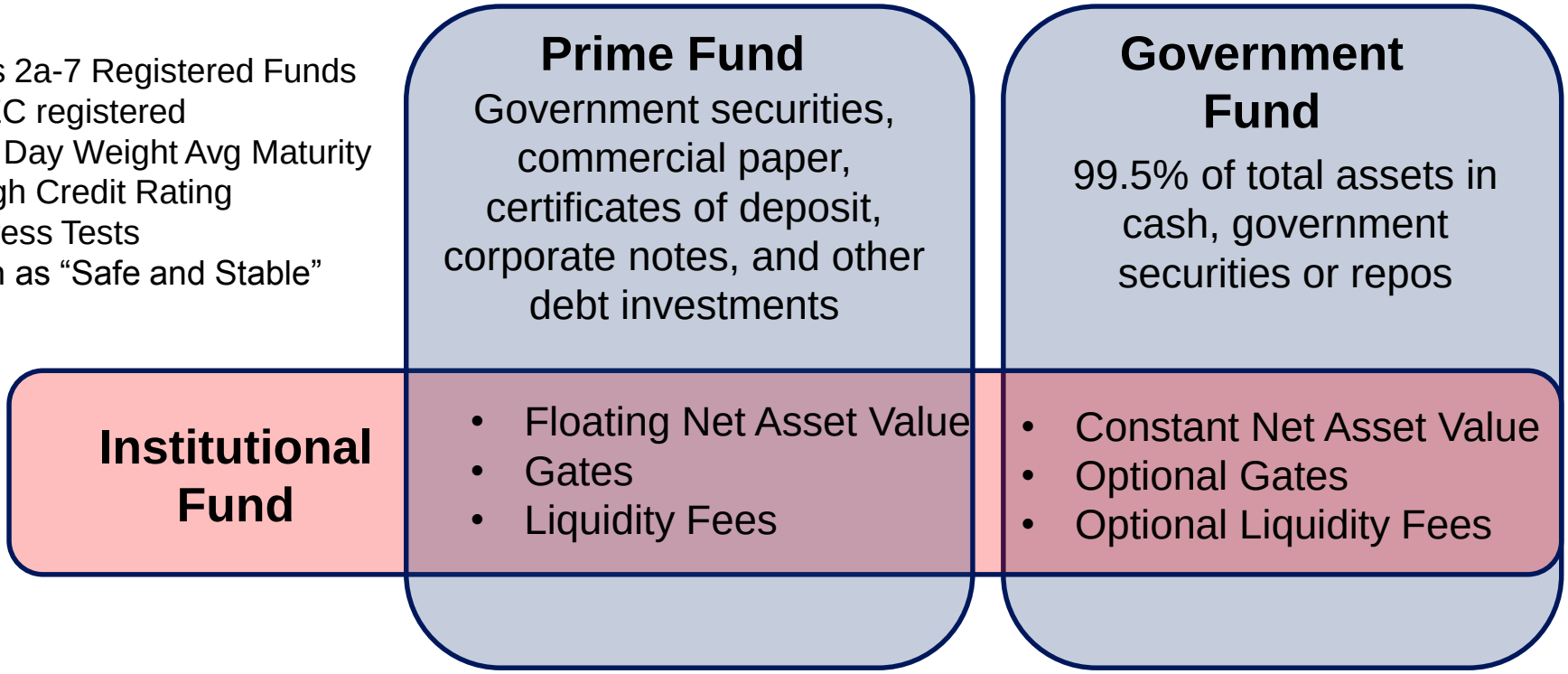
Money Market Reform: Impact on Short-term Rates

Money Market Reform – New Classifications

Initiated in 2010 Dodd Frank Act - Effective October 14, 2016

Effects 2a-7 Registered Funds
- SEC registered
- 60 Day Weight Avg Maturity
- High Credit Rating
- Stress Tests

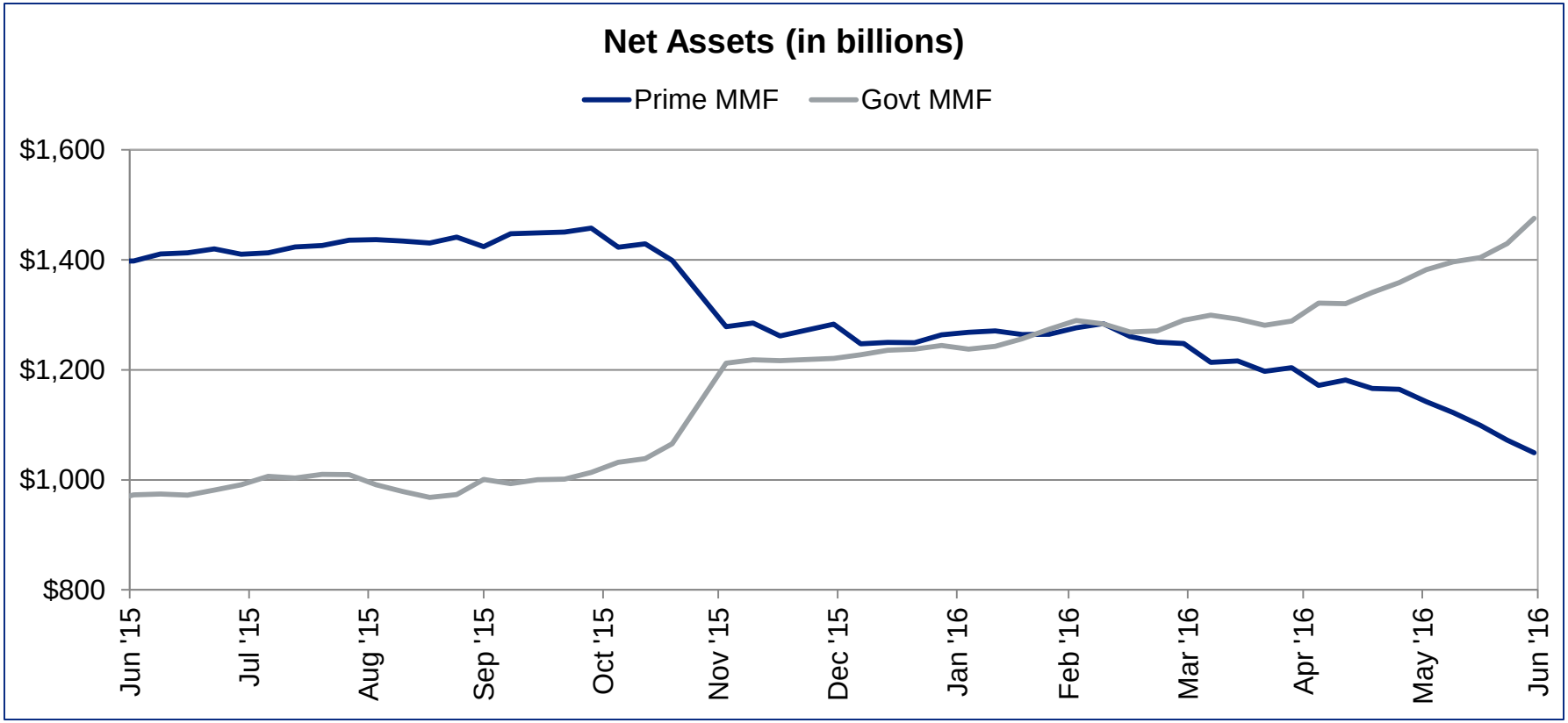
Known as “Safe and Stable”



Note: The Reform impacts Prime Funds by requiring a Floating Net Asset Value (similar to a mutual fund).
-Constant Net Asset Value assumes a dollar in = dollar out.
-Gates temporary measure to suspend redemptions during financially stressful times.
-Liquidity fees – to access your cash during stressful times a fee may be assessed in order to pay for that liquidity

2a-7 Reform Driving Asset Flows

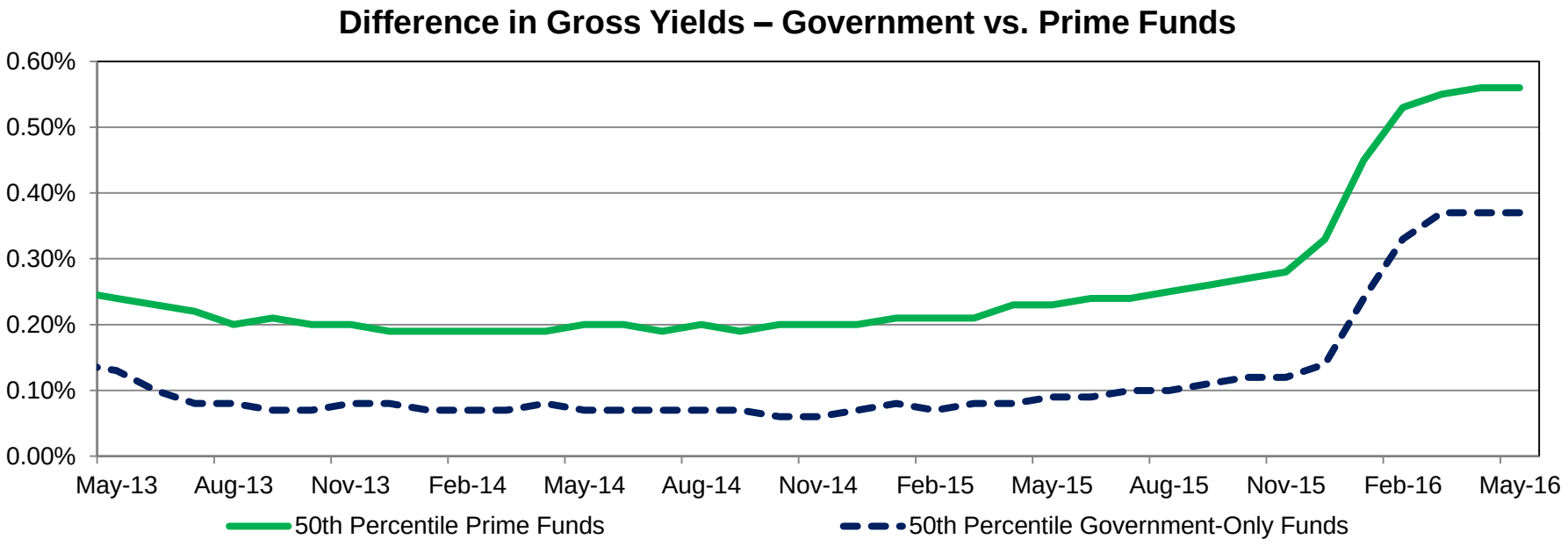
- Reform measures set to begin on 10/14/16 will reshape money market industry
- Funds continue to flow from Prime Money Market Funds (MMF's) to Government MMFs ahead of reform
- Flows thus far driven by fund conversions, voluntary investor movement likely forthcoming
- Significant supply/demand implications for front-end investors



Source: Bloomberg, as of 06/30/16.

Government Funds vs. Prime Funds

- A comparison between historic gross yields on iMoneyNet's 50th Percentile Government Institutional and Prime Institutional funds is depicted in the graph below
  - The average difference between the iMoneyNet 50th Percentile Government and Prime funds over the prior 3-year period ending May 31, 2016 is 14 basis points (0.14%)
  - The spread between Prime and Government funds could widen to 35 bps post-reform



Source: As measured by the average of the gross rate advantage of the 50th percentile of the iMoneyNet Fund Rankings for Prime Funds over the 50th percentile of the iMoneyNet Fund Rankings for Government Funds for the five years ended May 31, 2016. The iMoneyNet Prime Institutional Average includes 258 highly rated Prime funds, and the iMoneyNet Government Institutional Average includes 321 highly rated Government funds.

Short-Term Markets Bifurcate

Source: Bloomberg. PFMAM. Information on CD/CP averages are estimates based on independently compiled data, and are for general information purposes only.
CD = Certificate of Deposit CP = Commercial Paper

Money Market Reform - Implications

- Governmental investors unlikely to invest in Prime money market funds
  - Floating Net Asset Value, gates and liquidity fees not acceptable
- Greater demand for short-term government obligations
  - Higher prices, lower yields for government instruments
- Lower demand for Commercial Paper drives inverse relationship
- Expected result:
  - Wider spread between Government and Prime Funds
  - Local Government Investment Pool's (LGIP) provide significant advantages (stable Net Asset Value / Yield)

Liquidity Vehicle Options Considered

P.A. 20 Allowable Investments

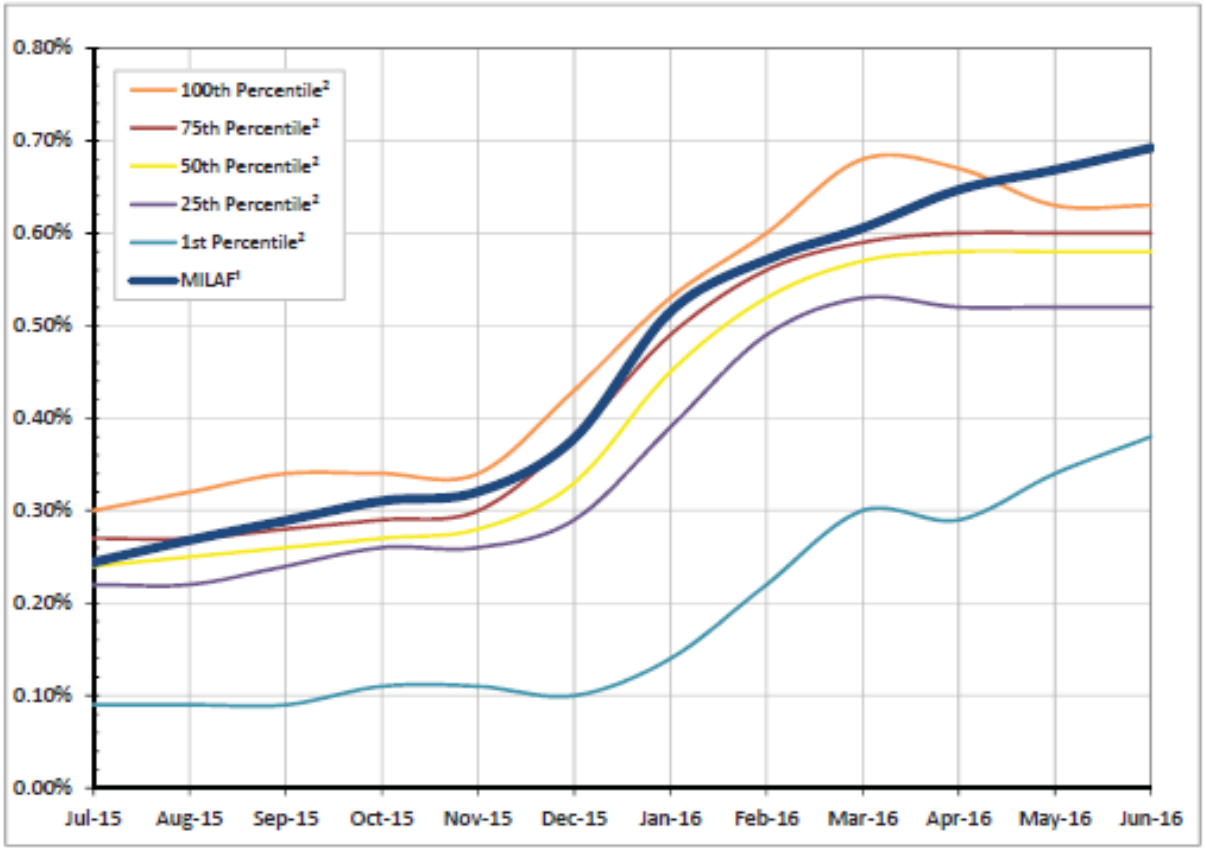
Sector	Maximum Maturity	Minimum Credit
U.S. Treasuries	No Limit	N/A
Federal Agencies	No Limit	N/A
Obligations of the State of Michigan	No Limit	Rated investment grade by at least one rating service
Commercial Paper	270 days	(A-1, A-2 / P-1, P-2) Rated in the two highest classifications by not less than two standard rating services
Certificates of Deposit (including CDAR's)	No Limit	N/A
Repurchase Agreements*	No Limit	N/A
Bankers' Acceptances	No Limit	N/A
Mutual Funds**	No Limit	N/A
Investment Pools**	No Limit	N/A

** Agreements must be collateralized with bonds, securities, and other obligations of the United States or an agency or instrumentality of the United States.*

*** Mutual funds and investment pools must be composed entirely of investment vehicles that are legal for direct investment by a public corporation.*

Local Government Investment Pool vs. Institutional Money Fund Index (Gross Yield)

MILAF+ Portfolio[1] vs. iMoneyNet Institutional Money Fund Index[2] (Gross)
July 2015 to June 2016



Note: Each line represents a different quartile of money market performance

[1] 30-day SEC gross yields as of the last day of each month.
[2] Benchmark Source: iMoneyNet U.S. Prime Institutional Average Money Market Funds; benchmark yields are as of the last business day of each month.

Gross Returns for Average Institutional Money Market Funds

- MILAF+ is a proxy for Local Government Investment Pools (LGIP)
- Money Market Reform is creating separation between LGIP's and 2a-7 funds
- As implementation date approaches, greater separation is anticipated

Conclusions

Summary Observations

- Money market funds have historically delivered stable value and safety
- Money market reform is changing the investment landscape
- P.A. 20 Available Liquidity Options include:
  - Bank money market accounts
  - 2a-7 Government Stable Value money market funds
  - 2a-7 Prime Floating Value money market funds
  - Local Government Investment Pools
  - Bank Trust investment pools

Conclusion:

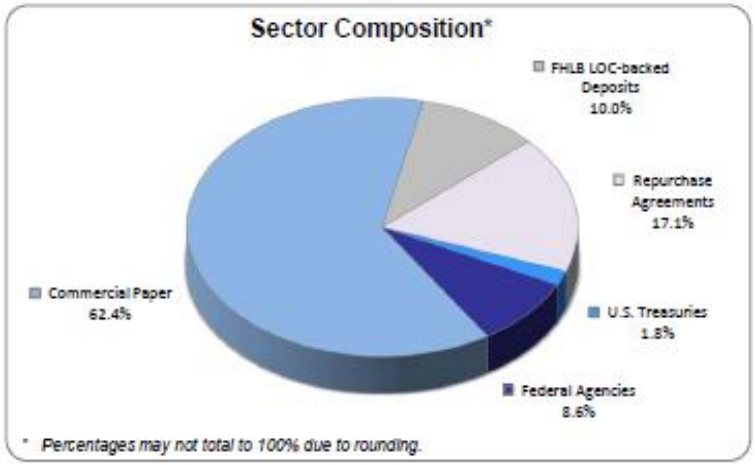
Based upon the primary goal of safety and stability and considering current market conditions, it our recommendation to utilize Local Government Investment Pools (LGIP) as the most advantageous liquidity vehicle

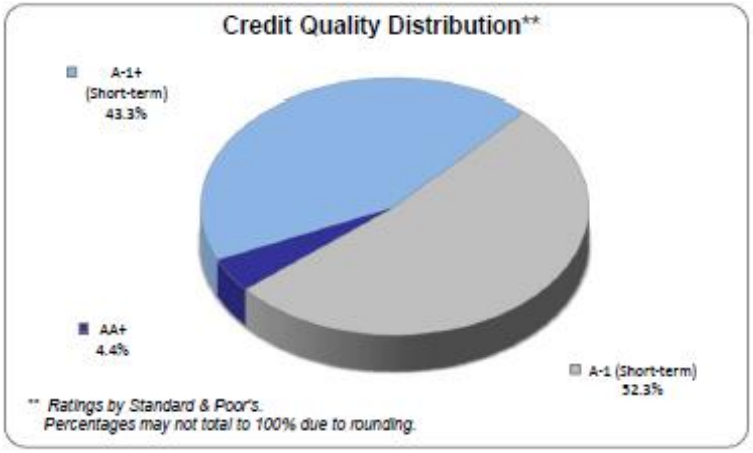
LGIP's deliver: Stable Value, highest yields, immediate liquidity

Local Government Investment Pool Options

Michigan Liquid Asset Fund Plus – July 31, 2016

Pool Statistics *	GovMIC Class
Credit Rating	AAAm ***
Disclosures	Information Statement
Asset Size	$1,494,493,578
10% of Pool	$149,449,358
Valuation	Stable Value
7 Day Yield	.52%
Services offered	4 Fund Classes, Full Treasury Management through Fifth Third Bank
Advisor Statistics **	
Investment Advisor	PFM Asset Management, LLC
Years in Business / MI	1984 / 1987
Assets Under Management	$107 billion

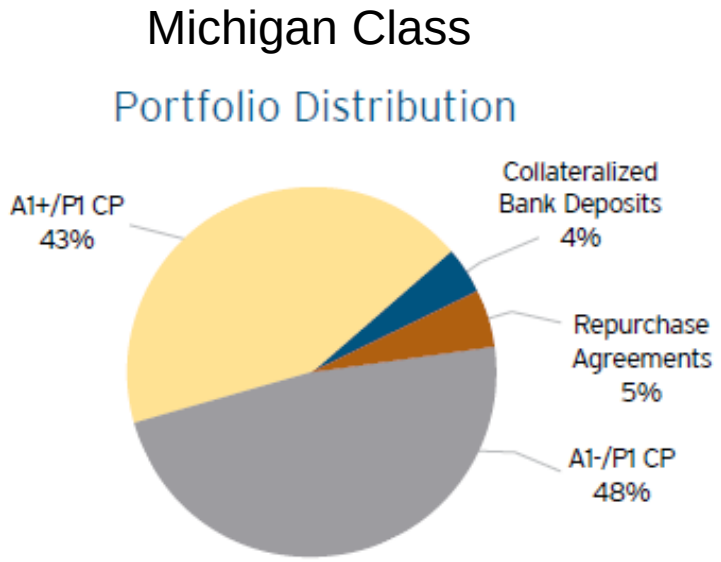




Note: * Pool Characteristics taken from MILAF+ pool website as of July 31, 2016
** Advisor information taken from respective Form ADV information published at FINRA.org
*** Standard & Poor Rating - A fund rated 'AAAm' demonstrates extremely strong capacity to maintain principal stability and to limit exposure to principal losses due to credit risk. 'AAAm' is the highest principal stability fund rating assigned by S&P Global Ratings

Michigan Class – July 31, 2016

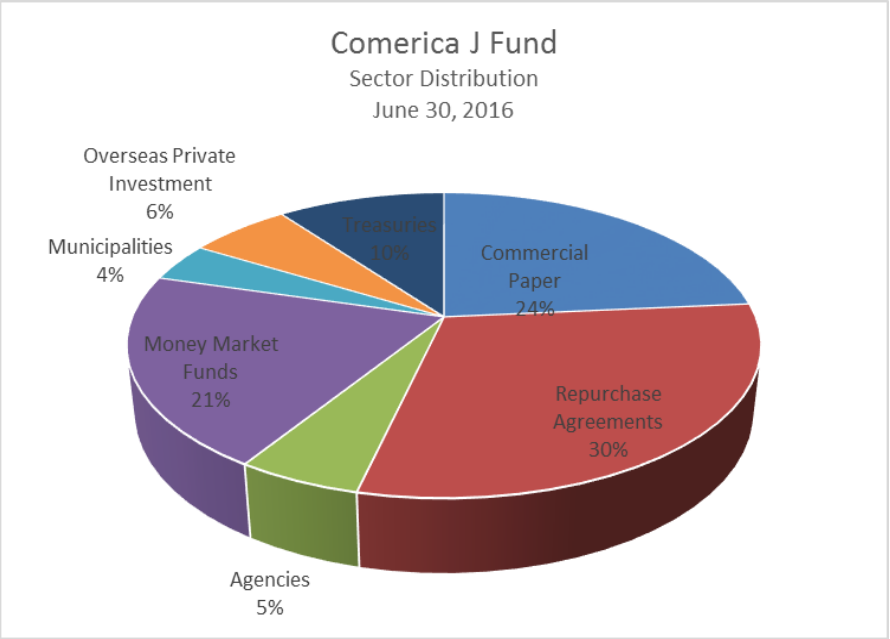
Pool Statistics *	MI Class
Credit Rating	AAAm ***
Asset Size	$536,625,241
Disclosures	Information Statement
10% of Pool	$53,662,524
Valuation	Floating Value
7 Day Yield	.60%
Services offered	2 Fund Classes – Class and Term
**Advisor Statistics ** **	
Investment Advisor	Public Trust Advisors, LLC
Years in Business / MI	2011 / 2014
Assets Under Management	$16 billion



Note: * Pool Characteristics taken from MichiganClass pool website as of July 31, 2016
** Advisor information taken from respective Form ADV information published at FINRA.org
*** Standard & Poor Rating - A fund rated 'AAAm' demonstrates extremely strong capacity to maintain principal stability and to limit exposure to principal losses due to credit risk. 'AAAm' is the highest principal stability fund rating assigned by S&P Global Ratings

Comerica J Fund – Trust Pool – June 30, 2016

Pool Statistics *	Comerica J Fund
Credit Rating	Not Rated
Disclosures	None
Asset Size	$365,357,090
10% of Pool	$36,535,709
Valuation	Stable
7 Day Yield	.366%
Services offered	Money Market
**Advisor Statistics ** **	
Investment Advisor	Comerica Trust
Years in Business / MI	Unknown
Assets Under Management	Unknown



Note: * Pool Characteristics provided by Comerica Bank. Chart developed based on Comerica holdings report – June 30, 2016
** The pool is invested through the Comerica Trust Department and does not provide a website not Information statement.
*** The pool is not rated.

Recommendations and Earnings Potential

Recommendations

1. Set target liquidity balances for JP Morgan Chase Accounts
   - Estimate balance to offset charges to be $13mm
   - Excess balances can earn .25% in interest

2. Set maximum investment for local government investment pools
   - PFMAM limits single member to maximum 20% of pool total
   - Recommend maximum 10% of pool total

3. Develop cash flows for individual funds to identify opportunities to invest longer and earn higher returns through separate account management.

4. Set up regular review of money market characteristics to determine maximum balances by pool and review credit metrics.

JPM vs. Money Market Earnings Comparison

CURRENT STRUCTURE			
Account Name	Current Location	July-16 Avg Investable Bal.	Monthly JPM Interest Earnings
Water Bond Fund	JPM	46,913,403	9,947
Health & Welfare	JPM	438,420	93
Sewer Bond Fund	JPM	145,053,632	13,794
Payroll Account	JPM	275,823	58
Sewer O&M	JPM	46,138,457	9,783
General Accounts Payable	JPM	3,399,386	721
Water O&M	JPM	21,999,967	4,665
Totals		264,219,089	39,061
	Annual Projected Net Earnings		461,172

PROPOSED STRUCTURE				
Account Name	Proposed Location	JPM Liquidity	Proposed Money Market	Monthly Estimated Earnings
Water Bond Fund	GovMIC	5,000,000	41,913,403	18,460
Health & Welfare	GovMIC	-	438,420	193
Sewer Bond Fund	GovMIC	5,000,000	140,053,632	61,685
Payroll Account	JPM	275,823	0	58
Sewer O&M	MI CLASS	5,000,000	41,138,457	20,906
General Accounts Payable	JPM	3,399,386	-	720
Water O&M	MI CLASS	9,499,967	12,500,000	6,352
Totals		28,175,176	236,043,913	108,375
		Annual Projected Net Earnings		1,279,527
			Difference	818,355

Note:

1) All account and fee information based upon July 2016 JP Morgan Chase Analysis statement
2) JP Morgan ECR rate is .35% and interest rate of .25% on balances not needed to cover fees
3) MILAF+/ GovMIC 7 day yield of .52% as of August 26, 2016
4) MI CLASS 7 day yield of .60% as of August 26, 2016
5) JPM Liquidity is based upon short-term needs provided by Deirdre Henry
6) Proposed Money Market structure considers 10% maximum limitation on Local Government Investment Pool

Annual Projected Advantage

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GLWA
Great Lakes Water Authority

Financial Services Group
Audit Committee Communication

Date: September 9, 2016

To: Great Lakes Water Authority Audit Committee

From: Deirdre Henry, Treasury Manager

Re: Monthly Transfers Related to DWSD Pursuant to Lease and Master Bond Ordinance

Background: The attached report summarizes the monthly cash transfers related to the Detroit Water & Sewerage Department (DWSD) for the period January 1, 2016 – September 1, 2016.

Type of Transfer:	**Funded by:**	**Location:**
Local System operations & maintenance expense	Retail Collections	Outside of Trust
DWSD's allocable share of the operations & maintenance portion of the closed City of Detroit General Retirement System (GRS) pension liability	Retail Collections	Outside of Trust; in an account designated for GRS pension payment
Lease Payment	Retail and Wholesale Collections	Stays within Trust; may be withdrawn by DWSD for the purpose of paying the costs of improvements, enlargements, or extensions
DWSD Budget Stabilization Fund	Retail Collections	Stays within Trust; may be applied by GLWA to address shortfalls in revenues collected by DWSD

Proposed Action: Receive and file report.

Great Lakes Water Authority
Cash Transferred to DWSD
Through September 1, 2016

	Water			Sewer			Total	Notes
FY 2016	Operations & Maintenance	Pension	Lease Payment (I&E Fund)	Operations & Maintenance	Pension	Lease Payment (I&E Fund)		
January 2016	$ 3,740,800	$ 2,486,700	$ 11,767,600	$ 2,824,900	$ 1,669,300	$ 4,380,000	$ 26,869,300	Lease and pension are for 7 months (Jul - Jan)
February 2016	3,740,800	355,200	1,681,100	2,824,900	238,500	625,700	9,466,200	Regular monthly transfer
February 2016	3,740,800			2,824,900			6,565,700	Extra one month of O&M per Lease 4.4(a)(ii)
March 2016	3,740,800	355,200	1,681,100	2,824,900	238,500	625,700	9,466,200	Regular monthly transfer
April 2016	3,740,800	355,200	1,681,100	2,824,900	238,500	625,700	9,466,200	Regular monthly transfer
May 2016	3,740,800	355,200	1,681,100	2,824,900	238,500	625,700	9,466,200	Regular monthly transfer
June 2016	3,740,800	355,200	1,681,100	2,824,900	238,500	625,700	9,466,200	Regular monthly transfer
Total FY 2016	***$ 26,185,600***	***$ 4,262,700***	***$ 20,173,100***	***$ 19,774,300***	***$ 2,861,800***	***$ 7,508,500***	***$ 80,766,000***	
FY 2017								
July 2016	$ 2,799,700	$ 355,200	$ 1,875,000	$ 3,461,300	$ 238,500	$ 2,291,700	$ 11,021,400	Regular monthly transfer
August 2016	2,799,700	355,200	1,875,000	3,461,300	238,500	2,291,700	11,021,400	Regular monthly transfer
September 2016	2,799,700	355,200	1,875,000	3,461,300	238,500	2,291,700	11,021,400	Regular monthly transfer
Total FY 2017	***$ 8,399,100***	***$ 1,065,600***	***$ 5,625,000***	***$ 10,383,900***	***$ 715,500***	***$ 6,875,100***	***$ 33,064,200***	
Total Cumulative Transfers	***$ 34,584,700***	***$ 5,328,300***	***$ 25,798,100***	***$ 30,158,200***	***$ 3,577,300***	***$ 14,383,600***	***$ 113,830,200***	

Note: Per Section 3.5 of the Lease, the Lease Payment may be used for: (a) bond principal and interest for Local System Improvements, (b) bond principal and interest for the City's share of common-to-all System Improvements, and © Local System improvements paid from the lease payment deposited to the Improvement & Extension (I&E) Fund. The lease payment in FY 2016 is net of debt service allocation established by City during its rate setting for FY 2016.

Great Lakes Water Authority
Budget Stabilization Fund Transfer History
Through September 1, 2016

FY 2016	**Water**	**Sewer**	**Total**	**Notes**
January 2016	$ 1,357,400	$ 3,261,700	$ 4,619,100	7 months (Jul - Jan)
February 2016	193,900	466,000	659,900	Regular monthly transfer
March 2016	193,900	466,000	659,900	Regular monthly transfer
April 2016	193,900	466,000	659,900	Regular monthly transfer
May 2016	193,900	466,000	659,900	Regular monthly transfer
June 2016	193,900	466,000	659,900	Regular monthly transfer
Total FY 2016	***$ 2,326,900***	***$ 5,591,700***	***$ 7,918,600***	
FY 2017				
July 2016	$ 30,000	$ 221,200	$ 251,200	Regular monthly transfer
August 2016	30,000	221,200	251,200	Regular monthly transfer
September 2016	30,000	221,200	251,200	Regular monthly transfer
Total FY 2017	***$ 90,000***	***$ 663,600***	***$ 753,600***	
Total Cumulative Transfers	***$ 2,416,900***	***$ 6,255,300***	***$ 8,672,200***	

GLWA
Great Lakes Water Authority

Financial Services Group
Audit Committee Communication

ADDENDUM #1 TO MEETING BINDER for Friday, September 9, 2016 at 8:00 a.m.

Agenda Item # 7A - Review of Preliminary Feasibility Forecast for the Water and Sewer System

GLWA
Great Lakes Water Authority

Financial Services Group
Audit Committee Communication

Date: September 9, 2016

To: Great Lakes Water Authority Audit Committee

From: Nicolette N. Bateson, CPA
Chief Financial Officer & Treasurer

Re: Review of Preliminary Feasibility Forecast for the Water and Sewer System

Background: The attached unaudited materials and analysis have been prepared in connection with a potential bond refunding in 2016 for the water and sewer systems as well as a potential issuance of additional water system bonds for the Great Lakes Water Authority (the "GLWA"). Those materials (attached) were prepared by The Foster Group, LLC and are comprised of the following.

1. Series 2016 Water and Sewer Bonds Financial Feasibility Report Executive Summary
2. Preliminary Water System Feasibility Report
3. Preliminary Sewer System Feasibility Report

Analysis: Readers of this report should consider the context in which these materials are presented.

It should be noted that the preliminary and/or projected financial operations of the water and sewer systems contained in the attached information are unaudited and based on various assumptions and estimates that are subject to significant operational, regulatory, customer demand and economic uncertainties, many of which are beyond the entity's control or are subject to change. Accordingly, readers should not place undue reliance on these projections. The GLWA cautions that preliminary or projected results may and often do differ materially from actual results.

Some of the factors that could cause actual results to differ materially from those projected are the GLWA's ability to execute the capital improvement program as scheduled and within budget, regional climate and weather conditions, and adverse legislative, regulatory or legal decisions (including environmental laws and regulations) affecting the Department's ability to manage the systems. It should further be noted

that these unaudited projections are based upon the water and sewer systems as they are operated and managed today as the Great Lakes Water Authority. Since the GLWA began operational control of regional assets owned by the City of Detroit Water & Sewerage Department (DWSD) on January 1, 2016, certain historical references are made to the DWSD's operations, capital planning, and financial performance.

Analysis: Mr. Bart Foster will review the attached preliminary materials at the Audit Committee on September 9, 2016.

Recommended Action: Receive and file report.

TFG

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MEMORANDUM

Series 2016 Water and Sewer Bonds
Financial Feasibility Report Executive Summary

September 6, 2016

To: Nickie Bateson

From: Bart Foster

This brief discussion and the accompanying exhibits are designed to provide an executive summary overview of the preliminary Financial Feasibility Reports we have prepared in conjunction with the Authority's issuance of the Series 2016 Bonds. The exhibits summarize the projected financial plans for the Authority's capital improvement program and annual revenue requirements, and projected fund balances resulting from these plans.

Key Takeaways:

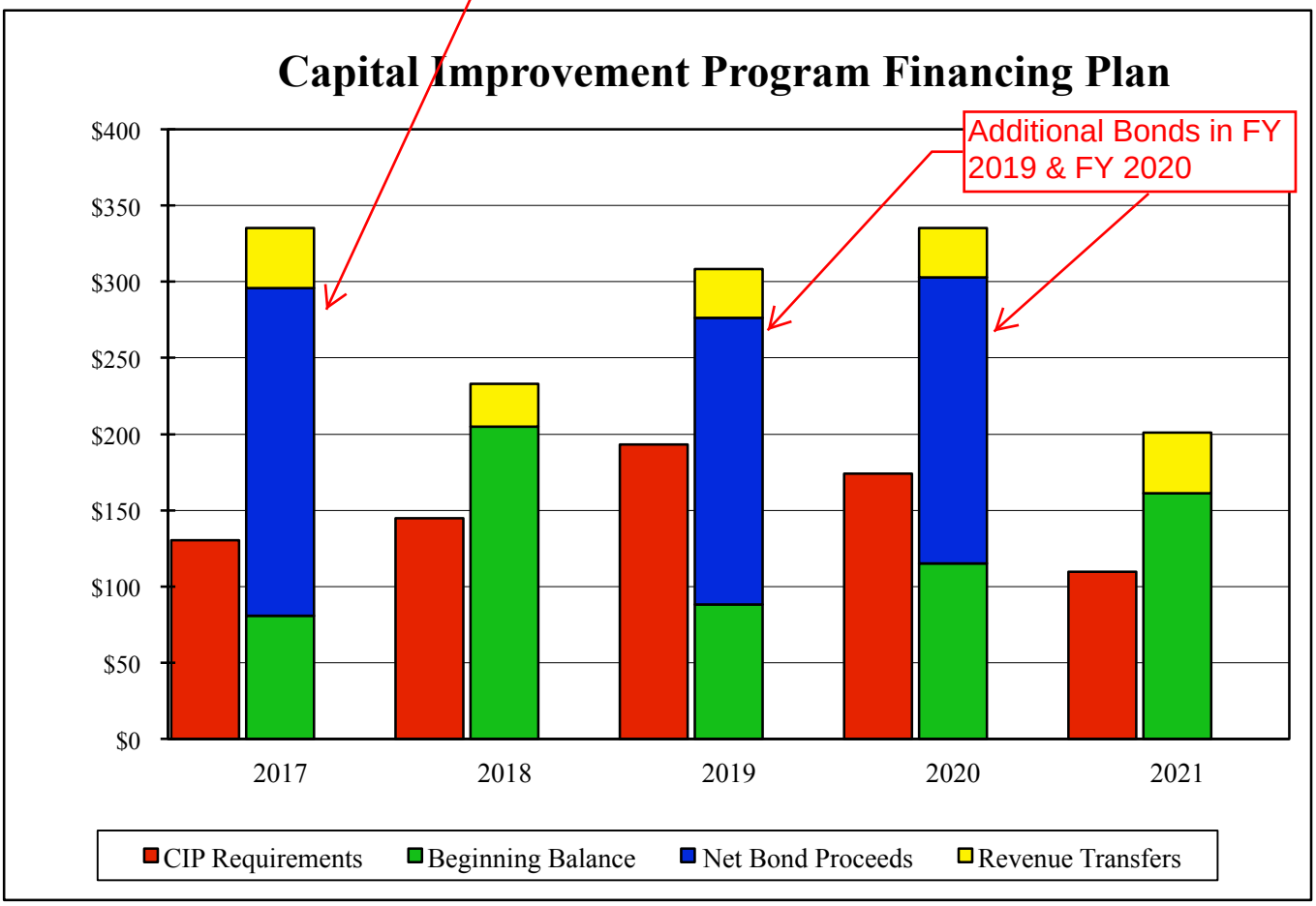
1. The Series 2016 "new money" Water Bonds are designed to generate approximately $272 million in proceeds to finance capital improvement expenditures through FY 2018.
   - *Of this amount, $57 million is scheduled to be transferred to a DWSD Construction Fund to finance improvements to the Local DWSD System. Debt service on these bonds will be directly assigned to Detroit local customers.*
   - *The remaining $215 million will be used to finance Authority Regional CIP expenditures.*
2. The Series 2016 Water Bonds and the Series 2016 Sewer Bonds also both have refunding components designed to result in debt service savings. The Series 2016 Sewer Bonds do not contain a new money component.
   - *The revenue requirement projections in the preliminary reports do not reflect any such debt service savings at this point.*
3. The capital financing plans during the 5-year projection period include additional bond sales, accompanied with strategic use of revenues transferred to the Improvement and Extension ("I&E") Fund to finance short-term CIP projects.
4. The ***consolidated*** revenue requirement projections in the Operational Financing Plan include elements related to the wholesale service requirements of the Authority **AND** the retail service requirements of DWSD, and recognize that all receipts from both organizations flow through the Master Bond Ordinance flow of funds.

5. The revenue requirement projections for FY 2017 and FY 2018 are consistent with the Biennial Budget approved by the Authority Board.
   - *The 2017 Water projection includes additional, unbudgeted revenue from Flint, and applies this revenue to transfers to the I&E Fund.*
6. Projections for remaining years assume annual 4% increases in the total revenue requirements, reflecting to maximum extent contemplated by the Lease(s).
7. Due to a projected decline in the revenue base under existing charges, the actual revenue adjustment (or increase in unit costs) required to produce the 4.0% increase in revenue requirements is higher than 4.0%.
   - *The projected adjustment for the Water System for 2018 also includes an amount necessary to make up the lost revenue from Genesee County, assuming they leave the System at that time.*
   - *The existing water service charges already contemplated Flint's final departure from the System, so their departure starting in FY 2018 does not result in additional projected charge adjustments.*
8. The financing plan assumes that the Authority will maintain an operating reserve equivalent to 90 days of annual operation and maintenance budgeted amounts.
   - *The minimum requirement is 30 days.*
9. The projected fund balances assume that a portion of the I&E Fund will be maintained in reserve during the short term.
10. The financial plans summarized by these projections are designed to enhance the Systems' balance sheets, reverse the erosion in net assets that has occurred in recent years, and improve the Systems' liquidity position, consistent with our understanding of the Authority's goals and objectives.

We are prepared to present this material at the Audit Committee Meeting on September 9 and discuss this matter further at your convenience.

Series 2016 Bonds Designed to Finance CIP thru FY 2018

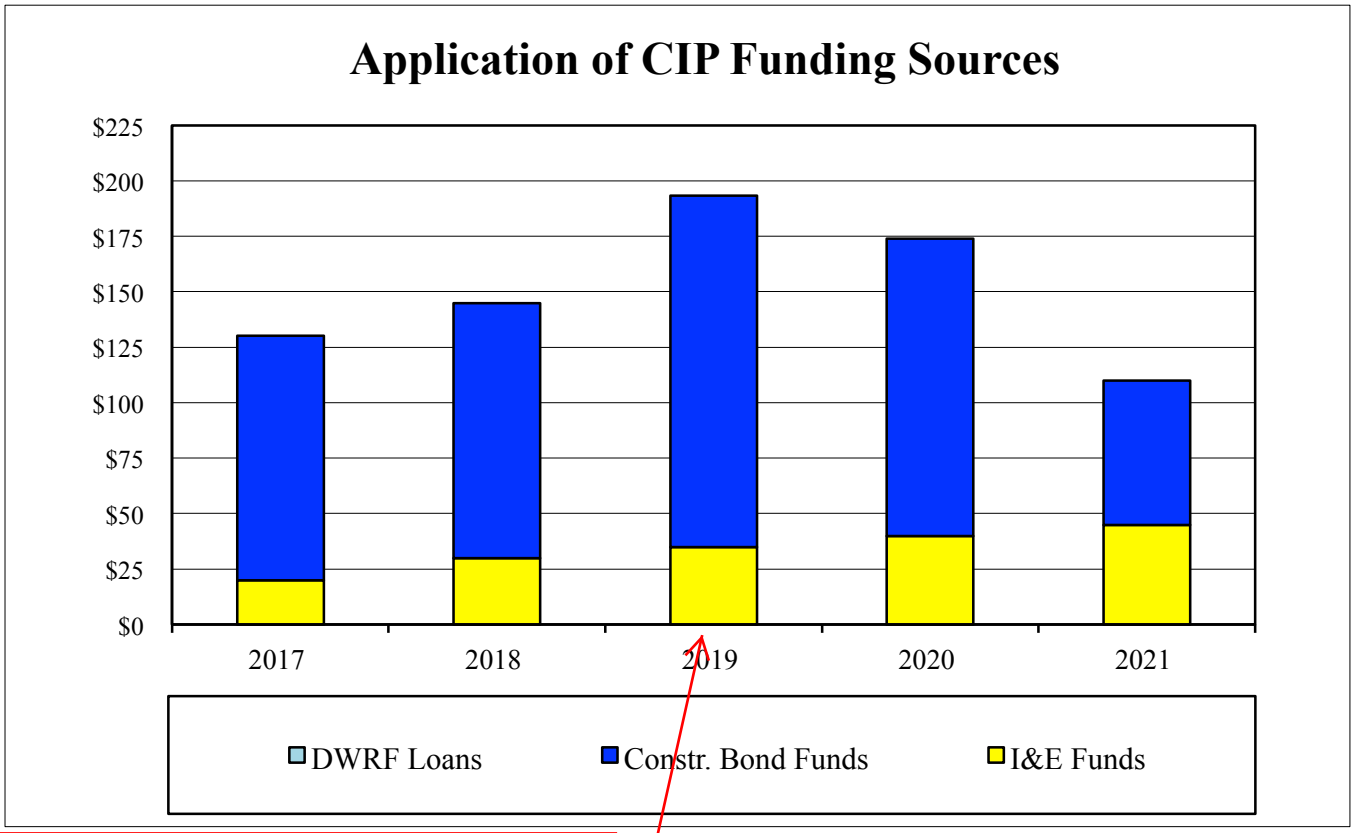
GLWA Water System Financial Plan Summary *($ millions)*



	2017	2018	2019	2020	2021
CIP Requirement	130.2	144.8	193.2	173.9	109.8
Sources					
Begin Balance	81.0	204.8	88.3	115.0	161.3
Bond Sale	246.6	0.0	200.0	200.0	0.0
Net Prem / Disc	40.4				
less: DWSD CIP	(57.0)	*0.0*	*0.0*	*0.0*	*0.0*
less: Issue Exp	(15.0)	0.0	(12.0)	(12.0)	0.0
Revenue Xfers	39.1	28.3	32.0	32.2	39.8
Total Sources	335.0	233.1	308.3	335.2	201.1
End Balance	204.8	88.3	115.0	161.3	91.3

Portion of Series 2016 Bonds provide financing for DWSD Local CIP expenditures

GLWA Water System Financial Plan Summary *($ millions)*



Forecast Strategically Applies I&E Funds to Short Term CIP in Gradually Increasing Amounts

	2017	2018	2019	2020	2021
DWRF Loans	0.0	0.0	0.0	0.0	0.0
I&E Funds	20.0	30.0	35.0	40.0	45.0
Constr. Bond Funds	110.2	114.8	158.2	133.9	64.8
I&E % of Total	*15%*	*21%*	*18%*	*23%*	*41%*

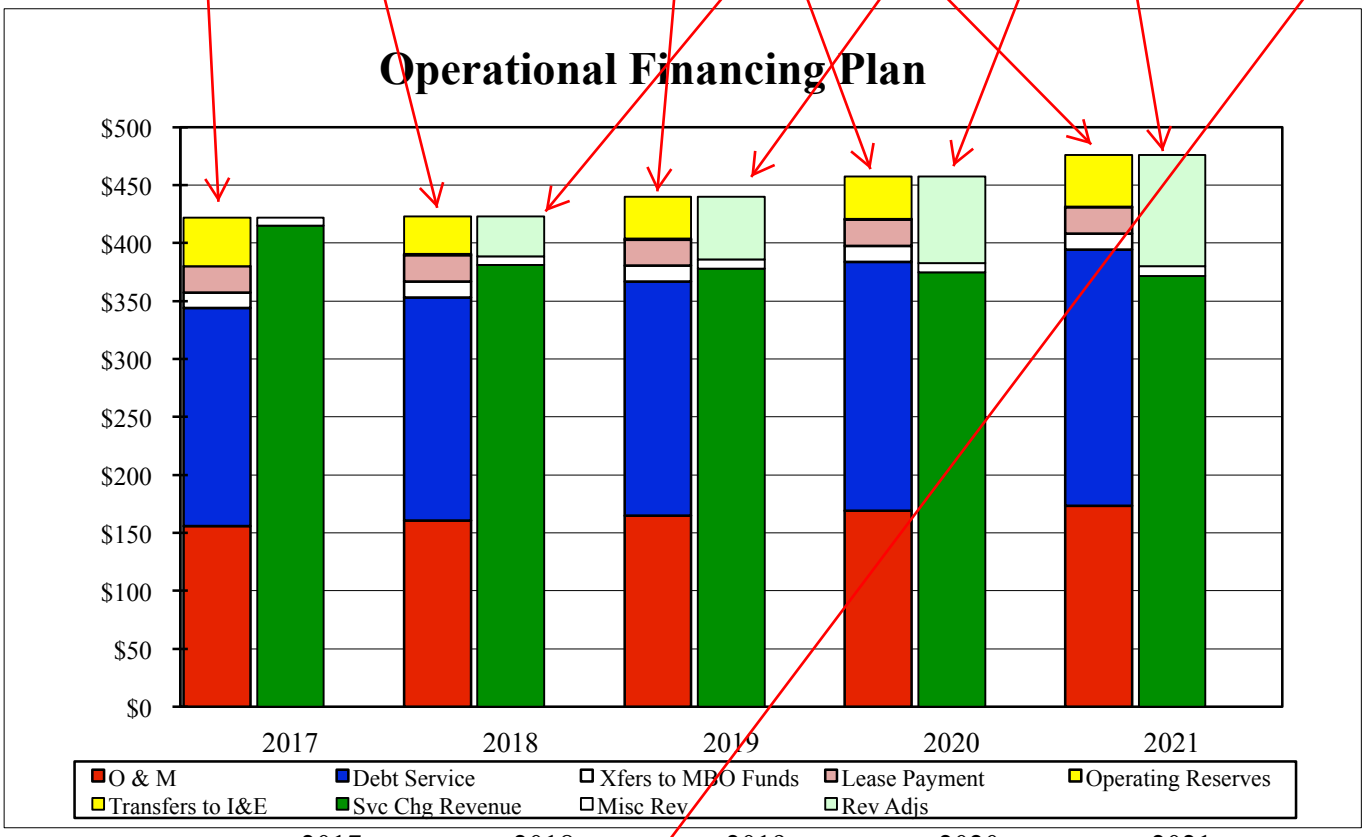
GLWA Biennial Budget + Flint Revenue

GLWA Biennial Budget

Annual 4% Increases

Revenue Adjustments >4% to Address Sales Declines (GCDC, Demographic)

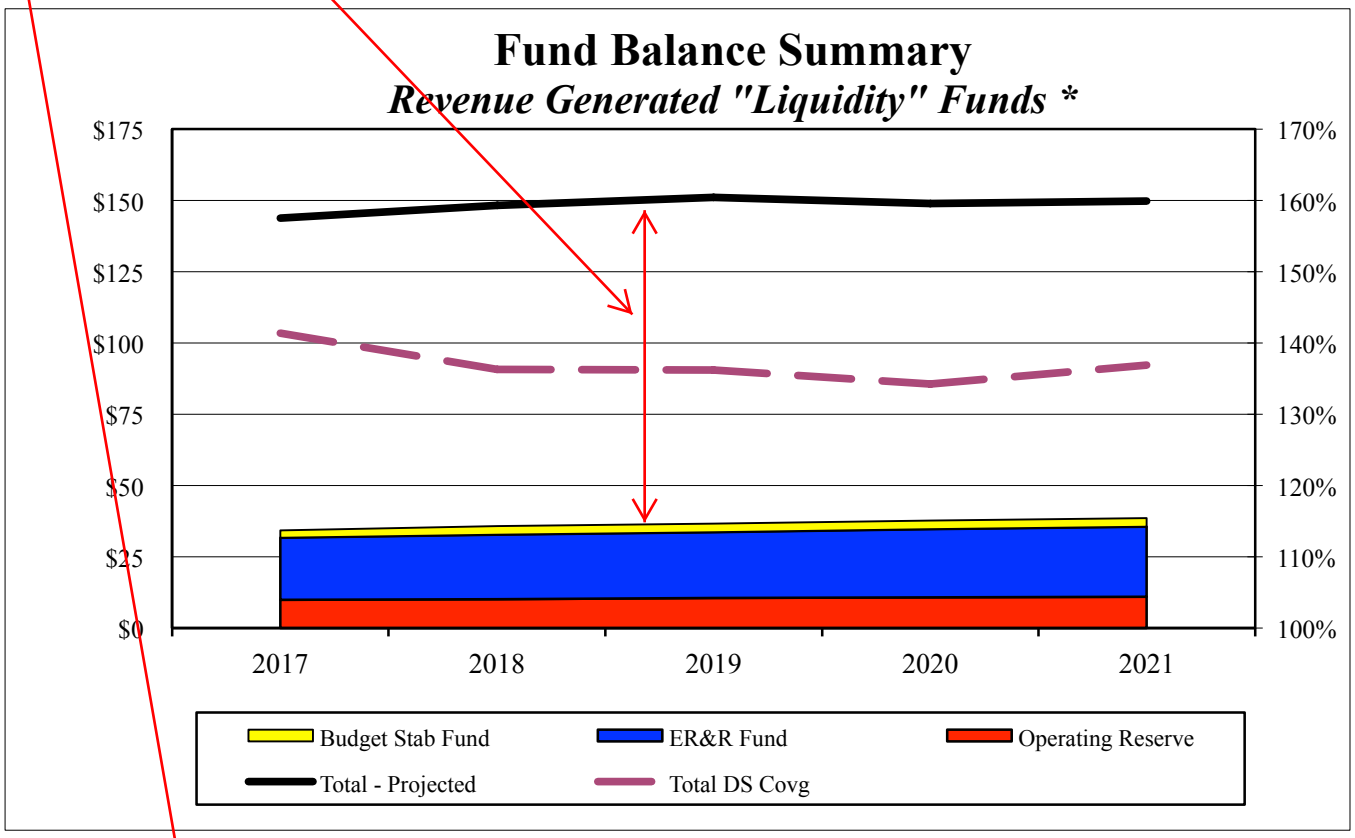
GLWA Water System Financial Plan Summary *($ millions)*



	2017	2018	2019	2020	2021
REVENUE					
Svc. Chg. Revenue	415.3	380.9	377.8	374.8	371.8
Revenue Adjustments		***9.0%***	***4.9%***	***4.9%***	***4.9%***
Revenue from Adjs		34.3	54.2	74.7	95.9
Other	6.8	7.9	7.9	8.0	8.1
Total Revenue	422.1	423.0	440.0	457.6	475.9
BUDGET					
O&M Expense	155.8	160.7	164.9	169.2	173.6
Debt Service	188.4	192.5	201.9	214.8	220.8
Xfers to MBO Funds	13.3	13.9	13.6	13.7	13.8
Lease Payment	22.5	22.5	22.5	22.5	22.5
Operating Reserves	0.0	1.1	0.9	0.8	0.8
Transfers to I&E	42.0	32.3	36.2	36.5	44.3
Total BUDGET	422.1	423.0	440.0	457.6	475.9
Balance	0.0	0.0	0.0	0.0	0.0
Senior DS Covg	185%	178%	186%	180%	181%
Sr + 2nd DS Covg	143%	138%	138%	136%	139%
Total DS Covg	141%	136%	136%	134%	137%

Forecast Assumes Maintenance of Operating Reserve at 90 Days (vs. Minimum 30 Days) and Strategically Applies I&E Funds to Short Term CIP

GLWA Water System Financial Plan Summary *($ millions)*

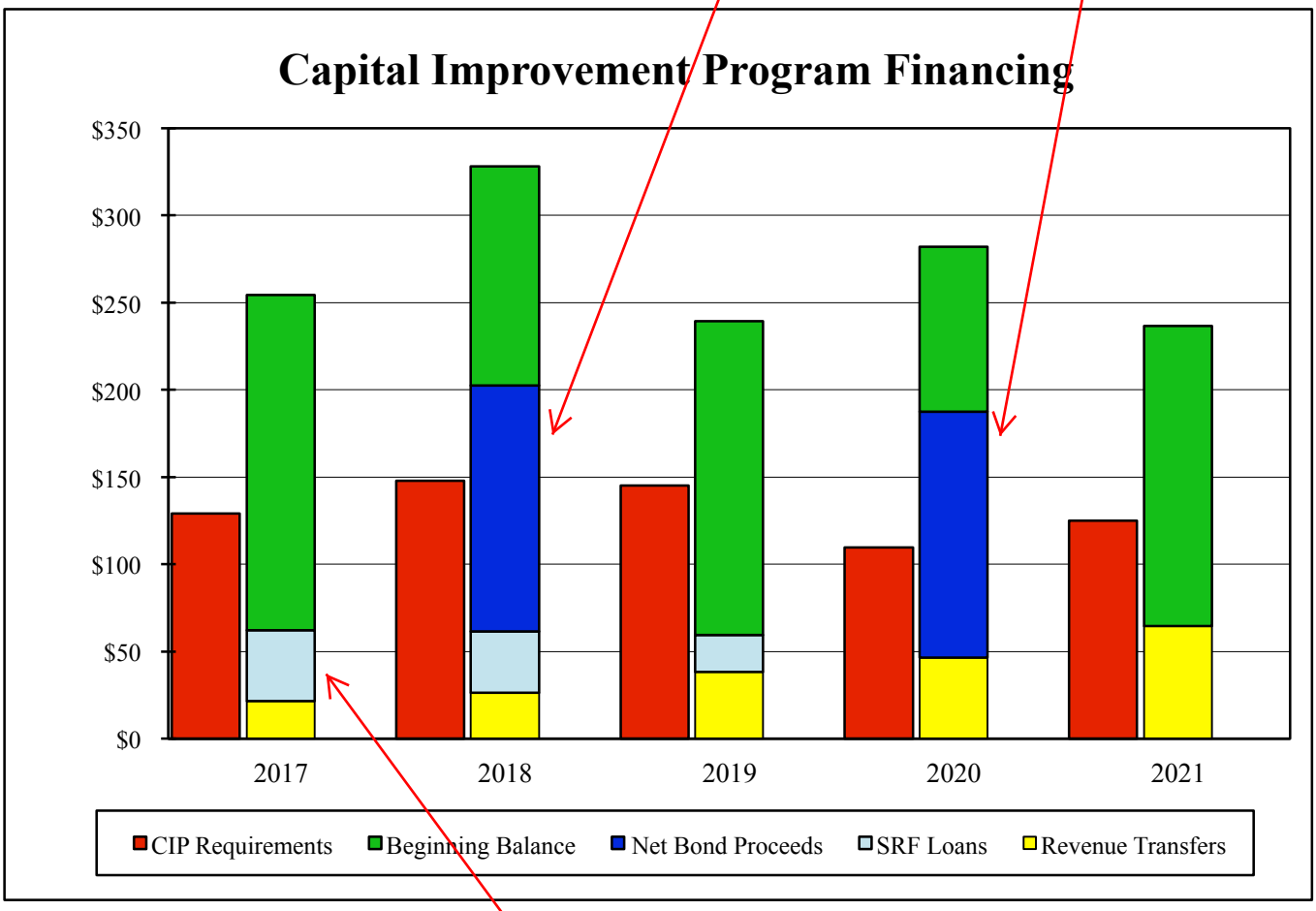


	2017	2018	2019	2020	2021
Fund Balance Minimums					
Operating Reserve	9.8	10.2	10.5	10.8	11.0
ER&R Fund	21.8	22.6	23.2	23.8	24.5
Budget Stab Fund	2.7	3.0	3.0	3.0	3.0
I&E Fund	0.0	0.0	0.0	0.0	0.0
Total - Minimums	34.3	35.8	36.7	37.6	38.6
Projections					
Operating Reserve	29.5	30.6	31.5	32.3	33.1
ER&R Fund	21.8	22.6	23.2	23.8	24.5
Budget Stab Fund	2.7	3.0	3.0	3.0	3.0
I&E Fund	89.8	92.1	93.2	89.8	89.1
Total - Projected	143.8	148.3	150.9	148.9	149.7
Projected > Minimum	*109.4*	*112.5*	*114.2*	*111.3*	*111.1*
Total DS Covg	141%	136%	136%	134%	137%

* Revenue Generated Funds only. Excludes Debt Service Reserve & Construction Funds (Bond Generated) & "Pass Thru" Funds (Debt Sevc, etc)

Projected Bond Sales in FY 2018 and FY 2020

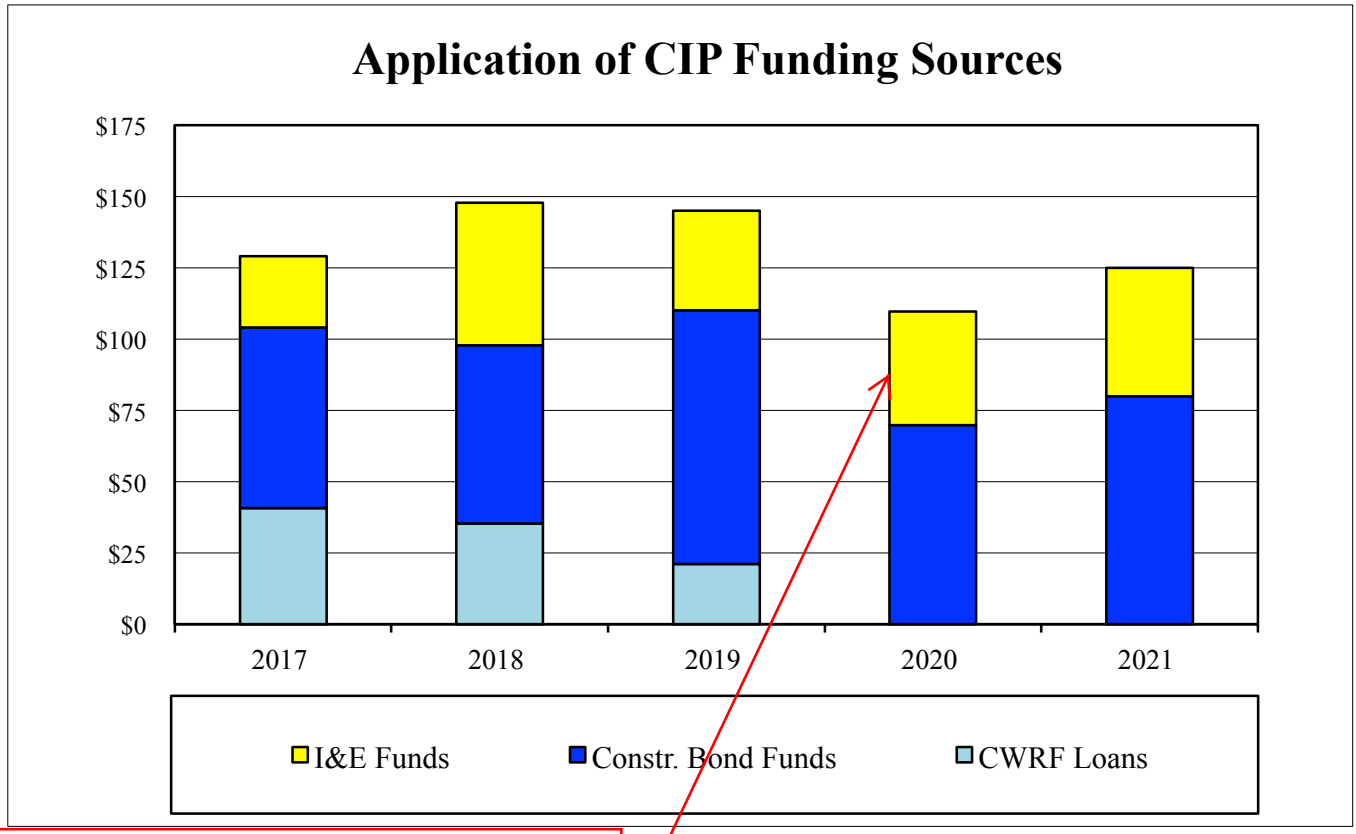
GLWA Sewage Disposal Financial Plan Summary *($ millions)*



	2017	2018	2019	2020	2021
CIP Req't	129.0	147.9	145.1	109.7	125.0
Sources					
Begin Balance	192.0	125.4	180.1	94.5	172.2
Bond Sale	0.0	150.0	0.0	150.0	0.0
less: DWSD CIP					
less: Issue Exp	0.0	(9.0)	0.0	(9.0)	0.0
SRF Loans	40.6	35.3	21.2	0.0	0.0
Revenue Xfers	21.7	26.3	38.2	46.4	64.6
Total Sources	254.3	328.0	239.5	281.9	236.7
End Balance	125.4	180.1	94.5	172.2	111.7

Significant SRF Loans (Reflects current commitments only)

GLWA Sewage Disposal Financial Plan Summary *($ millions)*



Forecast Strategically Applies I&E Funds to Short Term CIP in Gradually Increasing Amounts

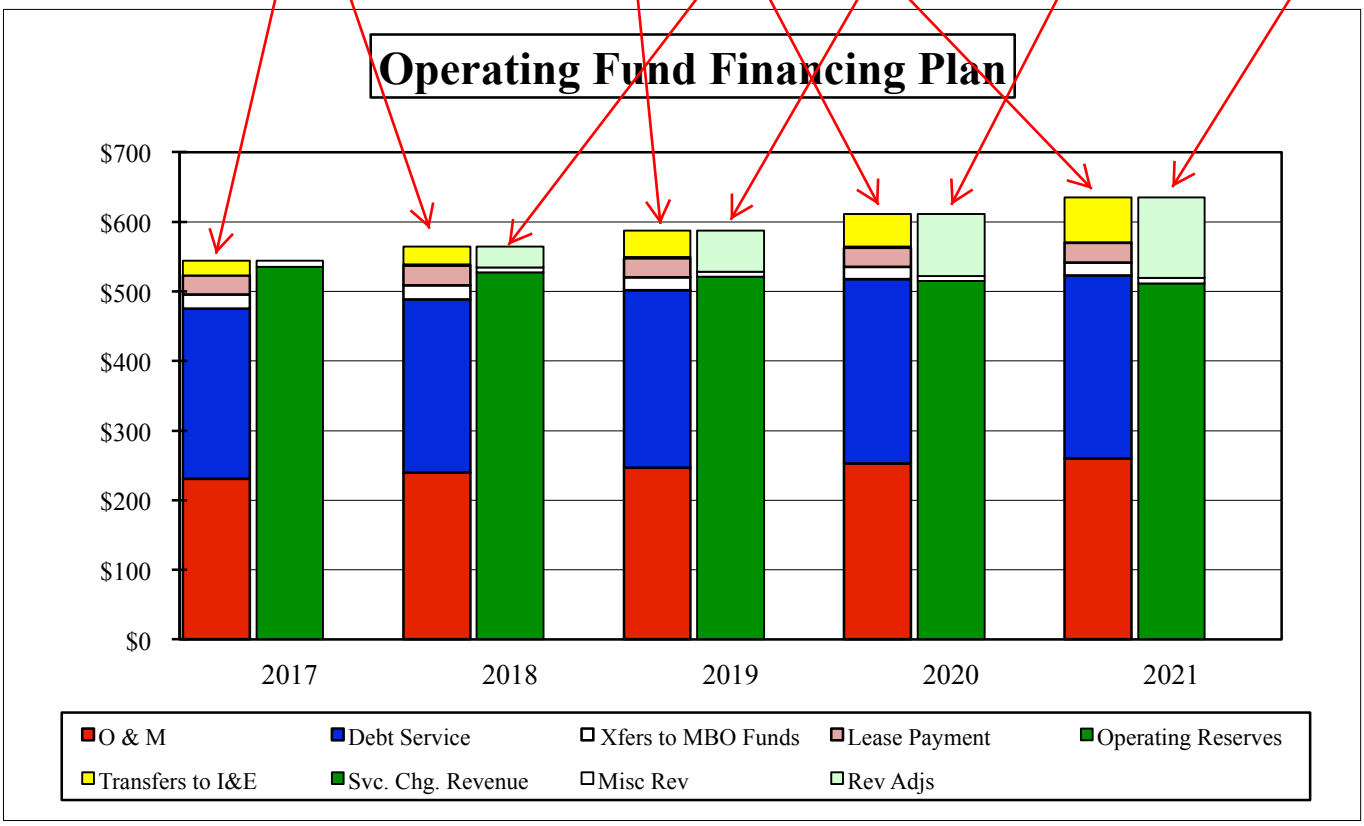
	2017	2018	2019	2020	2021
CWRF Loans	40.6	35.3	21.2	0.0	0.0
I&E Funds	25.0	50.0	35.0	40.0	45.0
Constr. Bond Funds	63.3	62.6	88.9	69.7	80.0
I&E % of Total	*19%*	*34%*	*24%*	*36%*	*36%*

GLWA Biennial Budget

Annual 4% Increases

Revenue Adjustments >4% to Address Sales Declines (Detroit Customers)

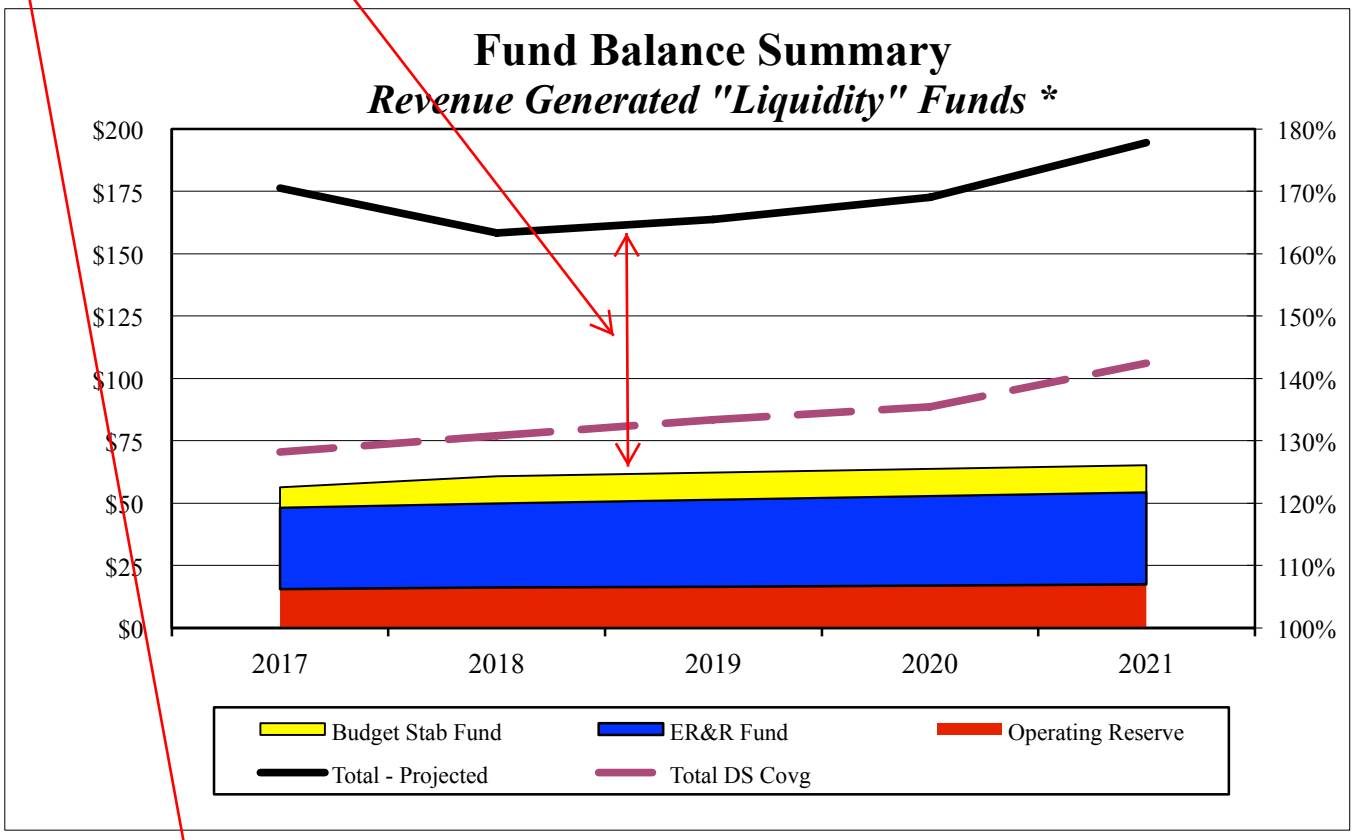
GLWA Sewage Disposal Financial Plan Summary *($ millions)*



	2017	2018	2019	2020	2021
REVENUE					
Svc. Chg. Revenue	535.5	527.0	520.8	514.8	511.6
Revenue Adjustments		***5.7%***	***5.3%***	***5.3%***	***4.7%***
Revenue from Adjs	0.0	30.1	58.9	88.4	115.8
Other	9.1	7.8	7.7	7.8	7.9
Total Revenue	544.6	564.8	587.4	610.9	635.3
BUDGET					
O&M Expense	231.1	239.4	246.3	253.0	259.8
Debt Service	244.5	248.8	255.8	264.3	263.6
Xfers to MBO Funds	19.8	21.0	18.3	18.3	18.5
Lease Payment	27.5	27.5	27.5	27.5	27.5
Operating Reserves	0.0	1.7	1.3	1.3	1.4
Transfers to I&E	21.7	26.3	38.2	46.4	64.6
Total BUDGET	544.6	564.8	587.4	610.9	635.3
Balance	0.0	0.0	0.0	(0.0)	(0.0)
Senior DS Covg	218%	221%	223%	227%	254%
Sr + 2nd DS Covg	159%	162%	166%	168%	177%
Total DS Covg	128%	131%	133%	135%	142%

Forecast Assumes Maintenance of Operating Reserve at 90 Days (vs. Minimum 30 Days) and Strategically Applies I&E Funds to Short Term CIP

GLWA Sewage Disposal Financial Plan Summary *($ millions)*



	2017	2018	2019	2020	2021
Fund Balance Minimums					
Operating Reserve	15.6	16.1	16.6	17.0	17.5
ER&R Fund	32.6	33.9	34.9	35.9	36.9
Budget Stab Fund	8.2	10.9	10.9	10.9	10.9
I&E Fund	0.0	0.0	0.0	0.0	0.0
Total - Minimums	56.4	60.9	62.4	63.8	65.3
Projections					
Operating Reserve	46.7	48.4	49.8	51.1	52.5
ER&R Fund	32.6	33.9	34.9	35.9	36.9
Budget Stab Fund	8.2	10.9	10.9	10.9	10.9
I&E Fund	88.7	65.0	68.3	74.7	94.3
Total - Projected	176.3	158.2	163.8	172.6	194.6
Projected > Minimum	*119.8*	*97.3*	*101.5*	*108.8*	*129.3*
Total DS Covg	128%	131%	133%	135%	142%

* Revenue Generated Funds only. Excludes Debt Service Reserve & Construction Funds (Bond Generated) & "Pass Thru" Funds (Debt Sevc, etc)

APPENDIX A

Feasibility Report

TFG

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BART FOSTER, PRESIDENT
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_____, 2016

Ms. Sue McCormick, Chief Executive Officer
Great Lakes Water Authority
735 Randolph Street
Detroit, Michigan 48226

Dear Ms. McCormick:

In accordance with our agreement with the Great Lakes Water Authority (the "Authority" and/or "GLWA"), we submit herewith our Financial Feasibility report to be included as an appendix to the preliminary official statement (the "Preliminary Official Statement") prepared by the Authority in connection with its issuance of $_____ Water System Revenue Senior Lien Bonds, Series 2016, $_____ Water System Revenue Refunding Senior Lien Bonds, Series 2016_, and $_____ Water System Revenue Refunding Second Lien Bonds, Series 2016_ (collectively, the "Series 2016 Bonds"). The Series 2016 Bonds are being issued to generate approximately $215 million of proceeds to finance regional water system capital improvements for the Authority, approximately $57 million of proceeds to finance local retail water system capital improvements for the Detroit Water and Sewerage Department, and to refinance certain outstanding Bonds of the Authority. The purpose of this report is to set forth information concerning financial factors relating to the Preliminary Official Statement and the Series 2016 Bonds.

The report contains financial feasibility information including analyses of water supply service charges, including specific charge methodology, projections of revenues under existing charges, projection of future operation and maintenance expenses, a summary of the Regional Water System Capital Improvement Program (the "CIP") for fiscal years 2017 through 2021, CIP financing, the impact of projected revenue requirements on future revenues and water supply charges for a five-year study period, and the ability of the Authority to meet the "Additional Bonds Test" as defined in the ordinance authorizing the issuance of bonds by the Authority (the "Master Bond Ordinance.") A listing of our major opinions developed as a result of our studies is presented at the end of the report.

THE FOSTER GROUP provides financial and engineering management consulting services to a broad customer base, specializing in services for municipal utility clients in the

United States. Our principal experience includes: managing financial planning, cost of service, and rate design studies for water and wastewater utilities; preparation of Feasibility Reports in conjunction with issuance of municipal water and sewer revenue bonds; development of other feasibility reports; design of financial management information systems; consulting assistance regarding contractual and other relationships amongst municipalities, and expert witness services in utility litigation matters.

Principals of THE FOSTER GROUP have prepared every financial feasibility report published in conjunction with the revenue bonds issued by the Detroit Water and Sewerage Department (the predecessor to the Authority) since 1989. Various reports have been issued in connection with work for the Authority on these matters and related matters, and are available for public inspection at the offices of the Authority.

It has been a pleasure to be of service to the Authority on this matter.

Very truly yours,

THE FOSTER GROUP

Bart Foster
President

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Contents

Page

Introduction 1

Regional Water System Summary 3

Introduction 3

Service Area 3

Historical Water Sales and Non-Revenue Water 4

Capital Improvement Program 6

Financial Feasibility for the Series 2016 Bonds 8

GLWA Financial Planning Guiding Principles 8

Service Charge Methodology and Existing Service Charges 10

Modifications Resulting from the Lease 11

Structural Wholesale Charge Reforms 12

Projection of Revenues 13

Operation and Maintenance Expense Projections 15

Capital Improvement Program Financing Plan 17

Operational Financing Plan 20

Projected Fund Balances 25

Compliance with Additional Bonds Test 26

Coverage Test 26

Alternate Test for Refundings 28

Opinions 29

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Introduction

This report is based on our analysis of the records and capital improvement programs of the Authority, discussions with key Authority personnel, and such other investigations as we have found necessary.

In this report, where standards or requirements are indicated as being applicable, being fulfilled, or to be attained, such standards or requirements are those promulgated by the United States Environmental Protection Agency (the "EPA") and the Michigan Department of Environmental Quality (the "MDEQ") in accordance with the provisions of Federal laws and the laws of the State of Michigan governing the supply of drinking water. Capitalized terms not otherwise defined herein shall have the same meaning as ascribed to them in the Preliminary Official Statement. References made herein to specific years are for the fiscal years ending June 30, unless otherwise noted.

The Authority was incorporated by the City of Detroit (the "City') and the Counties of Macomb, Oakland and Wayne (the "Counties") on November 26, 2014 pursuant to Act 233, Public Acts of Michigan, 1955, as amended ("Act 233"). At the time of the Authority's incorporation, the City, through its Detroit Water and Sewerage Department ("DWSD"), was providing wholesale water and sewer services to suburban wholesale customer communities and wholesale and retail water and sewer services to the City and its individual residents and businesses. Water service was provided via operation of the City's water supply system ("the Water System") that consisted of both wholesale and retail water production and delivery facilities.

On June 12, 2015, the City and GLWA executed a Regional Water Supply System Lease, a Regional Sewage Disposal System Lease and a Water and Sewer Services Agreement, and as of January 1, 2016, the City and GLWA executed a Shared Services Agreement (each as more fully described under "THE GREAT LAKES WATER AUTHORITY" in this Preliminary Official Statement). These agreements became effective on January 1, 2016 (the "Effective Date"), at which time the Authority assumed responsibility for the wholesale water and sewer services to the service area via operation of the portion of the Water System (the "Regional Water System") that provides service to the wholesale water customers. The Authority also provides "wholesale" water and sewer service to the City of Detroit, although the City is served via a Water and Sewer Services Agreement that is different from standard wholesale contracts, and the City of Detroit is not a wholesale customer of the Authority.

The portion of the Water System that provides water service directly to retail customers in the City of Detroit (the "Local Water System") continues to be operated by the City of Detroit through DWSD, just as the Authority's wholesale customers provide retail services to their individual residents and businesses. The Authority's customers (the "Customers") include communities and districts served via wholesale service contracts and the City of Detroit retail customer class, served via the terms of the Water and Sewer Services Agreement. The Authority is authorized by its Articles of Incorporation to provide retail water service, but does not currently provide retail service to any customers.

Certain portions of this report may refer to historical wholesale service performance and events as being attributable to the Authority, while in fact they were applicable to the operations of the DWSD that existed prior to the Effective Date. We consider the attribution to be technically accurate, since the Authority has assumed responsibility for such performance and events.

The proceeds from the Series 2016 Bonds, along with available fund balances and internally generated funds will be utilized to finance capital improvement expenditures scheduled in the CIP through June 30, 2018 (the "2016 Project"). Additional proceeds from the Series 2016 Bonds will be transferred to a construction fund for DWSD that is under the sole and exclusive control of DWSD to finance capital improvements to the DWSD Local Water System. Proceeds from the refunding portion of the Series 2016 Bonds will be utilized to refinance certain outstanding bonds of the Authority. The remaining capital improvement expenditures scheduled in the CIP for the five-year period ending June 30, 2019 are expected to be principally financed with additional bond issues in 2019 and 2020, augmented by internally generated funds. *See "Capital Improvement Program Financing."*

In conducting our studies and formulating our projections and opinions contained herein, we reviewed the books, records, agreements, capital improvement programs and other information produced by the Authority as we deemed necessary. While we consider such books, records, and other documents to be reliable, we have not verified the accuracy of these documents.

The projections set forth herein are intended as “forward-looking statements”. Actual results may differ materially from those projected, as influenced by conditions, events, and circumstances that may actually occur. *See "Financial Feasibility for the Series 2016 Bonds."*

Regional Water System Summary

Introduction

The water treatment and transmission system consists of three major intake facilities, five water treatment plants, a conveyance system that consists of over [____] miles of transmission mains throughout the system, 20 booster pumping stations, and 15 water storage reservoirs. The Systems Control Center located in the Water Board Building monitors and controls the water flow and pressure throughout the Regional Water System.

Service Area

The Regional Water System is one of the largest in the nation in terms of water produced and population served, as the Authority is responsible for treatment and transmission of water to most of southeast Michigan. The System presently serves an area of 981 square miles in Wayne, Oakland, Macomb, Lapeer, Genesee, Washtenaw, St. Clair, and Monroe Counties. *See map, inside back cover*. The Authority currently serves an estimated population of 3.8 million, with suburban customers served by wholesale service contracts comprising approximately 80 percent of the total, and the City of Detroit comprising the remainder.

The Authority has traditionally experienced no material competition from other water supply systems in the Southeastern Michigan region. However, Genesee County and the City of Flint (through which many of the other communities in Genesee County had traditionally purchased water from the System) formed the Karegnondi Water Authority (the "KWA") in 2010 and have been constructing water intake structures, pipelines and pumping station capital investments needed by KWA to operate as a fully independent ***raw*** water supply system.

The City of Flint already had its own water treatment plant, which in past years was only utilized to provide standby service. Over time, Flint had explored the possibility of expanding the capabilities of its plant to provide full service to its retail customers within its jurisdictional boundaries. The contract between the Authority and Flint reached its original duration and the parties were unable to negotiate an extension. Flint opted to leave the System, and the Authority terminated the existing contract in April 2013, providing a one-year termination notice as required in the contract. The parties continued attempts to negotiate a new service agreement during the termination period, but were unsuccessful. Flint ceased purchasing water from the Water System on May 1, 2014 and began using water from the Flint River as a source of supply to treat at its plant. Flint's plan was to eventually purchase raw KWA water and only use the Flint River as a back up supply. Flint's exit from the Water System produced a negative revenue variance of about $12.5 million, or about 3.5% of total Water System revenue during 2015.

Flint began experiencing water quality issues immediately upon separation from the Water System. The Authority expressed continued willingness to re-establish service to Flint, and on October 16, 2015, Flint signed a nine-month contract with the Authority for water service. The contract also provided that its term may be extended by mutual agreement of the parties. As part of this contract, Flint deposited $10 million with the Authority as an estimated prepayment for service over the term of the contract. On a monthly basis, the Authority draws

down from this deposit the amount equal to the amount invoiced to Flint. The original agreement contained provisions to monitor and adjust pre-payment amounts as necessary should the original $10 million prove to be insufficient, and to return any remaining unneeded prepayment funds to Flint at the conclusion of the contract. Through the end of the original contract termination date, Flint had utilized approximately $9.5 million of the original funding amount, which is recognized as revenue to the Authority during 2016.

The contract with Flint has been extended through June 30, 2017. Flint has agreed to continue to pre-pay for extended water service, and to replenish the prepayment fund for 2017 service in two installments. The first installment payment has been received and the second payment is scheduled to be deposited in October 2016. As a result of this extension, additional revenues of approximately $13.3 million are projected to be realized in 2017, and additional revenues may be realized in future years, depending on construction timelines for the KWA pipeline.

Flint does not have the capacity to provide water to Genesee County. The Genesee County Drain Commission plans to construct new treatment facilities to purify raw KWA water and provide it to customers in the county. The KWA raw water facilities are substantially complete and being tested.. The Genesee County treatment facilities are under construction. The Authority believes that final construction of these facilities will not be complete until at least June 30, 2017. In the interim Genesee County must continue to rely on the Authority for wholesale water service, and Genesee County continues to purchase water from the Authority on a "non-contract" basis. The parties had been engaged in negotiations to establish a formal agreement, but those negotiations failed to produce an agreement and the Authority does not anticipate any service to Genesee County after June 30, 2017, although that date is subject to construction schedules, potential additional negotiations, and other developments.

Flint and Genesee County (in total) currently account for approximately 6.4% of the Water System's water sales volume and 7.6% of the Water System's revenue. These sales volumes and revenues continue to be reflected in the projections in this report through 2017. *See "Financial Feasibility for the Series 2016 Bonds - Projection of Revenues."*

Other small communities in the northern area of the System's service area initially expressed various levels of interest in joining the KWA. The Authority has successfully executed new long-term wholesale contracts with each of these communities.

Historical Water Sales and Non-Revenue Water

A summary of historical water sales, water production, and "non-revenue" water (reported in thousands of cubic feet – "Mcf") is presented in Table 1. Water sales declined significantly in recent years, driven in part by the effects of the 2008 recession. After stabilizing during 2011 and 2012, reported sales figures for 2013 through 2015 continued to decline for both suburban wholesale and Detroit retail customers. Reported sales volumes for each of these years were significantly lower than planned levels, the wholesale portion of which were directly based on amounts included in service contracts with customers. In part, the Authority attributes the lower than expected sales volumes to three straight years of abnormally mild summer weather

conditions, which produced much lower outdoor water demands than experienced during "normalized" conditions. Higher demands occurred during this past summer, and reported water sales during 2016 indicate an increase over 2015, although part of this increase is attributable to Flint purchasing water during part of 2016, and not at all in 2015. However the Authority believes a portion of the lower sales volumes are indicative of changing attitudes towards water use being experienced universally throughout the country and throughout the entire year, and the impact of changing plumbing standards and fixtures such as low flow shower heads and toilets.

As part of the preparation of the 2016 budget and financial plan, the Authority altered its approach for projecting annual water sales levels, in an effort to eliminate continued lower than anticipated sales results and the associated revenue shortfall. *See "Financial Feasibility for the Series 2016 Bonds – Service Charge Methodology and Existing Service Charges."*

Table 1
Water Supply System Water Sales and Non-Revenue Water

	Fiscal Year Ending June 30,					
	2011	2012	2013	2014	2015	2016
Water Sales Volumes - Mcf						*est*
Suburban Wholesale *(a)*	16,094,700	16,280,300	15,687,900	14,778,500	13,547,000	14,730,400
Detroit Retail *(b)*	4,176,600	3,903,100	3,660,300	3,410,600	3,173,700	3,086,400
Total	20,271,300	20,183,400	19,348,200	18,189,100	16,720,700	17,816,800
Total Water Production - Mcf	26,513,000	27,219,500	26,832,800	26,088,800	23,238,000	23,580,700
Non-Revenue Water - Mcf	6,241,700	7,036,100	7,484,600	7,899,700	6,517,300	5,763,900
Non-Revenue % of Production	23.5%	25.8%	27.9%	30.3%	28.0%	24.4%

(a) Reflects sales reported by wholesale master meters.
(b) Reflects sales reported by individual retail meters.

The Water System, as is common with all water systems, experiences a differential between the quantity of water produced by the treatment plants during the fiscal year and the quantity of water billed during that same period of time. The differential is referred to as "non-revenue water" and is the result of factors such as range of accuracy of production and retail meters, losses due to leaks or major breaks in the transmission and distribution system, unmetered water that is used for fire protection, and accuracy of estimates for unmetered water use.

The last row of Table 1 shows the non-revenue water as a percentage of total system production for the last six years. The Authority believes that recent reported levels of non-revenue water may be misleading, partially attributable to a change in the manner by which production at the water plants is reported. This production is not metered, but is rather estimated based on pump curves. These data continue to be reviewed, and the Authority has initiated efforts to measure production figures and refine production estimating techniques. Irrespective of the accuracy of the reported production levels, mitigating the reported level of non-revenue water is (and should be) a goal of the Authority, and of the DWSD Local Water System. Future reports of non-revenue water for 2017 and beyond will reflect the new arrangement between the

Authority and DWSD, and the fact that the Authority is a provider of wholesale water service. For instance, the water use allocated to the Detroit retail customer class includes an estimate of unaccounted for water within the DWSD local system, and this amount is included in the basis for allocating revenue requirements to the Detroit customer class. As such, it is not technically "non-revenue" water.

Capital Improvement Program

The Authority's System Planning Division is responsible for coordinating the evaluation of capital needs and developing programs to meet those needs. This division formally reviews the Capital Improvement Program and incorporates revisions into the five-year capital agenda on an annual basis.

In accordance with the terms of the Articles of Incorporation, the CIP must be approved by a supermajority of at least five members of the Authority's Board of Directors. The Authority can modify individual projects within the CIP during the year to address changing costs and management decisions on specific project scope as long as the changes are within the basic framework approved by the Board. The Fiscal Year 2017-2021 CIP was approved by the Board on May 25, 2016.

The CIP is dynamic and requires continual review and modification during the course of each year. As additional cost information is developed from design work being performed on the various projects, cost estimates are adjusted accordingly. In connection with the issuance of the Series 2016 Bonds, the CIP has been updated to reflect modified plans and individual project activity subsequent to approval of the original CIP. An amended Fiscal Year 2017-2021 CIP was [unanimously] approved by the Board on [September __, 2016].

A summary of the amended water CIP is presented in Table 2. The CIP is divided into major categories representing each of the five water plants, water delivery categories of transmission and pumping stations and reservoirs, computer systems, and general purpose. Expenditures in the early years of the CIP are primarily focused on rehabilitating the Springwells Water Treatment Plant, which currently produces the most water of any of the five plants, and on improvements to water delivery facilities, designed to enhance reliability of service and to facilitate the planned repurposing of the Northeast Water Plant. *See "_____ - Master Plan Update" in this Preliminary Official Statement*. **Table 2 does not include any capital improvements to the local water service facilities owned and managed by DWSD**.

The recently completed Master Plan Update was somewhat unique, in that it was designed to establish a strategic infrastructure and operating plan associated with declining water demands, rather than to address growth. The total rated capacity of the existing five water treatment plants is 1.7 billion gallons per day. The Master Plan Update identified likely maximum demands in the range of 1.0 billion gallons per day during the 20-year planning period, and evaluated the possibility of repurposing one or more water treatment plants to strategically align available capacity and service requirements and planning for structural de-rating of capacity as warranted at the remaining four water treatment plants. The Master Plan recommends converting the existing Northeast Water Plant into a storage and pumping facility,

thereby eliminating the need to invest in improvements that would otherwise be required for the existing facility to maintain rated capacity. The Master Plan also contains investments designed to strategically deliver water to the System via the four remaining water treatment plants. The projected expenditures required to implement this revised operating scenario envisioned by the Master Plan are included in Table 2, and the Authority anticipates that the new reduced capacity plan will be initially operational by [2020]. While the new operating scenario will likely result in operating expense savings, none have been assumed in the projections presented in this report.

Table 2
Water Supply System Capital Improvement Program
Projected Expenditure Schedule - Fiscal Years 2017 through 2021

	Fiscal Year Ending June 30,					
Category	2017	2018	2019	2020	2021	Total
	$	$	$	$	$	$
Water Production						
Water Works Park	2,475,000	5,875,000	27,900,000	20,500,000	0	56,750,000
Springwells	28,753,000	28,630,000	33,000,000	25,600,000	10,300,000	126,283,000
Northeast	100,000	880,000	0	0	0	980,000
Southwest	3,853,000	3,160,000	2,150,000	900,000	0	10,063,000
Lake Huron	6,300,000	17,278,000	18,505,000	6,203,000	200,000	48,486,000
General Water Treatment	29,944,000	37,449,000	38,936,300	24,333,300	10,833,300	141,495,900
Subtotal Production	71,425,000	93,272,000	120,491,300	77,536,300	21,333,300	384,057,900
Water Delivery						
Water Transmission System	45,137,000	37,656,000	62,900,000	92,250,000	84,700,000	322,643,000
Pumping Station & Reservoirs	5,141,000	5,468,000	6,000,000	2,900,000	2,500,000	22,009,000
Subtotal Delivery	50,278,000	43,124,000	68,900,000	95,150,000	87,200,000	344,652,000
Computer Systems	3,828,000	3,748,000	3,425,000	1,000,000	1,050,000	13,051,000
General Purpose	4,701,000	4,701,000	425,000	250,000	250,000	10,327,000
Subtotal General	8,529,000	8,449,000	3,850,000	1,250,000	1,300,000	23,378,000
TOTAL	**130,232,000**	**144,845,000**	**193,241,300**	**173,936,300**	**109,833,300**	**752,087,900**

The Authority has initiated efforts to develop a new CIP as part of the 2018 budget preparation, with ultimate adoption scheduled for March 2017. Preliminary versions of that new CIP are being prepared for customer and stakeholder review. While the projected expenditure levels in various years are expected to change in order to reflect variations in project schedules, and the stakeholder review process may identify modifications to preliminary plans, the Authority is not aware of any changes that would result in material differences in the overall five-year expenditure levels in the preliminary versions of the new CIP from those indicated in this Report.

Financial Feasibility for the Series 2016 Bonds

The financial data used in the analyses presented herein were obtained from the financial records of the Authority and of DWSD. The financial records of the prior DWSD were audited annually and maintained in conformity with generally accepted accounting principles for water and wastewater utilities, and financial records of both the Authority and DWSD are subject to annual audits.

The projections set forth herein are intended as "forward-looking statements". In formulating these projections, The Foster Group has made certain assumptions with respect to conditions, events, and circumstances that may occur in the future. The methodology utilized by The Foster Group in performing these analyses follows generally accepted practices for such projections. Such methodologies are summarized in this report and are reasonable and appropriate for the purpose for which they are used. While The Foster Group believes the assumptions are reasonable and the projection methodology valid, actual results may differ materially from those projected, as influenced by conditions, events, and circumstances that may actually occur. Such factors may include the Authority's ability to execute the CIP as scheduled and within budget, regional climate and weather conditions affecting the demand for water, and adverse legislative, regulatory or legal decisions (including environmental laws and regulations) affecting the Authority's ability to manage the Regional Water System and maintain water quality.

GLWA Financial Planning Guiding Principles

The financial plans developed for the Authority's Water and Sewer Funds follow the guiding principles set forth in the various organizational documents, including the Articles of Incorporation, the Authority By-Laws, the Leases, the Water and Sewer Services Agreement with the City of Detroit, and the Master Bond Ordinances. The financial projections presented herein embrace these principles, which include:

- The Authority is empowered through its Board of Directors (the "Board") to provide wholesale water and wastewater service to the service area. The six member Board has the authority to execute contracts, to set policy for the Authority, to establish service charges for wholesale water and wastewater service, and to set a revenue requirement for the Detroit retail customer class[1].
- The Board must appoint an Audit Committee to "*review the reports related to the financial condition, operations, performance and management of the Authority*" on a regular basis.
- Certain actions by the Authority Board require "*the affirmative vote of at least 5 members of the Board."* The elements which require this supermajority approval

[1] The Authority has engaged the City of Detroit as its agent to establish retail water and sewer rates for the Detroit retail customer class, and to bill and collect for service from that class. The Authority retains oversight responsibility for these activities through monitoring of the agency relationship.

include, but are not limited to, service charge schedules, annual operating budgets, capital improvement programs, and issuance of debt.

- The Authority must establish biennial budgets, with the first year serving as formal authorization (including an approved schedule of service charges to support the budget) and the second year serving as an initial estimate of revenues and revenue requirements.
- Through 2025, the Water (and Sewer) System "*is assumed to experience annual increases in the Authority Revenue Requirement of not more than 4%; provided however, this limitation shall not be applicable if the Authority Revenue Requirement must increase beyond the 4% assumption in order to satisfy the Rate Covenant or to pay the cost of improvements to the Leased Water Facilities that are required to be made by Applicable Laws*."
- In accordance with the City's Plan of Adjustment, the Authority will provide annual contributions for Pension Obligations in an amount of $45.4 million (which includes annual administrative fees of $2.5 million) through 2023[2]. $24 million of this amount will be treated as an operating expense, and funded via the Pension Obligation sub account of the Operation and Maintenance Fund. The remaining $21.4 million will be treated as non-operating expense and funded via the Pension Obligation Payment Fund, which is subordinate to the debt service payment funds. The Water System's share of the amounts above are $10.3 million and $9.2 million, respectively.
- ALL revenues, including revenues from retail customers of the City of Detroit, are deposited into a trust established under the Master Bond Ordinance (the "Trust") and held by a trustee and subsequently applied to a flow of funds as set forth in summary fashion below:
    - Operation and Maintenance Fund, including separate accounts for the Authority Regional and Detroit Local operations, and including separate subaccounts for the "operating portion" of the Pension Obligation, separated by Authority Regional and Detroit Local portions; ***The accounts of the Operation and Maintenance Fund are the only monies held outside the Trust***;
    - Bond and Interest Redemption Funds, in cascading lien order, and including debt service accounts and bond reserve accounts;
    - Pension Obligation Payment Fund, to provide for funding of the Water System's share of the "non-operating portion" of the Pension Obligation and obligation for the B and C Notes;
    - Water Residential Assistance Program (WRAP) Fund established to provide bill payment assistance to residents throughout the service area;
    - Budget Stabilization Fund established as a reserve to manage collection performance of the Detroit retail customer class;
    - Extraordinary Repair and Replacement Reserve Fund established as a reserve to pay the costs of making major unanticipated repairs or replacements;
    - Improvement and Extension (I&E) Fund established to pay for improvements, enlargements, or extensions; separate subaccounts established for the Regional Water System and the Local Water System.

[2] The agreement contemplates a "true-up" adjustment in 2024 to reconcile with final actuarial analyses and to finalize the Authority's Pension Obligation.

  - Surplus Fund established to accommodate flexibility in managing the overall flow of funds.
- An annual Lease Payment of $50 million (of which the Regional Water System's share is $22.5 million). The Lease Payment is to be deposited into the Local Water System I&E Account, except in circumstances whereby the City applies a portion of the annual Lease Payment to pay a portion of its share of debt service. If the City elects to apply a portion of the Lease Payment to pay debt service, the total revenue requirement allocated to the City of Detroit retail customer class would be reduced accordingly.

These principles have been embraced in the initial financial plan established by the Authority, which serves as the guiding platform for the projections presented in this report. A discussion regarding the funding requirements of each element of the funds within the Trust is presented in the financial plan. *See "Operational Financing Plan*."

The Board adopted the Great Lakes Water Authority FY 2017 and 2018 Biennial Budget on May 25, 2016. The biennial budget establishes a formal authorization for 2017, including an approved schedule of service charges to support the budget, and an initial estimate for 2018. The budget includes several depictions of the overall financial plans, including a schedule that reflects "Sources of Revenues and Use of Revenue Requirements – Flow of Funds Basis per Master Bond Ordinance." That ***consolidated*** schedule includes elements related to the entire Water System, including wholesale service requirements of the Authority, as well as the retail service requirements of DWSD, and recognizes that all receipts from both organizations flow through the Master Bond Ordinance flow of funds. The projections in this report reflect the consolidated depiction of Authority revenue requirements for the entire Water System described above.

[Additional information regarding organizational documents and related initiatives is contained in "THE GREAT LAKES WATER AUTHORITY" section of this Preliminary Official Statement.]

Service Charge Methodology and Existing Service Charges

The Authority's water service charges are developed to provide sufficient levels of revenue to meet all operation and maintenance expenses of the Water System, debt service requirements on obligations issued for the Water System, capital improvement expenditures to be funded from current revenues, and other specific bond ordinance and revenue requirements. A schedule of wholesale water service charges is developed for each wholesale Customer, and an annual revenue requirement is established for the City of Detroit retail customer class, by determining the total costs of service and individual customer water service requirements. All Customers are proportionally allocated costs of service based on their use of the Regional Water System, as measured by each Customer's water usage, demands on the Regional Water System, and the distance and elevation relative to the water treatment plants.

The Authority's water cost of service allocation and service charge methodologies were developed in conjunction with its Customers as part of the design of the model contract originally implemented in 2010. The cost allocation and service charge methodologies are sound and strive to utilize the best available, verifiable information to allocate costs to individual Customers in the most equitable fashion possible. Customers are allocated costs based, in large part, on the demands they place on the system, and those demands are set forth in each Customer's contract.

The current water service charges became effective July 1, 2016 and were designed to generate an overall revenue increase of approximately 4.5 percent over revenues generated by the previous year's charges. Four percent of this increase was designed to support an overall increase of four percent in the Water System's annual revenue requirement for 2017. The remaining approximate 0.5% was designed to recognize lower water sales expected for 2017 compared with 2016. As described below, the wholesale service structure consists of commodity and fixed portions, which are unique for each Customer. The average unit cost of the charge structure for the wholesale customer class at large is $22.55 per thousand cubic feet.

The water service charges established for 2017 were developed in alignment with traditional cost of service principles that have been in place for over 30 years, although there are some notable modifications that emerged from the establishment of the Authority. These changes originally impacted the 2016 service charges previously established by DWSD, and continue for the 2017 service charges established by the Authority.

Modifications Resulting from the Lease

Prior to 2016, water cost allocations and charge schedules for wholesale customers have been developed on the "utility" basis, in conformance with State of Michigan statutes. Under the "utility" basis, a schedule of charges is developed for each wholesale customer that is designed to recover allocated cost of service responsibility as represented by operation and maintenance expense, depreciation expense, and a return on the investment the City had made in wholesale service facilities. The rate of return charged to wholesale customers generally averaged between six and seven percent in recent years. Water rates for retail customers within the City of Detroit were determined in the same manner, except that the rate of return was calculated to meet the Water System's cash requirements. The rate of return charged to City of Detroit customers was generally lower than that charged to wholesale customers, reflecting the City's ownership of the Water System and the associated risks, rights, and responsibilities of investing in regional water service facilities. In recent years, this annual "ownership benefit" was valued at approximately $20.7 million. In effect, that amount reflects an amount that is reduced from the cost of service initially allocated to the City of Detroit retail class, and added to the Suburban Wholesale class at large, prior to determining final cost responsibility and schedules of charges.

The Lease contains a directive to "lock in" the ownership benefit at the $20.7 million figure. The water service charges adopted for 2016 reflect the first year that formally reflects this provision. The principles of the utility basis remain in place, but rather than determining relative owner and non-owner rates of return on an annual basis, the resulting differential is fixed. The $20.7 million adjustment was also applied in development of the 2017 water service charges.

Structural Wholesale Charge Reforms

In recent years the structure of the wholesale charge schedules has been modified to recover more costs through a fixed component of the charge structure, and less through a commodity charge. This initiative is designed to more closely align the manner in which costs of service are allocated to customers and the manner in which such costs are recovered from customers, thereby further enhancing the water rate structure. In 2010 charges were designed to recover the entire wholesale revenue requirement through commodity charges. The 2011 charges reflected the first step in a phased approach and recovered approximately 10 percent of the revenue requirement through fixed charges. This portion was increased to approximately 27 percent in 2012 and to approximately 40 percent in 2013, where it remained through 2015. In addition to enhanced cost allocation and cost recovery alignment, this initiative also dampens seasonal and annual fluctuations in Water System revenues.

As noted earlier, reported sales volumes in recent years were significantly lower than planned levels, particularly during summer months and the traditional high levels of outdoor irrigation. Although downward adjustments in projected sales volumes were made each year, the still lower than anticipated water sales led to consistent revenue shortfalls, and the prior DWSD Board challenged management and customers to establish fundamental structural reforms similar in nature to the "Sewer Rate Simplification" initiative that was implemented for the 2015 sewer charges.

As part of the development of the 2016 water service charges, Authority management worked closely with customer representatives to recommend two fundamental modifications designed to provide enhanced equitability and revenue stability to the wholesale service charge schedules.

1. *Rather than relying on planning level estimates in customer contracts to develop revenue estimates and related financial plans, a uniform forecasting method was designed. Estimated 2016 water sales volumes for each Customer (including the City of Detroit retail class) reflected the 24-month average ending September 2014. This time period covers two of the most mild summers on record. For the wholesale class in total, the revised approach lowered projected sales volumes by over 10 percent. The resulting projected revenues were much less susceptible to abnormally low water sales volumes.*
2. *The portion of the allocated revenue requirement recovered through fixed monthly charges was increased to 60% from 40%. As a result, any future variances in water sales volume will have far less impact on annual revenue levels.*

The recommended modifications were accepted and incorporated into the 2016 water service charges. The actual reported billings to wholesale customers during 2016 indicate that the service charge structural reforms have produced initial success. For the first time this century, water sales volumes to wholesale customers exceeded planned levels during 2016, producing a positive revenue variance (compared to budgeted levels) of approximately $2.4 million[3].

[3] This positive revenue variance was further augmented by Flint's reconnection to the Regional Water System, which produced approximately $9.5 million of "unbudgeted" revenue during 2016.

The new structure was also utilized to develop the water service charges for 2017, which are in place today. The Authority anticipates that analysis of future water charges will evaluate the most recent water sales data and will continue to reflect the uniform forecasting approach. The Authority does not endorse converting to a full fixed charge rate structure, as was implemented for the suburban wholesale sewer charges. While future analyses may result in further modifications to the fixed / commodity approach, the new allocation reflects a reasonable and responsible balance and should continue to stabilize revenues.

Projection of Revenues

Table 3 presents projected operating revenues for 2017 through 2021. These projections reflect a baseline condition assuming that the existing 2017 water charges remain in effect for the duration of the study period (i.e., no revenue adjustments). Projected modifications to these charges and revenue levels will be discussed subsequently in Table 6. The Authority's financial records account for revenue based on all volume billed at the appropriate fiscal year charges and as such approximately reflect treated water pumped during the fiscal year. The projections shown in Table 3 are developed on the same basis.

Table 3
Projected Water System Sales and Revenues Under Existing Charges *(a)*

Line No.		Fiscal Year Ending June 30, 2017	2018	2019	2020	2021
		$	$	$	$	$
	Wholesale Customers					
1	Flint	13,303,200				
2	Genesee County	18,224,900				
3	All Other Wholesale Customers	295,883,400	295,983,600	295,028,200	294,077,300	293,129,900
4	Total Wholesale	327,411,500	295,983,600	295,028,200	294,077,300	293,129,900
	Detroit Retail Customer Class					
5	Revenue from Rates and Charges	87,844,900	84,942,300	82,800,000	80,720,500	78,700,000
6	Miscellaneous Revenue	4,750,000	4,750,000	4,750,000	4,750,000	4,750,000
7	Total Revenue from Detroit	92,594,900	89,692,300	87,550,000	85,470,500	83,450,000
8	**Total Operating Revenue**	**420,006,400**	**385,675,900**	**382,578,200**	**379,547,800**	**376,579,900**
	Revenues are based on projected water sales in thousands of cubic feet (Mcf) of:					
9	*Flint*	*600,000*				
10	*Genesee County*	*523,000*				
11	*All Other Wholesale*	*13,383,600*	*13,383,600*	*13,276,000*	*13,168,900*	*13,062,200*
12	*Detroit Retail Customer Class*	*3,034,000*	*2,958,200*	*2,884,200*	*2,812,100*	*2,741,800*
13	*Total Sales (Mcf)*	*17,540,600*	*16,341,800*	*16,160,200*	*15,981,000*	*15,804,000*

(a) Based on application of FY 2017 charges for 2017 through 2021. Net of projected bad debt expense.

Table 3 also presents the projected sales volumes upon which the commodity charge portion of the projected water revenues are based, and separates the portion of the wholesale customer class revenues and sales that are associated with Flint and Genesee County. As previously noted, these projections assume revenues from both of these customers for the entirety of 2017, and no sales or revenues thereafter resulting in a revenue reduction of approximately 6.5% of total Water System revenues. *See "Service Area."*

The projected 2017 revenues of approximately $13.3 million from Flint were not anticipated at the time the FY 2017 and 2018 Biennial Budget was prepared, and when the current water service charges were developed and approved. Therefore the existing service charges to all customers already contemplate the loss of revenue associated with Flint, and Flint's ultimate departure from the Regional Water System will not result in a service charge adjustment to other customers. Flint has agreed to continue to pre-pay for extended water service, and is replenishing the prepayment fund for 2017 service in two installments. The first installment payment has been received and the second payment is scheduled to be deposited in October 2016.

Genesee County's expected departure in 2018 will result in a negative revenue variance of approximately $18.2 million. This figure represents approximately 4.4 percent of all revenue from charges. The variable costs of providing water to Flint and Genesee County are not material, and absent offsetting additional savings in the short term, this revenue shortfall will need to be recovered from all other customers. *See "Operational Financing Plan."*

These revenue projections do not include any revenue from the City of Highland Park, a wholesale customer with a delinquent balance of close to $3.6 million. Highland Park began utilizing water from the Authority in January 2013 on an "interim non-contract" emergency basis and has not made a payment for water provided in over three years. Suburban wholesale revenues for 2016 and the remainder of the study period reflect application of the existing commodity charges to the projected sales volumes, and adding the revenue associated with the fixed monthly charges of the charge structure. The projected operating revenue from suburban wholesale customers assumes no collection from Highland Park, despite the fact that the Authority has taken legal action to recover the delinquent balance and ongoing bills for service, having received a favorable lower court judgment, subsequently stayed, pending action by the Michigan Supreme Court.

The projected water sales for 2017 reflect the uniform forecasting method introduced above. Projected sales volumes for 2018 through 2021 reflect the "most probable" scenario assumptions from the Master Plan findings. Under this scenario, the service population is projected to decline 0.55% annually for the suburban wholesale customer class and 0.75% annually for the Detroit retail customer class during the projection period. In addition, "usage per capita" is projected to decline 0.27% annually from current levels during the projection period, which produces annual reductions in sales volume expectations of approximately 0.8% for the suburban wholesale class and approximately 2.5% for the Detroit retail class. The projected annual revenue reductions are less than the projected sales volume reductions due to the fixed charge element in the charge structure, which reflects 60% of suburban wholesale water revenues and approximately 30% of Detroit retail water revenues.

The revenue projections for the retail class are reflected on a modified cash basis reflecting estimated billed revenues less an allowance for bad debt expense that was developed based on a review of recent collection results. Analysis of recent data indicates a collection rate of approximately 87 percent of all billed revenue to retail customers, and that metric has been used for these projections. Miscellaneous Operating Revenue includes revenues generated through the sale of equipment, penalty charges, turn-on and shut-off fees, fire hydrant maintenance, and other operations.

Operation and Maintenance Expense Projections

Table 4 presents projected operation and maintenance expense, and certain non-operating expenses related to financing legacy employee benefit obligations, for 2017 through 2021. Projections for 2017 and 2018 are equal to the amounts reflected in the initial biennial budget adopted by the Authority, and serve as a baseline for the remaining years. The expenses in this table reflect amounts for both Authority wholesale service and DWSD retail service.

The annual "normal" operating expenses of the Regional Water System are reflected on Lines 1 through 13. The projections include preliminary detailed evaluation of expected programmatic evolution regarding staffing plans and use of contractual resources. In general, these projections anticipate a gradual growth in internal staffing (and therefore in salaries and wages) and a gradual phase out of personal service contracts. The Authority continues to pursue implementation of programs designed to improve efficiency and produce operating expense savings, and it is possible that such savings will emerge during the projection period, particularly in the non-personnel cost categories. However, given the complexities of standing up two new operational entities, we believe it is prudent to not reflect any such savings for purposes of these projections, pending additional developments. The Authority operating expenses include an "unallocated reserve" on Line 12 designed to acknowledge the dynamic operational structure of a brand new entity and to address unforeseen operational needs. In particular, the biennial budget for 2017 and 2018 placed downward pressure on individual budgetary lines to remove contingencies that were previously within individual departments. The Authority has pledged to align use of the unallocated reserve with a new fiscal note process to increase accountability. The total "normal" operation and maintenance expenses for the Authority are shown on Line 13, and are projected to increase approximately 2.7% annually after 2018.

The projected operating budget for DWSD Local Water System operation and maintenance expense is shown on Line 14. This line item reflects amounts collected via retail rates charged to the Detroit retail customer class and transferred to the Detroit Local Operation and Maintenance Account to fund local operating expenses. The amounts are effectively "pass through" revenue requirements for the Authority. For purposes of these projections we have assumed an annual increase of three percent starting in 2019. Line 15 indicates the projected combined annual operation and maintenance expense for both entities, and represents the projected amount of revenues that will be transferred to the Operation and Maintenance Fund for each year related to current operating expenses of the Water System.

Table 4
Projected Operation and Maintenance Expense (and Selected Non-Operating Expenses)

Line No.		*Fiscal Year Ended June 30,*				
		2017	2018	2019	2020	2021
		$	$	$	$	$
1	Salaries & Wages	15,888,600	16,683,400	17,495,300	18,214,300	18,960,800
2	Overtime	2,384,600	2,364,900	2,402,400	2,450,500	2,499,500
3	Employee Benefits	5,775,700	6,059,700	6,299,000	6,622,000	6,962,200
4	Subtotal Personnel	24,048,900	25,108,000	26,196,700	27,286,800	28,422,500
5	Personal (Transitional) Service Contracts	5,658,200	5,953,600	5,531,700	5,064,600	4,564,500
6	TOTAL Personnel Costs	29,707,100	31,061,600	31,728,400	32,351,400	32,987,000
7	Contractual/Purchased Services	28,882,500	28,111,900	28,883,000	29,749,500	30,642,000
8	Utilities	33,643,000	32,659,500	33,639,300	34,648,400	35,688,000
9	Chemicals	6,192,500	6,192,500	6,378,200	6,569,600	6,766,700
10	Supplies & Other	10,316,900	9,964,800	10,263,800	10,571,700	10,888,800
11	Subtotal	108,742,000	107,990,300	110,892,700	113,890,600	116,972,500
12	Unallocated Reserve	3,137,400	8,364,200	8,871,400	9,111,200	9,357,800
13	Total "Normal" GLWA O&M	111,879,400	116,354,500	119,764,100	123,001,800	126,330,300
14	DWSD Local O&M	33,596,300	34,013,600	34,836,600	35,881,700	36,958,200
15	Combined Total "Normal" O&M	145,475,700	150,368,100	154,600,700	158,883,500	163,288,500
	Operating Pension Reimbursement *(a)*					
16	GLWA Regional	6,037,100	6,037,100	6,037,100	6,037,100	6,037,100
17	DWSD Local	4,262,900	4,262,900	4,262,900	4,262,900	4,262,900
18	Total	10,300,000	10,300,000	10,300,000	10,300,000	10,300,000
19	GRAND TOTAL O&M	155,775,700	160,668,100	164,900,700	169,183,500	173,588,500
	Non-Operating Expense *(b)*					
20	Non-Operating Portion of Pension Reimb.	9,200,000	9,200,000	9,200,000	9,200,000	9,200,000
21	B & C Note Non-Operating Payments	1,712,700	1,712,700	1,712,800	1,712,800	1,712,800
22	Transfer to Pension Obligation Payment Fund	10,912,700	10,912,700	10,912,800	10,912,800	10,912,800

(a) Transferred to Pension Obligation sub-account of the Operation and Maintenance Fund, and treated as Operation and Maintenance Expense for purposes of Net Revenue determination.
(b) ***Not*** *treated as Operation and Maintenance Expense for purposes of Net Revenue determination.*

As noted above, the operation and maintenance expenses also include deposits to the Pension Obligation subaccounts of the Operation and Maintenance Fund, which total $10.3 million annually for the Water System, and which are shown on Lines 16 and 17 of Table 4. The remaining Water System $9.2 million annual contribution to the Pension Obligation Payment Fund is shown as a non-operating expense on Line 20, and the Water System's allocated share of the B and C Notes issued by the City of Detroit to finance other post employment benefits settled by Detroit's Plan of Adjustment are shown on Line 21. The Water System's allocated share of the annual $45.4 million combined annual contribution to the GRS pension plan totals $19.5 million, as reflected on Lines 18 and 20 of Table 4. These deposits are designed to end in 2023, although the Plan of Adjustment stipulates that the final resolution of the obligation will be subject to a true-up analysis.

Capital Improvement Program Financing Plan

Table 5 presents a plan for financing the Regional Water System CIP (Line 1) for the study period. Traditionally, the Water System's capital financing strategies followed a "maximum debt financing" strategy. In essence, within the constraints of the Additional Bonds Test and the Water System's debt service coverage policies, the amount of bonds to be issued was designed to maximize the capital requirements financed with bond proceeds. Recently, Authority management (with support of the Board) has modified the traditional strategy and established a long term goal of reducing the Water System's significant reliance on debt for capital financing and has indicated management's intent to shift towards a more balanced debt/revenue financing approach. The capital financing plan presented herein is designed to continue implementation of that more balanced approach. Customer representatives have embraced this planning strategy as being essential to improving the financial position of the Water System.

Lines 2 through 16 outline the sources available to meet the CIP financing requirements. Line 2 shows the estimated net balance in the Authority Improvement and Extension ("I&E") Fund as of June 30, 2016, which is available to fund the CIP. Line 3 shows the amount projected to be transferred to the I&E Fund each year from current operating revenues. Total funds available from the I&E Fund are indicated on Line 4. For planning purposes, revenue transfers to the I&E Fund are not assumed to be eligible to finance capital improvements until at least the year subsequent to their generation.

The capital financing available from the Authority Construction Fund is indicated on Lines 5 through 17. Line 5 shows the estimated net balance in the Construction Fund as of June 30, 2016, which is available to fund the CIP. The Series 2016 Bonds are designed to provide approximately $272 million of proceeds to finance capital improvements, $57 million of which are committed to be transferred to the DWSD Construction Fund to finance improvements to the DWSD Local Water System. The remaining total of approximately $215 million will be utilized to finance expenditures in the Regional Water System CIP through June 30, 2018 (the "2016 Project"). The capital financing plan presented in Table 5 envisions issuances of additional revenue bonds in 2019 and 2020 to finance additional expenditures in the Authority CIP. For planning purposes, these projected additional bonds do not include any proceeds to finance expenditures for the DWSD Local Water System. To the extent that DWSD opts to pursue financing of local system projects through Authority revenue bond transactions, these projections would change. While the Authority is responsible for the debt service on bonds issued to finance capital improvements to the DWSD Local Water System, the annual principal and interest requirements are included in the revenue requirements assigned to the City of Detroit customer class.

The Authority is in the process of issuing Junior Lien Water Supply System Revenue Bonds through the State Drinking Water Revolving Fund (DWRF) to finance approximately $33 million of CIP expenditures for local DWSD capital improvements. Loans totaling approximately $16 million [closed in] September 2016 and an additional $17 million are scheduled to close in March 2017. Proceeds from these loans are reflected on Line 13 of Table 5, and shown to be transferred to the DWSD Construction Fund on Line 14. Again, while the

Authority is responsible for the debt service on these Junior Lien Bonds, the annual principal and interest requirements are included in the revenue requirements assigned to the City of Detroit retail customer class. The projections presented in this report do not anticipate any DWRF proceeds to finance Authority capital improvements.

Table 5
Capital Improvement Program Financing

Line No.	Item	*Fiscal Year Ending June 30,* 2017	2018	2019	2020	2021	Total	
		$	$	$	$	$	$	
	Financing Requirements							
1	Capital Improvement Program (a)	130,232,000	144,845,000	193,242,000	173,936,000	109,833,000	752,088,000	
	Financing Sources							
	Improvement and Extension (I&E) Fund							
2	Beginning Balance (b)	68,000,000	87,070,300	85,396,600	82,388,800	74,587,000	*68,000,000*	*(h)*
3	Revenue Financed Capital	39,070,300	28,326,300	31,992,200	32,198,200	39,781,000	171,368,000	
4	Subtotal - Improvement & Extension Fund	107,070,300	115,396,600	117,388,800	114,587,000	114,368,000	239,368,000	
	Construction Bond Funds							
5	Beginning Balance (b)	13,000,000	117,741,500	2,896,500	32,654,500	86,718,500	*13,000,000*	*(h)*
	Bond Proceeds							
6	Water System Revenue Bonds (c)	246,600,000	0	200,000,000	200,000,000	0	646,600,000	
7	Net Premium / Discount	40,397,500					40,397,500	
8	Less: Defeasance Requirements	0					0	
9	Less: Transfer to DWSD Const. Fund (d)	(57,000,000)	0	0	0	0	(57,000,000)	
10	Less: Bond Reserve Requirements (e)	(13,756,200)	0	(10,700,000)	(10,700,000)	0	(35,156,200)	
11	Less: Issuance Expenses	(1,267,800)	0	(1,300,000)	(1,300,000)	0	(3,867,800)	
12	Net Bond Proceeds Available	214,973,500	0	188,000,000	188,000,000	0	590,973,500	
13	State Drinking Water Revolving Fund Loans	16,000,000	17,000,000	0	0	0	33,000,000	
14	Less: Transfer to DWSD Constr. Fund	(16,000,000)	(17,000,000)	0	0	0	(33,000,000)	
15	Net State DWRF Financing for Authority	0	0	0	0	0	0	
16	Subtotal - Construction Bond Funds	227,973,500	117,741,500	190,896,500	220,654,500	86,718,500	603,973,500	
17	**Total Financing Sources Available**	335,043,800	233,138,100	308,285,300	335,241,500	201,086,500	843,341,500	
	Application of Financing Sources							
18	Project Expeditures from I&E Funds	20,000,000	30,000,000	35,000,000	40,000,000	45,000,000	170,000,000	
19	Project Expeditures from Construction Funds	110,232,000	114,845,000	158,242,000	133,936,000	64,833,000	582,088,000	
20	**Total Financing Sources Applied**	130,232,000	144,845,000	193,242,000	173,936,000	109,833,000	752,088,000	
	Financing Sources Available for Future Requirements							
21	Improvement & Extension Fund (f)	87,070,300	85,396,600	82,388,800	74,587,000	69,368,000	*69,368,000*	*(i)*
22	Construction Bond Funds (g)	117,741,500	2,896,500	32,654,500	86,718,500	21,885,500	*21,885,500*	*(i)*
23	**Financing Sources Available for Future Req'ts**	204,811,800	88,293,100	115,043,300	161,305,500	91,253,500	*91,253,500*	*(i)*

(a) From Table 2.
(b) Estimated balance available June 30, 2016 (applies only to Fiscal Year 2017).
(c) The Series 2016 Bonds (for Fiscal Year 2017) and projected additional future bonds.
(d) Includes amounts from the Series 2016 Bonds to provide funding to the DWSD CIP for 2017 and 2018. Assumes that no DWSD CIP financing will be required from additional future bonds.
(e) Assumes amounts will be required from bond proceeds to fund debt service reserve fund.
(f) Line 4 minus Line 17.
(g) Line 15 minus Line 18.
(h) Total column reflects estimated balance available June 30, 2016.
(i) Total column reflects estimated balance available June 30, 2021.

Lines 18 through 20 illustrate the projected application of financing sources to meet the CIP financing requirements stated on Line 1. The balances of funds available for subsequent years is shown on Lines 21 through 23 and are carried forward to Lines 2 and 5 in the next year. The plan to finance the Authority CIP is designed to carry over annual balances in the I&E Fund of approximately $75 to $90 million, and adequate balances in the Authority Construction Fund to facilitate the timing of subsequent bond sales.

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Operational Financing Plan

Table 6 presents a projected plan for the annual operating and capital financing requirements of the Water System for the 2017 through 2021 projection period. The table provides an indication of the adequacy of the Authority's revenues and the feasibility of the future anticipated revenue bond sales and the associated financing plan. This table is designed to indicate the approximate level of annual operating revenues that is projected to be necessary to finance the remaining years of the current CIP and ongoing operating requirements. The overall financial plan summarized by these projections is designed to embrace the Authority's long-term financial stability strategy, which leverages optimization savings, coupled with annual revenue adjustments (equivalent to four percent of the prior year's total revenue budget), to produce increasing amounts of "unrestricted cash" that remains after providing for payment of operation and maintenance expenses, debt service payments, and funding of the various non-operating elements set forth in the foundational documents for the Authority. *See "GLWA Financial Planning Guiding Principles."*

Operating revenue projections, presented in Table 3, are based on the Authority's current water service charge schedule. Projected "Revenues from Adjustments" are presented on Lines 2 through 5, and reflect the increase in annual unit costs necessary to produce a revenue level equal to maximum extent contemplated by the terms of the Lease, which calls for a target 4.0% increase in annual revenue requirements. Due to a projected decline in the revenue base under existing charges, the actual revenue adjustment (or increase in unit costs) required to produce the 4.0% increase in revenue is actually higher than 4.0%. The projected adjustment for the Water System for 2018 also includes an amount necessary to make up the lost revenue from Genesee County as they depart the Regional Water System. The projected revenue adjustments during the projection period are believed to be comparable with those that should be experienced in other areas of the country having water systems of comparable age, and facing similar infrastructure challenges, as the Water System.

Projected non-operating revenues of the Regional Water System include investment earnings from all eligible Water System funds and have been projected based on an analysis of funds on hand, construction schedules, and average fund balances. An annual interest rate of 0.75 percent has been assumed in projecting interest income for all funds.

The Revenue Requirements in this table are presented in a manner that follows the flow of funds set forth in the Master Bond Ordinance. Operation and maintenance expenses are provided for first, followed by debt service separated by the various liens, followed by deposits to the Pension Obligation Payment Fund, the the WRAP Fund, the Budget Stabilization Fund, the Extraordinary Repair and Replacement Reserve Fund, and finally the I&E Fund (including the Lease Payment), as further described below.

The projected operation and maintenance expenses shown on Lines 11 through 15 reflect the total projected transfers to the Operation and Maintenance Funds, including amounts to provide for the operating expense portion of the Pension Obligation reimbursement, as summarized in Table 4.

Table 6
Operational Financing Plan

Line No.	Item	Fiscal Year Ending June 30, 2017 $	2018 $	2019 $	2020 $	2021 $
	Revenue (a)					
1	Operating Revenue Under Existing Charges	415,256,400	380,925,900	377,828,200	374,797,800	371,829,900
	Projected Revenue from Adjustments					
2	FY 2018: 9.0%		34,259,400	33,980,800	33,708,300	33,441,300
3	FY 2019: 4.9%			20,253,600	20,091,200	19,932,100
4	FY 2020: 4.9%				20,940,000	20,774,200
5	FY 2021: 4.9%					21,764,700
6	Total Projected Revenue from Water Charges	415,256,400	415,185,300	432,062,600	449,537,300	467,742,200
7	Miscellaneous Operating Revenue	4,750,000	4,750,000	4,750,000	4,750,000	4,750,000
8	Total Operating Revenue	420,006,400	419,935,300	436,812,600	454,287,300	472,492,200
9	Non-Operating Revenue	2,077,600	3,101,500	3,145,700	3,269,400	3,366,700
10	**Total Revenue Available**	422,084,000	423,036,800	439,958,300	457,556,700	475,858,900
	Revenue Requirements					
11	Transfer to GLWA Regional O&M Account	111,879,400	116,354,500	119,764,100	123,001,800	126,330,300
12	Transfer to DWSD Local O&M Account	33,596,300	34,013,600	34,836,600	35,881,700	36,958,200
13	Transfer to GLWA Pension O&M Account	6,037,100	6,037,100	6,037,100	6,037,100	6,037,100
14	Transfer to DWSD Pension O&M Account	4,262,900	4,262,900	4,262,900	4,262,900	4,262,900
15	Total O&M Expense	155,775,700	160,668,100	164,900,700	169,183,500	173,588,500
	Debt Service - Bond and Interest Redemption Deposits					
	Senior Lien Bonds					
16	Outstanding Bonds	133,321,000	131,401,700	124,708,100	124,680,800	125,140,200
17	The 2016 GLWA Bonds	11,010,500	16,115,800	16,115,000	16,114,500	16,118,800
18	Future Bonds (lien unspecified)	0	0	7,125,000	19,767,000	25,283,800
19	Total Senior Debt Service	144,331,500	147,517,500	147,948,100	160,562,300	166,542,800
	Second Lien Bonds					
20	Outstanding Bonds	42,042,100	42,596,100	51,036,100	51,025,300	51,059,300
21	The 2016 GLWA Bonds	0	0	0	0	0
22	Total Second Lien Bonds	42,042,100	42,596,100	51,036,100	51,025,300	51,059,300
23	Subtotal Debt Service	186,373,600	190,113,600	198,984,200	211,587,600	217,602,100
24	SRF Junior Lien Bonds	2,036,400	2,410,700	2,953,300	3,244,100	3,242,600
25	Total Debt Service	188,410,000	192,524,300	201,937,500	214,831,700	220,844,700
26	Non-Operating Portion of Pension Reimb.	9,200,000	9,200,000	9,200,000	9,200,000	9,200,000
27	B & C Note Non-Operating Payments	1,712,700	1,712,700	1,712,800	1,712,800	1,712,800
28	Transfer to Pension Obligation Payment Fund	10,912,700	10,912,700	10,912,800	10,912,800	10,912,800
29	Transfer to WRAP Fund	2,076,300	1,904,600	2,059,000	2,143,000	2,229,900
30	Transfer to Budget Stabilization Fund	360,400	360,500	0	0	0
31	Transfer to Extra. Repair and Repl. Fund	0	733,900	634,900	642,400	660,800
32	Lease Payment - Transfer to Detroit Local I&E	22,500,000	22,500,000	22,500,000	22,500,000	22,500,000
	Transfers to I&E Fund to Finance Capital Improvements					
33	Transfer to GLWA Regional I&E Account	39,070,300	28,326,300	31,992,200	32,198,200	39,781,000
34	Transfer to DWSD Local I&E Account	2,978,600	4,008,500	4,168,800	4,335,600	4,509,000
35	Total Transfers to I&E Fund	42,048,900	32,334,800	36,161,000	36,533,800	44,290,000
36	Operating Reserves	0	1,097,900	852,400	809,400	832,200
37	**Total Revenue Requirements**	422,084,000	423,036,800	439,958,300	457,556,600	475,858,900
38	Indicated Balance (Deficiency)	0	0	0	100	0
	Debt Service Coverage Projections					
39	Senior Lien for Rate Covenant Purposes	185%	178%	186%	180%	181%
40	Second Lien for Rate Covenant Purposes	143%	138%	138%	136%	139%
41	SRF Junior Lien for Rate Covenant Purposes	141%	136%	136%	134%	137%
42	*Net Revenues (10) - (15)*	*266,308,300*	*262,368,700*	*275,057,600*	*288,373,200*	*302,270,400*
43	*Net Revenues Available after Debt Service (42)-(25)*	*77,898,300*	*69,844,400*	*73,120,100*	*73,541,500*	*81,425,700*
44	*Applied to MBO Reserve Funds (28,29,30,31)*	*(13,349,400)*	*(13,911,700)*	*(13,606,700)*	*(13,698,200)*	*(13,803,500)*
45	*Applied as Lease Payment to DWSD I&E Acct (32)*	*(22,500,000)*	*(22,500,000)*	*(22,500,000)*	*(22,500,000)*	*(22,500,000)*
46	*Applied to Operating Reserves (36)*	*0*	*(1,097,900)*	*(852,400)*	*(809,400)*	*(832,200)*
47	*Available for System CIP*	*42,048,900*	*32,334,800*	*36,161,000*	*36,533,900*	*44,290,000*

(a) From Table 3. Based on application of FY 2017 charges for 2017 through 2021.
(b) From Table 4.

The Authority's projected debt service is depicted on Lines 16 through 25, separated by priorities of lien. The debt service on outstanding bonds does not reflect potential savings provided by the refunding portion of the Series 2016 Bonds. Debt service on senior lien bonds is summarized on Lines 16 through 19, and includes existing debt service on outstanding bonds, plus estimated debt service on the projected "new money" portion of the Series 2016 Bonds, and on future bond sales indicated in Table 5. For purposes of these projections, a scale assuming level debt service based on a 30-year term and an interest rate of 4.75 percent has been assumed on all of these projected bond sales. While no strategic designation as to the lien status of future bonds has been made nor contemplated, for purposes of these projections it is assumed that any additional bonds would be issued as senior lien. A similar presentation of debt service on second lien bonds is presented on Lines 20 through 22. Projected repayments of DWRF Loans are stated on Line 24. These figures reflect repayments of existing loans, an expected transaction to close approximately $16 million of loans in [September 2016], and an additional transaction of approximately $17 million scheduled to close in March 2017. These transactions are entirely related to improvements to the Detroit Local Water System.

Transfers to the WRAP Fund, shown on Line 29, are established at 0.5% of total projected revenues from service charges. For purposes of these projections, we've assumed that annual amounts deposited into the WRAP Fund will be fully exhausted in the year they are transferred, and therefore these projections do not track WRAP Fund balances or activities.

Transfers to the Budget Stabilization Fund on Line 30 reflect those amounts necessary to establish a balance equivalent to twenty percent of the average annual bad debt expense for the City of Detroit retail customer class for the preceding two fiscal years. The Lease provides that the initial balance in this fund can be achieved over a three-year period. The projections are designed to fully fund the Budget Stabilization Fund (via rates and charges to the Detroit Retail class) by 2018, and to remain at that "fully funded" level thereafter. Actual future funding requirements will be determined by future levels of reported bad debt expense. To the extent that future bad debt expense increases, additional deposits to the Fund will be required. To the extent that future bad debt expense is reduced, the Budget Stabilization Fund balance may be reduced and funds "freed up" for other uses specific to the Detroit retail class.

Transfers to the Extraordinary Repair and Replacement Reserve ("ER&R") Fund are indicated in amounts equal to the lesser of three percent of that year's budgeted operation and maintenance expense (including both the GLWA Regional and DWSD Local operating expenses, but excluding transfers to the Pension O&M subaccounts) or that which is necessary to enable the aggregate value of the fund to equal 15 percent of that year's budgeted operation and maintenance expense. The beginning balance in this fund reflects a fully funded status, and projected transfers shown on Line 31 are those required to maintain this status as budgeted operating expenses increase.

The next revenue requirement relates to the Regional Water System's share of the $50 million Lease Payment. To the extent that the City of Detroit opts to direct the entire amount of the Lease Payment to finance capital improvements, a $22.5 million transfer of Authority revenues to the Detroit Local Water I&E Account of the Water System I&E Fund will occur. For

purposes of these projections we have assumed that the City will select to direct the entirety of the Lease Payment to the Detroit Local I&E Account, as shown on Line 32.

Remaining balances are next available for transfer to the Authority Regional and Detroit Local I&E subaccounts of the I&E Fund held within the Trust. The amounts shown on Line 34 for the Detroit Local I&E Account are equal to those indicated in the biennial budget for 2017 and 2018. For purposes of these projections we have assumed annual increases of four percent in the remaining years.

Line 36 of Table 6 presents a revenue requirement established to ensure adequate balances of operating reserves, or working capital. This reserve is established in a similar manner to the Extraordinary Repair and Replacement Reserve Fund and is summarized in detail in Table 7. Annual deposits are targeted to achieve a desired balance expressed in terms of a set amount of days of annual operation and maintenance expense. The June 30, 2016 balance of this reserve was established at a level equivalent to 90 days of annual Authority operation and maintenance expense, including the operating portion of the transfer to the GLWA Pension O&M Account. Projected amounts in 2018 and beyond are anticipated to maintain the total balance at 90 days of annual budgets, as they increase due to inflation.

All remaining revenues are assumed to be transferred to the GLWA Regional I&E Account (as shown on Line 33), and are included in the capital financing plan in Table 5. These projected amounts represent the difference between the total revenue requirements (as established by the overall assumption that the total budgeted revenue requirements will increase 4% annually) and the sum of the other revenue requirements discussed above. For instance, the 2018 revenue requirements are consistent with those contained in the biennial budget and total approximately $423 million. An increase of 4% results in total 2019 revenue requirements of approximately $440 million. After providing for all of the projected 2019 revenue requirements (other than the GLWA Regional I&E Account) in the manner delineated above, which total approximately $408 million, approximately $32 million remains, which is reflected as the transfer to the GLWA Regional I&E Account on Line 33.

Pursuant to the Rate Covenant of the Master Bond Ordinance, water service charges must be established to maintain debt service coverage ratios of at least 1.20 for Senior Lien Bonds, 1.10 for Second Lien Bonds, and 1.00 for SRF Junior Lien Bonds. The prior DWSD Board had established minimum policy targets that were 0.15 higher for each of these ratios, or at least 1.35 for Senior Lien Bonds, 1.25 for Second Lien Bonds, and 1.15 for SRF Junior Lien Bonds. While the Authority Board has yet to formally establish a new debt service coverage policy, the financial plans presented herein are designed to comply with the prior policy.

Projections of annual debt service coverage levels are summarized on Lines 39 through 41. These coverage levels are calculated on the same basis as required by the rate covenant contained in the Master Bond Ordinance. As indicated, annual coverage levels, assuming the revenue adjustments shown, are projected to be in excess of the amounts required by the Master Bond Ordinance and current policy.

The financial plan presented herein is designed to enhance the System's balance sheet, reverse the erosion in net assets that has occurred in recent years, and improve the Water System's liquidity position. Authority management has embraced this planning strategy, which results in increasing debt service coverage ratios, as indicated in the table.

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Projected Fund Balances

Table 7 presents a summary of the projected cash and investment balances in the System's Operating, Budget Stabilization, ER&R, and I&E Funds. It does not reflect any of the funds that are effectively "exhausted" in the year they are transferred, such as the Debt Service Accounts within the Bond and Interest Redemption Funds, the Pension Obligation Payment Fund, and the WRAP Fund.

Table 7
Projected Cash and Investment Fund Balances

Line No.	Item	*Fiscal Year Ending June 30,* 2017	2018	2019	2020	2021
		$	$	$	$	$
	Operating Fund					
1	Beginning Balance	29,500,000	29,500,000	30,597,900	31,450,300	32,259,700
2	Deposit from Operations	0	1,097,900	852,400	809,400	832,200
3	Ending Balance	29,500,000	30,597,900	31,450,300	32,259,700	33,091,900
	Budget Stabilization Fund					
4	Beginning Balance	2,326,900	2,687,300	3,047,800	3,047,800	3,047,800
5	Deposits / (Withdrawals)	360,400	360,500	0	0	0
6	Ending Balance	2,687,300	3,047,800	3,047,800	3,047,800	3,047,800
	ER&R Fund					
7	Beginning Balance	21,821,300	21,821,300	22,555,200	23,190,100	23,832,500
8	Transfers In	0	733,900	634,900	642,400	660,800
9	Ending Balance	21,821,300	22,555,200	23,190,100	23,832,500	24,493,300
	I&E Fund *(a)*					
10	Beginning Balance	67,704,100	89,753,000	92,087,800	93,249,100	89,783,300
11	Deposits from Revenues *(b)*	42,048,900	32,334,800	36,161,300	36,534,200	44,290,300
12	Capital Expenditures	(20,000,000)	(30,000,000)	(35,000,000)	(40,000,000)	(45,000,000)
13	Ending Balance	89,753,000	92,087,800	93,249,100	89,783,300	89,073,600
	Total Revenue Generated Funds *(c)*					
14	Beginning Balance	121,352,300	143,761,600	148,288,700	150,937,300	148,923,300
15	Net Transfers	22,409,300	4,527,100	2,648,600	(2,014,000)	783,300
16	Ending Balance	143,761,600	148,288,700	150,937,300	148,923,300	149,706,600
	Other Funds					
17	Bond Reserve	70,903,900	70,903,900	78,028,900	97,795,900	123,079,700
18	Bond Redemption (Avg)	62,803,300	64,174,800	67,312,500	71,610,600	73,614,900
19	Construction Fund	117,741,500	2,896,500	22,654,500	66,718,500	1,885,500
20	Total Funds	395,210,300	286,263,900	318,933,200	385,048,300	348,286,700
21	*Subtotal w/o Construction Funds*	*277,468,800*	*283,367,400*	*296,278,700*	*318,329,800*	*346,401,200*

(a) Only includes GLWA I&E Account
(b) Does not include Lease Payment transferred to DWSD Local I&E Account.
(c) Excludes MBO Funds that are funded and assumed to be fully expended each year, such as the Bond and Interest Redemption Funds, the Pension Obligation Payment Fund, and the WRAP Fund.

The figures on Lines 1 through 16 represent those funds that are entirely generated by revenues, and exclude any amounts funded by bond proceeds. The mechanics of these funds have already been discussed. For planning purposes, operating revenues generated to finance capital improvements are transferred to the I&E Fund and assumed to be not be eligible for capital financing until at least the following year. These funds are technically available to be transferred to a Surplus Fund and to other System funds for any System use.

The Bond Reserve and Construction Fund balances on Lines 17 and 19 are generated via issuance of debt. The Debt Service Accounts of the Bond and Interest Redemption Funds (while funded via revenues) are effectively cleared out as debt service payments are made. The amounts shown on Line 18 of the table reflect the average balances throughout the year. Table 7 illustrates the projected stability in cash and investment balances.

Compliance with Additional Bonds Test

The "Additional Bonds Test" (the "ABT") of the Master Bond Ordinance governing issuance of the Series 2016 Bonds provides two approaches for certifying eligibility to issue the bonds. For any bonds that are structured to provide new capital financing proceeds, the test requires a net revenues analysis to show coverage of maximum annual future debt service. An alternate test is available for bonds that are issued solely for refunding purposes.

Coverage Test

The coverage test portion of the Additional Bonds Test states that the Authority may not issue additional securities to finance system improvements unless the applicable net revenues of the Water System generate sufficient coverage of the maximum future annual principal and interest requirements on the outstanding bonds and on the additional bonds issued. The coverage requirement for each lien of priority includes debt service for the lien in question, plus debt service on all bonds (if any) of all higher lien priorities. Sufficient coverage is defined as being equal to or greater than 120 percent for Senior Lien Bonds, 110 percent for Second Lien Bonds, and 100 percent for all bonds, including Junior Lien Bonds. For purposes of determining the "applicable" net revenues, the Authority may utilize either (a) the historical net revenues for the most recently completed fiscal year for which there is an audit report (so long as the fiscal year has been completed within 16 months of the issuance date of the bonds in question); (b) the current fiscal year; or (c) the immediately succeeding fiscal year. To the extent that a historical year is chosen as the "applicable" year, and to the extent that any changes in rates, fees and charges has been authorized prior to the issuance of the bonds being evaluated, net revenues may be augmented by an amount reflecting the effect of such changes had the Water System's billings during such Fiscal Year been at the increased charges.

Table 8 presents the level of ABT coverage provided for the Series 2016 Bonds. For purposes of the test, we have prepared calculations of "ABT Net Revenues" for each of the three potentially available years defined by the test and described above. We have presented historical, augmented figures for 2015, which will remain eligible for the historical test up until October 31, 2016. These 2015 "ABT Net Revenues" reflect the "modified cash" basis (derived from DWSD's accrual basis "Statement of Changes in Net Position" in the audited financial

statements). We have also provided projected figures for 2017, the current fiscal year, and 2018, the succeeding fiscal year. The projected figures are consistent with those presented in Table 6. While the ABT technically only requires compliance with ANY ONE of the applicable years, this table presents capacity under ALL applicable test periods.

Table 8
Ability of the System to Meet the Additional Bonds Test for Issuance of the Bonds

Line No.			(1) Historical Test	(2) Prospective Test	(3) Prospective Test
			DWSD	Current Year	Succeeding Year
			FY 2015	FY 2017	FY 2018
			$	*$*	*$*
1	Revenues		366,104,300	423,036,800	439,958,300
2	Operating Expenses		(136,029,800)	(160,668,100)	(164,900,700)
3	Net Revenues		230,074,500	262,368,700	275,057,600
4	Augmentation *(a)*		**49,085,200**	***NA***	***NA***
5	Augmented Revenues		415,189,500	423,036,800	439,958,300
6	Augmented Net Revenues		279,159,700	262,368,700	275,057,600
	Alllowable Max Future Debt Service				
7	Senior Lien Bonds	*1.20*	232,633,100	218,640,600	229,214,700
8	Senior and 2nd Lien Bonds	*1.10*	253,781,500	238,517,000	250,052,400
9	All Bonds, Including SRF Jr Lien	*1.00*	279,159,700	262,368,700	275,057,600
	Existing Maximum Future Debt Service				
10	Senior Lien Bonds	*in 2035*	144,602,100	144,602,100	144,602,100
11	2nd Lien Bonds	*in 2022*	176,334,600	176,334,600	176,334,600
12	SRF Jr Lien Bonds	*in 2022*	178,863,900	178,863,900	178,863,900
	Allowable Incremental Max Future Debt Service				
13	Senior Lien Bonds		88,031,000	74,038,500	84,612,600
14	Senior and 2nd Lien Bonds		77,446,900	62,182,400	73,717,800
15	All Bonds, Including SRF Jr Lien		100,295,800	83,504,800	96,193,700

(a) Augmented Revenue Calculation

		(1)	(2)	(3)	(4)	(5)	(6)
		Reported	*Augmentation - % Charge Adjustment*			*Calculated*	*Augmented*
		Revenue	*FY 16 Charges*	*FY 17 Charges*	*Combined*	*Augmentation*	*Revenue*
					(2) & (3)	*(1)*(4)*	*(1) + (5)*
	FY 2015	*audited*					
16	*Wholesale Service Revenue*	*264,930,700*	*11.3%*	*3.9%*	*15.6%*	*41,421,800*	*306,352,500*
17	*Retail Service Revenue*	*93,221,400*	*4.8%*	*3.2%*	*8.2%*	*7,663,400*	*100,884,800*
18	*Total Revenue from Charges*	*358,152,100*			*13.7%*	*49,085,200*	*407,237,300*

The applicable Net Revenues on Line 6 of Table 8 produce the various "allowable" maximum future debt service levels by lien on Lines 7 through 9. Subtracting the existing maximum future debt service by lien on Lines 10 through 12 (which includes debt service on the DWRF Loans that [closed] on September 16, 2016, but which does NOT include any potential savings associated with the Series 2016 Refunding Bonds) from the allowable figures indicates the effective capacity for any Authority new money bonds, and effectively defines sizing and structure strategies for the capital financing plan. Our calculations indicate significant capacity to

accommodate sizing and structuring strategies for the new money portion of the Series 2016 Bonds.

In footnote (a) to the table, we have illustrated the calculation of the augmented revenues for the historical test. The augmentation calculation for the 2015 revenues simply applies the average class "unit cost" increases for the 2016 and 2017 service charges to the audited 2015 revenues.

Alternate Test for Refundings

The alternate test simply requires that any bonds that are issued solely for refunding purposes may also be issued "without regard to" the coverage test summarized above, so long as debt service savings can be illustrated in all future years. To the extent that any the Series 2016 Bonds are issued solely as refunding bonds, compliance with the "ABT" of the Bond Ordinance can be achieved if such savings can be demonstrated.

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Opinions

As a result of our investigations and analyses, we have formulated the following opinions:

1. While faced with additional capital expenditures to ensure reliability of service and implement the Master Plan Update, the projected increases in the Authority's wholesale water charges through 2021 are expected to be comparable to what will be experienced in other large wholesale providers.

2. The Authority's organizational documents establish financial planning guiding principles that are designed to ensure responsible financial performance, balancing service requirements and impacts on Customers, and to result in continued improvements in the current financial position of the Water System, including reported debt service coverage and liquidity balances.

3. The Authority's financial plan is sound, supported by gradual revenue adjustments, and is expected to be sufficient to adequately fund the CIP and other programs necessary to meet Water System obligations.

4. The revenues pledged as security for the Series 2016 Bonds are projected to be sufficient to comply with rate covenants required by the Master Bond Ordinance and the targets established by Authority policy.

5. The requirements contained in the Master Bond Ordinance authorizing the issuance of the Series 2016 Bonds will be met so long as after issuance of the Series 2016 Bonds, the maximum future debt service in any year will not exceed $232,633,100 on Senior Lien Bonds, $253,781,500 on the sum of Senior and Second Lien Bonds, and $279,159,700 in total on all bonds, including SRF Junior Lien Bonds.

APPENDIX A

Feasibility Report

TFG

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_____, 2016

Ms. Sue McCormick, Chief Executive Officer
Great Lakes Water Authority
735 Randolph Street
Detroit, Michigan 48226

Dear Ms. McCormick:

In accordance with our agreement with the Great Lakes Water Authority (the "Authority" and/or "GLWA"), we submit herewith our Financial Feasibility report to be included as an appendix to the preliminary official statement (the "Preliminary Official Statement") prepared by the Authority in connection with its issuance of $_____ Sewer System Revenue Refunding Senior Lien Bonds, Series 2016_, and $_____ Sewer System Revenue Refunding Second Lien Bonds, Series 2016_ (collectively, the "Series 2016 Bonds"). The Series 2016 Bonds are being issued to refinance certain outstanding Bonds of the Authority. The purpose of this report is to set forth information concerning financial factors relating to the Preliminary Official Statement and the Series 2016 Bonds.

The report contains financial feasibility information including analyses of sewage disposal service charges, including specific charge methodology, projections of revenues under existing charges, projection of future operation and maintenance expenses, a summary of the Regional Sewer System Capital Improvement Program (the "CIP") for fiscal years 2017 through 2021, CIP financing, the impact of projected revenue requirements on future revenues and sewage disposal charges for a five-year study period, and the ability of the Authority to meet the "Additional Bonds Test" as defined in the ordinance authorizing the issuance of bonds by the Authority (the "Master Bond Ordinance."). A listing of our major opinions developed as a result of our studies is presented at the end of the report.

THE FOSTER GROUP provides financial and engineering management consulting services to a broad customer base, specializing in services for municipal utility clients in the United States. Our principal experience includes: managing financial planning, cost of service, and rate design studies for water and wastewater utilities; preparation of Feasibility Reports in conjunction with issuance of municipal water and sewer revenue bonds; development of other feasibility reports; design of financial management information systems; consulting assistance

regarding contractual and other relationships amongst municipalities, and expert witness services in utility litigation matters.

Principals of THE FOSTER GROUP have prepared every financial feasibility report published in conjunction with the revenue bonds issued by the Detroit Water and Sewerage Department (the predecessor to the Authority) since 1989. Various reports have been issued in connection with work for the Authority on these matters and related matters, and are available for public inspection at the offices of the Authority.

It has been a pleasure to be of service to the Authority on this matter.

Very truly yours,

THE FOSTER GROUP

Bart Foster
President

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Contents

Page

Introduction 1

Regional Sewer System Summary 3

Introduction 3

Service Area 3

Historical Wastewater Volumes 3

Capital Improvement Program 5

Financial Feasibility for the Series 2016 Bonds 7

GLWA Financial Planning Guiding Principles 7

Service Charge Methodology and Existing Service 9

Rate Simplification Initiative 10

Modifications Resulting from the Lease 12

Projection of Revenues 13

Operation and Maintenance Expense Projections 15

Capital Improvement Program Financing Plan 16

Operational Financing Plan 19

Projected Fund Balances 23

Compliance with Additional Bonds Test 24

Coverage Test 24

Alternate Test for Refundings 26

Opinions 27

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Introduction

This report is based on our analysis of the records and capital improvement programs of the Authority, discussions with key Authority personnel, and such other investigations as we have found necessary.

In this report, where standards or requirements are indicated as being applicable, being fulfilled, or to be attained, such standards or requirements are those promulgated by the United States Environmental Protection Agency (the "EPA") and the Michigan Department of Environmental Quality (the "MDEQ") in accordance with the provisions of Federal environmental laws governing the discharge of pollutants to the nation's air and waters and the laws of the State of Michigan. Capitalized terms not otherwise defined herein shall have the same meaning as ascribed to them in the Preliminary Official Statement. References made herein to specific years are for the fiscal years ending June 30, unless otherwise noted.

The Authority was incorporated by the City of Detroit (the "City') and the Counties of Macomb, Oakland and Wayne (the "Counties") on November 26, 2014 pursuant to Act 233, Public Acts of Michigan, 1955, as amended ("Act 233"). At the time of the Authority's incorporation, the City, through its Detroit Water and Sewerage Department ("DWSD"), was providing wholesale water and sewer services to suburban wholesale customer communities and wholesale and retail water and sewer services to the City and its individual residents and businesses. Sewage disposal service was provided via operation of the City's sewage disposal system ("the Sewer System") that consisted of both wholesale and retail sewage collection, treatment, and disposal facilities.

On June 12, 2015, the City and GLWA executed a Regional Water Supply System Lease, a Regional Sewage Disposal System Lease and a Water and Sewer Services Agreement, and as of January 1, 2016, the City and GLWA executed a Shared Services Agreement (each as more fully described under "THE GREAT LAKES WATER AUTHORITY" in this Preliminary Official Statement). These agreements became effective on January 1, 2016 (the "Effective Date"), at which time the Authority assumed responsibility for the wholesale water and sewer services to the service area via operation of the portion of the Sewer System (the "Regional Sewer System") that provides service to the wholesale sewer customers. The Authority also provides "wholesale" water and sewer service to the City of Detroit, although the City is served via a Water and Sewer Services Agreement that is different from standard wholesale contracts, and the City of Detroit is not a wholesale customer of the Authority.

The portion of the Sewer System that provides sewer service directly to retail customers in the City of Detroit (the "Local Sewer System") continues to be operated by the City of Detroit through DWSD, just as the Authority's wholesale customers provide retail services to their individual residents and businesses. The Authority's customers (the "Customers") include communities and districts served via wholesale service contracts and the City of Detroit retail customer class, served via the terms of the Water and Sewer Services Agreement. The Authority is authorized by its Articles of Incorporation to provide retail sewer service, but does not currently provide retail service to any customers.

Certain portions of this report may refer to historical wholesale service performance and events as being attributable to the Authority, while in fact they were applicable to the operations of the DWSD that existed prior to the Effective Date. We consider the attribution to be technically accurate, since the Authority has assumed responsibility for such performance and events.

The proceeds from the Series 2016 Bonds will be utilized to refinance certain outstanding bonds of the Authority. None of the Series 2016 Bonds are designed to generate additional capital financing. The capital improvement program expenditures scheduled in the CIP through at least September 2017 are projected to be financed by available fund balances, draws from loans from the Michigan State Clean Water Revolving Fund ("CWRF"), and internally generated funds. The projections in this report include future bond issues, perhaps as early as September 2017, to finance capital improvement expenditures set forth herein. *See "Capital Improvement Program Financing."*

In conducting our studies and formulating our projections and opinions contained herein, we reviewed the books, records, agreements, capital improvement programs and other information produced by the Authority as we deemed necessary. While we consider such books, records, and other documents to be reliable, we have not verified the accuracy of these documents.

The projections set forth herein are intended as “forward-looking statements”. Actual results may differ materially from those projected, as influenced by conditions, events, and circumstances that may actually occur. *See "Financial Feasibility for the Series 2016 Bonds."*

Regional Sewer System Summary

Introduction

The Regional Sewer System consists of a wastewater treatment plant (the "Plant") providing primary and secondary treatment of wastewater and a sewage collection and interceptor main network within the City through which wastewater is conveyed to the Plant for treatment. The Authority's Customers, including the City of Detroit, own and operate their own collection systems and discharge their wastewater into the Regional Sewer System's interceptors.

Service Area

The Authority is responsible for the control and treatment of wastewater from most of southeast Michigan. The Regional Sewer System presently serves an approximately 850 square mile area in Wayne, Oakland, and Macomb Counties. Wholesale sewage collection, treatment, and disposal service is provided to 77 communities, including the City of Detroit. *See map, inside back cover.*

Approximately 20 percent of the wholesale Customers service area is served by combined sewer lines, designed to convey both sanitary sewage and storm water drainage to the Authority's wholesale (interceptor) collection system, with the remaining 80% utilizing separate sanitary sewers and storm sewers for drainage. The City of Detroit's local collection system is almost entirely comprised of combined sewers.

The Regional Sewer System currently serves approximately 2.8 million people, or one-third of the population of the State of Michigan, with suburban wholesale customers comprising approximately 75% of the total. *See "Historical Wastewater Volumes."*

Historical Wastewater Volumes

A summary of historical wastewater volumes (reported in thousands of cubic feet – "Mcf") is presented in Table 1. Despite reductions in the service population, the treated wastewater volumes have not changed materially over that time period. This is due in large part to the fact that only about one-third of the treated wastewater volumes are related to sanitary volumes that result from customer water use. The vast majority of treated volumes is related to infiltration into the Sewer System, or to runoff into the combined sewer system of wet weather flows. The volatility of wet weather events can dramatically affect the level of flow received at the Plant, irrespective of population levels or water use patterns.

The table also illustrates metered volumes from Customers during this period. Wastewater contributions from most of the suburban wholesale Customers are measured by wholesale master wastewater meters, although for some customers metering wastewater is not practical due to the complexities of connections to the Regional Sewer System. Wastewater contributions from Customers not served by wholesale master wastewater meters, including the City of Detroit, are estimated based on water production and/or sales data. The "metered" data

for these "unmetered" Customers in the table therefore do not contain volumes related to infiltration into the Sewer System, or to runoff into the combined sewer system of wet weather flows.

Table 1
Sewage Disposal System Wastewater Volumes

Year	Annual Wastewater Treated Mcf	*Metered* Customer Volume: Suburban Wholesale (a) Mcf	Detroit Retail (b) Mcf	Total Mcf
2001	33,353,300	16,309,000	5,948,800	22,257,800
2002	35,318,400	16,643,200	5,374,000	22,017,200
2003	29,383,000	14,009,700	6,309,700	20,319,400
2004	31,602,100	15,680,700	6,122,600	21,803,300
2005	29,784,000	15,400,000	4,919,400	20,319,400
2006	33,353,300	15,640,600	4,652,100	20,292,700
2007	32,136,800	15,707,500	4,331,200	20,038,700
2008	32,644,800	15,266,300	3,716,300	18,982,600
2009	34,863,900	16,469,400	3,956,900	20,426,400
2010	29,596,900	13,448,300	3,622,700	17,071,000
2011	33,888,000	15,065,800	3,743,100	18,808,900
2012	34,155,400	15,052,400	3,328,600	18,381,100
2013	29,489,900	13,287,800	3,088,000	16,375,900
2014	31,174,300	14,329,200	2,949,500	17,284,900
2015	29,770,700	13,867,200	2,685,000	16,552,200
2016	27,966,000	12,935,200	2,752,500	15,687,700

(a) Primarily metered wastewater volumes, but also includes water sales volumes for some customers whose wastewater is not metered. For 2015 and 2016, reflects volumes measured and monitored, but not billed.
(b) Reported water sales to retail customers

The metered wholesale contributions from suburban wholesale Customers are largely impacted by wet weather events, and annual fluctuations are to be expected. The reduction in 2015 and 2016 are also partially attributable to investments by a few major Customers to reduce dry weather infiltration in their own collection systems.

Effective with the 2015 wholesale sewer service charges, metered wastewater volumes are no longer used to bill Customers, and therefore no longer impact the financial performance of the Sewer System. *See "Rate Simplification Initiative."*

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Capital Improvement Program

The Authority's System Planning Division is responsible for coordinating the evaluation of capital needs and developing programs to meet those needs. This division formally reviews the Capital Improvement Program and incorporates revisions into the five-year capital agenda on an annual basis.

In accordance with the terms of the Articles of Incorporation, the CIP must be approved by a supermajority of at least five members of the Authority's Board of Directors. The Authority can modify individual projects within the CIP during the year to address changing costs and management decisions on specific project scope as long as the changes are within the basic framework approved by the Board. The Fiscal Year 2017-2021 CIP was approved by the Board on May 25, 2016.

The CIP is dynamic and requires continual review and modification during the course of each year. As additional cost information is developed from design work being performed on the various projects, cost estimates are adjusted accordingly. The Authority is in the process of initiating a wastewater master plan update and a reliability-centered asset management program, both of which are designed to refine future long-term CIPs. As part of the update efforts, the Authority continues to evaluate the possibility of extending the formal CIP planning period from five years to ten years.

As a result of the dynamic nature of the plan and the continual review efforts it is possible that the CIP expenditures reflected in the table below will continue to change, particularly in the later years of the current five-year planning period. The Authority is not aware of any specific projects that will require additional expenditures, but anticipates that some level of estimated future projects will be included as these initiatives are completed.

A summary of the sewer CIP is presented in Table 2. The CIP is divided into major categories. The Wastewater Treatment categories identify specific functions at the Plant and include Primary Treatment, Secondary Treatment, Solids Handling, Disinfection Facilities, and General Wastewater Treatment. The Wastewater Collection categories include the Regional Sewer System (improvements to interceptor sewers), Combined Sewer System (improvements to combined sewer overflow facilities), and Wastewater Lift Stations. Categories are also included to represent Information Technology and General Purpose projects.

The "Allowance for Future Projects" category in the table consists of an estimated allowance for potential additional projects that may emerge from the master plan update and related planning activities. **Table 2 does not include any capital improvements to the local sewer service facilities owned and managed by DWSD**.

Table 2
Capital Improvement Program Projected Expenditure Schedule

	Fiscal Year Ended June 30,					
	2017	2018	2019	2020	2021	Total
	$	$	$	$	$	$
Wastewater Treatment						
Primary Treatment	22,576,000	24,790,000	26,900,000	14,538,000	2,679,000	91,483,000
Secondary Treatment	5,767,000	8,593,000	5,600,000	0	0	19,960,000
Solids Handling	17,751,000	9,900,000	8,250,000	5,770,000	0	41,671,000
Disinfection	6,155,000	13,350,000	15,550,000	5,750,000	0	40,805,000
General Wastewater Trtmt	29,454,000	29,196,000	33,550,000	30,950,000	20,750,000	143,900,000
Subtotal Treatment	81,703,000	85,829,000	89,850,000	57,008,000	23,429,000	337,819,000
Wastewater Collection						
Regional Sewer System	22,110,000	25,050,000	19,250,000	31,000,000	22,700,000	120,110,000
Combined Sewer System	1,000,000	1,500,000	1,750,000	3,000,000	0	7,250,000
Wastewater Lift Stations	14,000,000	25,500,000	28,640,000	17,700,000	8,000,000	93,840,000
Subtotal Collection	37,110,000	52,050,000	49,640,000	51,700,000	30,700,000	221,200,000
Information Technology	6,242,000	8,123,000	5,425,000	1,000,000	1,050,000	21,840,000
General Purpose	3,918,000	1,892,000	155,000	0	0	5,965,000
Allowance for Future Projects	*0*	*0*	*0*	*0*	*69,821,000*	69,821,000
Subtotal General	10,160,000	10,015,000	5,580,000	1,000,000	70,871,000	97,626,000
TOTAL	**128,973,000**	**147,894,000**	**145,070,000**	**109,708,000**	**125,000,000**	**656,645,000**

The Authority has initiated efforts to develop a new CIP as part of the 2018 budget preparation, with ultimate adoption scheduled for March 2017. Preliminary versions of that new CIP are being prepared for customer and stakeholder review. While the projected expenditure levels in various years are expected to change in order to reflect variations in project schedules, and the stakeholder review process may identify modifications to preliminary plans, the Authority is not aware of any changes that would result in material differences in the overall five-year expenditure levels in the preliminary versions of the new CIP will be materially different from those indicated in this Report.

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Financial Feasibility for the Series 2016 Bonds

The financial data used in the analyses presented herein were obtained from the financial records of the Authority, and of DWSD. The financial records of the prior DWSD were audited annually and maintained in conformity with generally accepted accounting principles for water and wastewater utilities, and financial records of both the Authority and DWSD are subject to annual audits.

The projections set forth herein are intended as "forward-looking statements". In formulating these projections, The Foster Group has made certain assumptions with respect to conditions, events, and circumstances that may occur in the future. The methodology utilized by The Foster Group in performing these analyses follows generally accepted practices for such projections. Such methodologies are summarized in this report and are reasonable and appropriate for the purpose for which they are used. While The Foster Group believes the assumptions are reasonable and the projection methodology valid, actual results may differ materially from those projected, as influenced by conditions, events, and circumstances that may actually occur. Such factors may include the Authority's ability to execute the CIP as scheduled and within budget, regional climate and weather conditions affecting the demand for water, and adverse legislative, regulatory or legal decisions (including environmental laws and regulations) affecting the Authority's ability to manage the Regional Sewer System and maintain water quality.

GLWA Financial Planning Guiding Principles

The financial plans developed for the Authority's Water and Sewer Funds follow the guiding principles set forth in the various organizational documents, including the Articles of Incorporation, the Authority By-Laws, the Leases, the Water and Sewer Services Agreement with the City of Detroit, and the Master Bond Ordinances. The financial projections presented herein embrace these principles, which include:

- The Authority is empowered through its Board of Directors (the "Board") to provide wholesale water and wastewater service to the service area. The six member Board has the authority to execute contracts, to set policy for the Authority, to establish service charges for wholesale water and wastewater service, and to set a revenue requirement for the Detroit retail customer class[1].
- The Board must appoint an Audit Committee to "*review the reports related to the financial condition, operations, performance and management of the Authority*" on a regular basis.
- Certain actions by the Authority Board require "*the affirmative vote of at least 5 members of the Board."* The elements which require this supermajority approval include, but are not limited to, service charge schedules, annual operating budgets, capital improvement programs, and issuance of debt.

[1] The Authority has engaged the City of Detroit as its agent to establish retail water and sewer rates for the Detroit retail customer class, and to bill and collect for service from that class. The Authority retains oversight responsibility for these activities through monitoring of the agency relationship.

- The Authority must establish biennial budgets, with the first year serving as formal authorization (including an approved schedule of service charges to support the budget) and the second year serving as an initial estimate of revenues and revenue requirements.
- Through 2025, the Sewer (and Water) System "*is assumed to experience annual increases in the Authority Revenue Requirement of not more than 4%; provided however, this limitation shall not be applicable if the Authority Revenue Requirement must increase beyond the 4% assumption in order to satisfy the Rate Covenant or to pay the cost of improvements to the Leased Water Facilities that are required to be made by Applicable Laws*."
- In accordance with the City's Plan of Adjustment, the Authority will provide annual contributions for Pension Obligations in an amount of $45.4 million (which includes annual administrative fees of $2.5 million) through 2023[2]. $24 million of this amount will be treated as an operating expense, and funded via the Pension Obligation sub account of the Operation and Maintenance Fund. The remaining $21.4 million will be treated as non-operating expense and funded via the Pension Obligation Payment Fund, which is subordinate to the debt service payment funds. The Sewer System's share of the amounts above are $13.7 million and $12.2 million, respectively.
- ALL revenues, including revenues from retail customers of the City of Detroit, are deposited into a trust established under the Master Bond Ordinance (the "Trust") and held by a trustee and subsequently applied to a flow of funds as set forth in summary fashion below:
    - Operation and Maintenance Fund, including separate accounts for the Authority Regional and Detroit Local operations, and including separate subaccounts for the "operating portion" of the Pension Obligation, separated by Authority Regional and Detroit Local portions; ***The accounts of the Operation and Maintenance Fund are the only monies held outside the Trust***;
    - Bond and Interest Redemption Funds, in cascading lien order, and including debt service accounts and bond reserve accounts;
    - Pension Obligation Payment Fund, to provide for funding of the Sewer System's share of the "non-operating portion" of the Pension Obligation and obligation for the B and C Notes;
    - Water Residential Assistance Program (WRAP) Fund established to provide bill payment assistance to residents throughout the service area;
    - Budget Stabilization Fund established as a reserve to manage collection performance of the Detroit retail customer class;
    - Extraordinary Repair and Replacement Reserve Fund established as a reserve to pay the costs of making major unanticipated repairs or replacements;
    - Improvement and Extension (I&E) Fund established to pay for improvements, enlargements, or extensions; separate subaccounts established for the Regional Sewer System and the Local Sewer System.
    - Surplus Fund established to accommodate flexibility in managing the overall flow of funds.

[2] The agreement contemplates a "true-up" adjustment in 2024 to reconcile with final actuarial analyses and to finalize the Authority's Pension Obligation.

- An annual Lease Payment of $50 million (of which the Regional Sewer System's share is $27.5 million). The Lease Payment is to be deposited into the Local Sewer System I&E Account, except in circumstances whereby the City applies a portion of the annual Lease Payment to pay a portion of its share of debt service. If the City elects to apply a portion of the Lease Payment to pay debt service, the total revenue requirement allocated to the City of Detroit retail customer class would be reduced accordingly.

These principles have been embraced in the initial financial plan established by the Authority, which serves as the guiding platform for the projections presented in this report. A discussion regarding the funding requirements of each element of the funds within the Trust is presented in the financial plan. *See "Operational Financing Plan*."

The Board adopted the Great Lakes Water Authority FY 2017 and 2018 Biennial Budget on May 25, 2016. The biennial budget establishes a formal authorization for 2017, including an approved schedule of service charges to support the budget, and an initial estimate for 2018. The budget includes several depictions of the overall financial plans, including a schedule that reflects "Sources of Revenues and Use of Revenue Requirements – Flow of Funds Basis per Master Bond Ordinance." That ***consolidated*** schedule includes elements related to the entire Sewer System, including wholesale service requirements of the Authority, as well as the retail service requirements of DWSD, and recognizes that all receipts from both organizations flow through the Master Bond Ordinance flow of funds. The projections in this report reflect the consolidated depiction of Authority revenue requirements for the entire Sewer System described above.

[Additional information regarding organizational documents and related initiatives is contained in " THE GREAT LAKES WATER AUTHORITY" section of this Preliminary Official Statement.]

Service Charge Methodology and Existing Service

The Authority's sewage disposal service charges are developed to provide sufficient levels of revenue to meet all operation and maintenance expenses of the Sewer System, debt service requirements on obligations issued for the Sewer System, capital improvement expenditures to be funded from current revenues, and other specific bond ordinance and revenue requirements. A schedule of wholesale sewer service charges is developed for each wholesale Customer, and an annual revenue requirement is established for the City of Detroit retail customer class, by determining the total costs of service and individual customer service requirements.

The general philosophy employed to develop the Authority's wholesale service charges has been consistent for many years. All Customers are proportionally allocated costs of service based on their use of the Regional Sewer System, as measured by estimates of contributed wastewater volumes and loadings and related data. Allocation of treatment plant costs to Customers reflect the relative pollutant loadings in the various flow types (sanitary, dry weather infiltration, wet weather inflow) contributed by each Customer. Costs associated with major

interceptors and pump stations are allocated to Customers based on solely on estimated contributed volume, and partially based on the geography and use of the collection system in certain

The Authority also establishes industrial waste control charges, applicable to all non-residential retail customers in the Service Area, and industrial surcharges, applicable to each commercial, governmental, and industrial user of the Regional Sewer System whose wastewater discharge exceeds the domestic equivalency of certain pollutant parameters.

Rate Simplification Initiative

The current wholesale sewage disposal service charges became effective July 1, 2016 and were designed to generate an overall revenue increase of approximately 4.9 percent over revenues generated by the previous year's charges. The current schedule of charges represents the third year following the Authority's "Rate Simplification Initiative", which was designed to greatly improve the efficiency, understanding, and stability of the process of establishing sewer service charges. Four key strategies define the Rate Simplification Initiative:

1. Simplified Calculation of SHAREs - Each Customer is assigned a share of various cost pools that make up the annual revenue requirement for the Regional Sewer System. These individual shares are based on a review of historical wastewater contributions to the Sewer System, and when taken in concert result in a consolidated SHARE for each customer. SHAREs were locked in for an initial period of three years, although the protocol allows for appeals for interim adjustments should demographic changes or other circumstances merit.
2. Simplified Flow Balancing - Previously, significant efforts and costs were expended in pursuit of precise estimates of wastewater volumes and loadings, and the cost allocation principles were focused on updating these data annually. The parties realized that such pursuit was fruitless and wasteful, and that efforts were better directed towards higher value added initiatives. A much more streamlined approach to evaluating wastewater contribution data was developed and implemented.
3. Simplified Estimates of Cost Pools – Similarly, prior approaches to cost allocation sought precision in determining annual costs of service to specific cost categories, beyond the financial system's ability to track and report such costs. The Rate Simplification Initiative relies on historical data to establish relative assignment of operating and capital revenue requirements to cost pools from which to apply SHAREs.
4. Simplified Charge Structure – The prior wholesale charge structure consisted of fixed monthly or quarterly charges for each customer, and a unique commodity charge for each customer. Based on individual characteristics, the relative revenues recovered from fixed and commodity charges varied widely, and created confusion. In general, approximately 35% of revenues were collected via fixed charges and the remaining 65% via commodity charges. Under Rate Simplification, all wholesale Customers are billed monthly, and all costs from wholesale Customers are recovered via fixed monthly charges – irrespective of the metered or estimated contributed wastewater for that month. Data on contributed wastewater continues to be collected and monitored for purposes of evaluating future SHAREs for a subsequent rate period after the initial three-year rate period concludes.

The Rate Simplification Initiative delivers many benefits to both the Authority and its customers. It further aligns allocation and recovery of costs with realistic expectations of precision. The Rate Simplification solution preserves the basic relative historical allocation of revenue requirements to customers, which had not changed materially despite the rigorous annual review of wastewater volumes and loadings. It aligns cost recovery with cost allocation principles, recognizing that over 90% of the annual revenue requirement is fixed irrespective of variable flow volumes and weather conditions. And finally, the Rate Simplification Initiative results in stability for both the Authority and its Customers. Customers know what the bill will be every month, and that annual changes in charges will be much more homogenous than prior experience. The stability and regularity of the Authority's revenue stream is dramatically enhanced, particularly since all customers are now billed monthly. Prior to Rate Simplification approximately 65% of the revenues from the wholesale class were billed and paid quarterly, creating cash management challenges.

The initial rate period SHAREs are in the process of being reviewed and updated for a second rate period, scheduled to commence with the 2018 sewer service charges. New technical information regarding wastewater flows and pollutant contributions is being analyzed and reviewed with Customer representatives as part of the Authority's Customer Outreach Process, and initial recommendations are scheduled to be developed in November 2017. While the modified SHAREs may result in moderate variances between Customers, the overarching goal of maintaining stability should preclude any volatile impacts on individual Customers.

As part of the process of implementing the Rate Simplification Initiative, the parties agreed to modify and consolidate the relevant terms of the existing "Rate Settlement Agreements" that have governed the manner by which sewage disposal charges were determined for suburban wholesale Customers. The basic premises of these agreements were maintained, but updated to align with the general Rate Simplification approach. One of the modifications was abandonment of the traditional "look-back" process, by which annual revenues and revenue requirements from a completed fiscal year were reviewed and analyzed, and subject to "true-up" amounts billed to each Customer, including the City of Detroit retail customer class at large. Analyses were regularly conducted since 1980, and resulted in amounts due to the Regional Sewer System from Customers, or due to Customers from the Regional Sewer System. These specific amounts were generally reflected on bills to Customers in the second subsequent year following the review.

In recent years changes in accounting guidance and related matters caused the Authority and its Customers to re-evaluate the manner by which look-back adjustments were computed. Working collaboratively with Customer representatives, the Authority finalized a comprehensive review to determine look-back adjustments for 2008, 2009, 2010, 2011, and 2012. These analyses resulted in a "5-Year Look-Back" and an accompanying implementation plan, the result of which added an annual amount of $20 million to the Detroit retail class and a net total due of approximately $4.6 million from the wholesale class. These adjustments were fully implemented via charges applied through 2016, and the traditional "look-back" no longer exists. The surviving terms document has been incorporated into wholesale contracts and into the Water and Sewer Services Agreement with the City of Detroit. It contains provisions to accommodate the general

intent of the original look-back concept in a simplified manner by adjusting future cost pools to reflect knowledge gained during interim periods.

While the traditional look-back process no longer exists, the surviving contractual terms stipulate that bad debt expense associated with a suburban wholesale Customer is chargeable to the suburban wholesale class at large, and that bad debt expense associated with the City of Detroit retail customer class is chargeable to the City retail customers only. This requirement is implemented by including in service charges to the various customer classes (a) prospective bad debt expense, and (b) "true-up" bad debt expense adjustments (reflecting the difference between actual and projected amounts) for the respective customer class.

The current service charges to suburban wholesale Customers include recovery of two separate amounts related to bad debt associated with Highland Park - approximately $5.6 million related to projected bad debt expense (no recovery from Highland Park) during 2017, and approximately $3.46 million related to bad debt expense true-up adjustments for 2013 – 2015. The true-up adjustment for the 2017 charges had the effect of adding approximately 1.2% to the overall revenue adjustment for the suburban wholesale customer class, resulting in an overall increase of approximately 4.9% compared to the allocated share increase of the budget increase, which totaled 3.7%.

Modifications Resulting from the Lease

One of the surviving terms from the Rate Settlement Agreements was an adjustment in the cost of service allocations that reflected the "Payment for Indirect Benefits or Services" that was established as part of the 1978 Rate Settlement Agreement. This provision recognized that the City was entitled to a *"payment to reflect the cost of indirect benefits or services provided by the City of Detroit to DWSD for common use facilities within the City of Detroit, such as police and fire protection, the risk of tort liability, the loss of tax base that the City loses as a result of the Department's tax exemption, and the fact that the suburbs receive sewage treatment without having to devote any of their land to a tax free utility."*

The value of the payment was originally established at $1 million annually, and the agreement stipulated that it be increased by five percent annually. In effect, the adjusted amount is added to the revenue requirements allocated to the suburban wholesale Customer class and deducted from the Detroit retail customer class. No payment was made to the City General Fund, but the "ownership benefit" was reflected in charges to customers in the City of Detroit retail class.

The Lease contains a directive to "lock in" the ownership benefit at the $5.516 million figure. The sewer service charges adopted for 2016 reflected the first year that formally reflects this provision. The $5.516 million adjustment was also applied in development of the 2017 sewer service charges.

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Projection of Revenues

Table 3 presents projected operating revenues for 2017 through 2021. These projections reflect a baseline condition assuming that the existing 2017 sewer service charges remain in effect for the duration of the study period (i.e., no revenue adjustments). Projected modifications to these charges and revenue levels will be discussed subsequently in Table 6. The Authority's financial records account for revenue based on when service is provided, as such approximately reflect wastewater contributions treated and disposed of during the fiscal year. For instance, bills issued in August are reflective of service provided in July and are accounted for as July revenue. The projections shown in Table 3 are developed on the same basis.

Table 3
Summary of Projected Operating Revenue Under Existing Charges *(a)*

Line No.		Fiscal Year Ending June 30				
		2017	2018	2019	2020	2021
		$	$	$	$	$
1	Wholesale Customers	260,876,800	260,876,800	260,876,800	260,876,800	260,876,800
2	Industrial Specific Charges	19,423,200	19,423,200	19,423,200	19,423,200	19,423,200
	Detroit Retail Customer Class					
3	Revenue from Rates and Charges	255,168,400	246,661,700	240,535,100	234,476,900	231,328,600
4	Miscellaneous Revenue	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000
5	Total Revenue from Detroit	260,168,400				
6	**Total Operating Revenue**	**260,168,400**	**251,661,700**	**245,535,100**	**239,476,900**	**236,328,600**
7	*Retail revenues are based on projected water sales in thousands of cubic feet (Mcf)*	*2,800,000*	*2,730,000*	*2,661,800*	*2,595,200*	*2,588,700*

(a) Based on application of FY 2017 charges for 2017 through 2021. Net of projected bad debt expense.

Projected revenues from suburban wholesale Customers reflect continued application of the fixed monthly charges associated with the Rate Simplification Initiative. As such, there is no need to rely on projected billable wastewater volumes to develop these projections.

These revenue projections do not include any revenue from the City of Highland Park, a wholesale customer with a delinquent balance of close to $[30] million. Highland Park has made periodic small payments, but its delinquency continues to grow. The Authority has taken legal action to recover the delinquent balance and ongoing bills for service, having received a favorable lower court judgment, subsequently stayed, pending action by the Michigan Supreme Court.

As noted above, the current service charges to suburban wholesale Customers include recovery amounts related to bad debt associated with Highland Park. These service charges were developed to recover both the current revenue requirements allocated to Highland Park and the

bad debt true-up adjustment. The true-up adjustment is scheduled to continue through 2021, but will be modified to reflect actual future results. In effect, the Regional Sewer System and the suburban wholesale Customers are fully "hedged" against lack of payment of bills by Highland Park. The current service charges already include prospective and true-up amounts, and any recovery from Highland Park will serve to reduce the amounts currently being carried by other Customers through future true-up adjustments.

Table 3 also presents the projected sales volumes upon which the commodity charge portion of projected revenues from the City of Detroit retail class are based. Projected sales volumes for 2018 through 2021 reflect the "most probable" scenario assumptions from the water Master Plan findings. Under this scenario, the Detroit service population is projected to decline 0.75% annually, and "usage per capita" is projected to decline 0.27% annually from current level. These assumptions produce annual reductions in sales volume expectations from the Detroit retail customer class of approximately 2.5%.

The revenue projections for the retail class are reflected on a modified cash basis reflecting estimated billed revenues less an allowance for bad debt expense that was developed based on a review of recent collection results. Analysis of recent data indicates a collection rate of approximately 87 percent of all billed revenue to retail customers, and that metric has been used for these projections.

Miscellaneous Operating Revenue includes revenues generated through the sale of equipment, penalty charges, turn-on and shut-off fees, fire hydrant maintenance, and other operations.

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Operation and Maintenance Expense Projections

Table 4 presents projected operation and maintenance expense, and certain non-operating expenses related to financing legacy employee benefit obligations, for 2017 through 2021. Projections for 2017 and 2018 are equal to the amounts reflected in the initial biennial budget adopted by the Authority, and serve as a baseline for the remaining years. The expenses in this table reflect amounts for both Authority wholesale service and DWSD retail service.

Table 4
Projected Operation and Maintenance Expense (and Selected Non-Operating Expenses)

Line No.		*Fiscal Year Ended June 30,*				
		2017	2018	2019	2020	2021
		$	$	$	$	$
1	Salaries & Wages	27,476,800	28,343,300	29,722,800	30,944,300	32,212,300
2	Overtime	5,044,300	5,242,000	5,325,200	5,431,700	5,540,300
3	Employee Benefits	10,684,600	10,960,200	11,393,100	11,977,300	12,592,700
4	Subtotal Personnel	43,205,700	44,545,500	46,441,100	48,353,300	50,345,300
5	Personal (Transitional) Service Contracts	7,117,300	7,593,400	7,055,400	6,459,600	5,821,700
6	TOTAL Personnel Costs	50,323,000	52,138,900	53,496,500	54,812,900	56,167,000
7	Contractual/Purchased Services	54,961,200	56,838,300	58,409,500	60,161,800	61,966,600
8	Utilities	32,921,100	32,974,700	33,963,900	34,982,900	36,032,200
9	Chemicals	14,345,700	14,384,500	14,816,100	15,260,500	15,718,300
10	Supplies & Other	15,878,800	14,819,200	15,263,700	15,721,600	16,193,300
11	Subtotal	168,429,800	171,155,600	175,949,700	180,939,700	186,077,400
12	Unallocated Reserve	7,429,000	11,737,800	12,316,500	12,665,800	13,025,400
13	Total "Normal" GLWA O&M	175,858,800	182,893,400	188,266,200	193,605,500	199,102,800
14	DWSD Local O&M	41,535,500	42,854,500	44,337,500	45,667,600	47,037,600
15	Combined Total "Normal" O&M	217,394,300	225,747,900	232,603,700	239,273,100	246,140,400
	Operating Pension Reimbursement *(a)*					
16	GLWA Regional	10,838,400	10,838,400	10,838,400	10,838,400	10,838,400
17	DWSD Local	2,861,600	2,861,600	2,861,600	2,861,600	2,861,600
18	Total	13,700,000	13,700,000	13,700,000	13,700,000	13,700,000
19	GRAND TOTAL O&M	231,094,300	239,447,900	246,303,700	252,973,100	259,840,400
	Non-Operating Expense *(b)*					
20	Non-Operating Portion of Pension Reimb.	12,200,000	12,200,000	12,200,000	12,200,000	12,200,000
21	B & C Note Non-Operating Payments	2,270,400	2,270,400	2,270,400	2,270,400	2,270,300
22	Transfer to Pension Obligation Payment Fund	14,470,400	14,470,400	14,470,400	14,470,400	14,470,300

(a) Transferred to Pension Obligation sub-account of the Operation and Maintenance Fund, and treated as Operation and Maintenance Expense for purposes of Net Revenue determination.
(b) ***Not*** *treated as Operation and Maintenance Expense for purposes of Net Revenue determination.*

The annual "normal" operating expenses of the Regional Sewer System are reflected on Lines 1 through 13. The projections include preliminary detailed evaluation of expected programmatic evolution regarding staffing plans and use of contractual resources. In general, these projections anticipate a gradual growth in internal staffing (and therefore in salaries and wages) and a gradual phase out of personal service contracts. The Authority continues to pursue

implementation of programs designed to improve efficiency and produce operating expense savings, and it is possible that such savings will emerge during the projection period, particularly in the non-personnel cost categories. However, given the complexities of standing up two new operational entities, we believe it is prudent to not reflect any such savings for purposes of these projections, pending additional developments. The Authority operating expenses include an "unallocated reserve" on Line 12 designed to acknowledge the dynamic operational structure of a brand new entity and to address unforeseen operational needs. In particular, the biennial budget for 2017 and 2018 placed downward pressure on individual budgetary lines to remove contingencies that were previously within individual departments. The Authority has pledged to align use of the unallocated reserve with a new fiscal note process to increase accountability. The total "normal" operation and maintenance expenses for the Authority are shown on Line 13, and are projected to increase approximately 2.8% annually after 2018.

The projected operating budget for DWSD Local Sewer System operation and maintenance expense is shown on Line 14. This line item reflects amounts collected via retail rates charged to the Detroit retail customer class and transferred to the Detroit Local Operation and Maintenance Account to fund local operating expenses. The amounts are effectively "pass through" revenue requirements for the Authority. For purposes of these projections we have assumed an annual increase of three percent starting in 2019. Line 15 indicates the projected combined annual operation and maintenance expense for both entities, and represents the projected amount of revenues that will be transferred to the Operation and Maintenance Fund for each year related to current operating expenses of the Sewer System.

As noted above, the operation and maintenance expenses also include deposits to the Pension Obligation subaccounts of the Operation and Maintenance Fund, which total $13.7 million annually for the Sewer System, and which are shown on Lines 16 and 17 of Table 4. The remaining Sewer System $12.2 million annual contribution to the Pension Obligation Payment Fund is shown as a non-operating expense on Line 20, and the Sewer System's allocated share of the B and C Notes issued by the City of Detroit to finance other post employment benefits settled by Detroit's Plan of Adjustment are shown on Line 21. The Sewer System's allocated share of the annual $45.4 million combined annual contribution to the GRS pension plan totals $26 million, as reflected on Lines 18 and 20 of Table 4. These deposits are designed to end in 2023, although the Plan of Adjustment stipulates that the final resolution of the obligation will be subject to a true-up analysis.

Capital Improvement Program Financing Plan

Table 5 presents a plan for financing the Regional Sewer System CIP (Line 1) for the study period. Traditionally, the Sewer System's capital financing strategies followed a "maximum debt financing" strategy. In essence, within the constraints of the Additional Bonds Test and the Sewer System's debt service coverage policies, the amount of bonds to be issued was designed to maximize the capital requirements financed with bond proceeds. Recently, Authority management (with support of the Board) has modified the traditional strategy and established a long term goal of reducing the Sewer System's significant reliance on debt for capital financing and has indicated management's intent to shift towards a more balanced debt/revenue financing approach. The capital financing plan presented herein is designed to

continue implementation of that more balanced approach. Customer representatives have embraced this planning strategy as being essential to improving the financial position of the Sewer System.

Table 5
Capital Improvement Program Financing

Line No.	Item	*Fiscal Year Ending June 30,* 2017 $	2018 $	2019 $	2020 $	2021 $	Total $	
	Financing Requirements							
1	Capital Improvement Program (a)	128,973,000	147,894,000	145,070,000	109,708,000	125,000,000	781,645,000	
	Financing Sources							
	Improvement and Extension Fund							
2	Beginning Balance (b)	92,000,000	88,701,800	65,033,600	68,281,400	74,723,000	*92,000,000*	*(h)*
3	Revenue Financed Capital	21,701,800	26,331,800	38,247,800	46,441,600	64,550,900	197,273,900	
4	Subtotal - Improvement & Extension Fund	113,701,800	115,033,600	103,281,400	114,723,000	139,273,900	289,273,900	
	Construction Bond Funds							
5	Beginning Balance (b)	100,000,000	36,675,000	115,081,000	26,176,000	97,468,000	*100,000,000*	*(h)*
	Bond Proceeds							
6	Sewer System Revenue Bonds (c)	0	150,000,000	0	150,000,000	0	300,000,000	
7	Less: Defeasance Requirements	0	0	0	0	0	0	
8	Less: Deposit to DWSD Construction Fund	0	0	0	0	0	0	
9	Less: Bond Reserve Requirements (d)	0	(8,100,000)	0	(8,100,000)	0	(16,200,000)	
10	Less: Issuance Expenses	0	(900,000)	0	(900,000)	0	(1,800,000)	
11	Net Bond Proceeds Available	0	141,000,000	0	141,000,000	0	282,000,000	
12	State Revolving Fund Loans (e)	40,648,000	35,300,000	21,165,000	0	0	97,113,000	
13	Subtotal - Construction Bond Funds	140,648,000	212,975,000	136,246,000	167,176,000	97,468,000	479,113,000	
14	Total Financing Sources Available	254,349,800	328,008,600	239,527,400	281,899,000	236,741,900	768,386,900	
	Application of Financing Sources							
15	Project Expeditures from I&E Funds	25,000,000	50,000,000	35,000,000	40,000,000	45,000,000	195,000,000	
16	Project Expeditures from Construction Funds	103,973,000	97,894,000	110,070,000	69,708,000	80,000,000	461,645,000	
17	Total Financing Sources Applied	128,973,000	147,894,000	145,070,000	109,708,000	125,000,000	656,645,000	
	Financing Sources Available for Future Requirements							
18	Improvement & Extension Fund (f)	88,701,800	65,033,600	68,281,400	74,723,000	94,273,900	*94,273,900*	*(i)*
19	Construction Bond Funds (g)	36,675,000	115,081,000	26,176,000	97,468,000	17,468,000	*17,468,000*	*(i)*
20	Total Financing Sources Available for Future	125,376,800	180,114,600	94,457,400	172,191,000	111,741,900	111,741,900	*(i)*

(a) From Table 2.
(b) Estimated balance available June 30, 2016 (applies only to Fiscal Year 2017).
(c) The 2016 Bonds (for Fiscal Year 2017) and projected additional future bonds.
(d) For future bonds, assumes amounts will be required from bond proceeds to fund debt service reserve fund.
(e) Reflects draw down on funds as project expenditures are incurred.
(f) Line 4 minus Line 14.
(g) Line 12 minus Line 15.
(h) Total column reflects estimated balance available June 30, 2016.
(i) Total column reflects estimated balance available June 30, 2021.

Lines 2 through 14 outline the sources available to meet the CIP financing requirements. Line 2 shows the estimated net balance in the Authority Improvement and Extension ("I&E") Fund as of June 30, 2016, which is available to fund the CIP. Line 3 shows the amount projected to be transferred to the I&E Fund each year from current operating revenues. Total funds available from the I&E Fund are indicated on Line 4. For planning purposes, revenue transfers to

the I&E Fund are not assumed to be eligible to finance capital improvements until at least the year subsequent to their generation.

The capital financing available from the Authority Construction Fund is indicated on Lines 5 through 13. Line 5 shows the estimated net balance in the Construction Fund as of June 30, 2016, which is available to fund the CIP. Line 11 presents the proceeds from State Clean Water Revolving Fund (CWRF) Loans. In [September 2016] the Authority [issued] Junior Lien Sewage Disposal System Revenue Bonds through the CWRF to finance approximately $70.6 million of improvements scheduled in the Authority CIP. As the Authority incurs expenditures for CWRF funded projects, invoices are transmitted to the state administrators of the CWRF for remittance. As such, the amounts shown on Line 11 reflect the projected expenditure schedule of CWRF funded projects.

Existing available fund balances, draws from loans from the CWRF, and transfers from revenues to the Authority I&E Fund are projected to be sufficient to finance Regional Sewer System CIP expenditures through at least September 2017. The capital financing plan presented in Table 5 envisions issuance of additional revenue bonds in 2018 and 2020 to finance additional expenditures in the Regional Sewer System CIP. For planning purposes, these projected additional bonds do not include any proceeds to finance expenditures for the DWSD Local Sewer System. To the extent that DWSD opts to pursue financing of local system projects through Authority revenue bond transactions, these projections would change. While the Authority is responsible for the debt service on any bonds issued to finance capital improvements to the DWSD Local Sewer System, the annual principal and interest requirements are included in the revenue requirements assigned to the City of Detroit retail customer class.

Lines 15 through 17 illustrate the projected application of financing sources to meet the CIP financing requirements stated on Line 1. The balances of funds available for subsequent years is shown on Lines 18 through 21 and are carried forward to Lines 2 and 5 in the next year. The plan to finance the Authority CIP is designed to carry over annual balances in the I&E Fund of approximately $65 to $90 million, and adequate balances in the Authority Construction Fund to facilitate the timing of subsequent bond sales.

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Operational Financing Plan

Table 6 presents a projected plan for the annual operating and capital financing requirements of the Sewer System for the 2017 through 2021 projection period. The table provides an indication of the adequacy of the Authority's revenues and the feasibility of the future anticipated revenue bond sales and the associated financing plan. This table is designed to indicate the approximate level of annual operating revenues that is projected to be necessary to finance the remaining years of the current CIP and ongoing operating requirements. The overall financial plan summarized by these projections is designed to embrace the Authority's long-term financial stability strategy, which leverages optimization savings, coupled with annual revenue adjustments (equivalent to four percent of the prior year's total revenue budget), to produce increasing amounts of "unrestricted cash" that remains after providing for payment of operation and maintenance expenses, debt service payments, and funding of the various non-operating elements set forth in the foundational documents for the Authority. *See "GLWA Financial Planning Guiding Principles."*

Operating revenue projections, presented in Table 3, are based on the Authority's current water service charge schedule. Projected "Revenues from Adjustments" are presented on Lines 2 through 5, and reflect the increase in annual unit costs necessary to produce a revenue level equal to maximum extent contemplated by the terms of the Lease, which calls for a target 4.0% increase in annual revenue requirements. Due to a projected decline in the City of Detroit retail revenue base under existing charges, the actual revenue adjustment (or increase in unit costs) required to produce the 4.0% increase in revenue is actually higher than 4.0%. The projected revenue adjustments during the projection period are believed to be comparable with those that should be experienced in other areas of the country having Sewer Systems of comparable age, and facing similar infrastructure challenges, as the Sewer System.

Projected non-operating revenues of the Regional Sewer System include investment earnings from all eligible Sewer System funds and have been projected based on an analysis of funds on hand, construction schedules, and average fund balances. An annual interest rate of 0.75 percent has been assumed in projecting interest income for all funds.

The Revenue Requirements in this table are presented in a manner that follows the flow of funds set forth in the Master Bond Ordinance. Operation and maintenance expenses are provided for first, followed by debt service separated by the various liens, followed by deposits to the Pension Obligation Payment Fund, the the WRAP Fund, the Budget Stabilization Fund, the Extraordinary Repair and Replacement Reserve Fund, and finally the I&E Fund (including the Lease Payment), as further described below.

The projected operation and maintenance expenses shown on Lines 11 through 15 reflect the total projected transfers to the Operation and Maintenance Funds, including amounts to provide for the operating expense portion of the Pension Obligation reimbursement, as summarized in Table 4.

Table 6
Operational Financing Plan

Line No.	Item	Fiscal Year Ending June 30, 2017 $	2018 $	2019 $	2020 $	2021 $
	Revenue (a)					
1	Operating Revenue Under Existing Charges	535,468,400	526,961,700	520,835,100	514,776,900	511,628,600
	Projected Revenue from Adjustments					
2	FY 2018: 5.7%		30,098,200	29,748,300	29,402,200	29,222,400
3	FY 2019: 5.3%			29,132,900	28,794,000	28,617,900
4	FY 2020: 5.3%				30,179,800	29,995,200
5	FY 2021: 4.7%					27,977,000
6	Total Projected Revenue from Sewer Charges	535,468,400	557,059,900	579,716,300	603,152,900	627,441,100
7	Miscellaneous Operating Revenue	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000
8	Total Operating Revenue	540,468,400	562,059,900	584,716,300	608,152,900	632,441,100
9	Non-Operating Revenue	4,115,200	2,755,100	2,691,300	2,750,900	2,898,900
10	Total Revenue Available	544,583,600	564,815,000	587,407,600	610,903,800	635,340,000
	Revenue Requirements					
11	Transfer to GLWA Regional O&M Account	175,858,800	182,893,400	188,266,200	193,605,500	199,102,800
12	Transfer to DWSD Local O&M Account	41,535,500	42,854,500	44,337,500	45,667,600	47,037,600
13	Transfer to GLWA Pension O&M Account	10,838,400	10,838,400	10,838,400	10,838,400	10,838,400
14	Transfer to DWSD Pension O&M Account	2,861,600	2,861,600	2,861,600	2,861,600	2,861,600
15	Total O&M Expense	231,094,300	239,447,900	246,303,700	252,973,100	259,840,400
	Debt Service					
	Senior Lien Bonds					
16	Outstanding Bonds	134,142,800	134,263,100	134,033,000	133,618,000	119,772,500
17	The 2016 GLWA Bonds	0	0	0	0	0
18	Future Bonds (lien unspecified)	0	3,562,500	9,481,400	14,825,200	18,962,400
19	Total Senior Debt Service	134,142,800	137,825,600	143,514,400	148,443,200	138,734,900
	Second Lien Bonds					
20	Outstanding Bonds	53,456,200	53,422,200	53,299,200	55,230,000	64,247,100
21	The 2016 GLWA Bonds	0	0	0	0	0
22	Total Second Lien Bonds	53,456,200	53,422,200	53,299,200	55,230,000	64,247,100
23	Subtotal Debt Service	187,599,000	191,247,800	196,813,600	203,673,200	202,982,000
	State Revolving Loan Repayments					
24	Senior Lien Bonds	9,375,200	9,276,300	9,270,700	9,271,400	9,027,100
25	Junior Lien Bonds	47,534,300	48,266,000	49,676,900	51,374,100	51,567,700
26	Subtotal SRF Loan Repayments	56,909,500	57,542,300	58,947,600	60,645,500	60,594,800
27	Total Debt Service	244,508,500	248,790,100	255,761,200	264,318,700	263,576,800
28	Non-Operating Portion of Pension Reimb.	12,200,000	12,200,000	12,200,000	12,200,000	12,200,000
29	B & C Note Non-Operating Payments	2,270,400	2,270,400	2,270,400	2,270,400	2,270,300
30	Transfer to Pension Obligation Payment Fund	14,470,400	14,470,400	14,470,400	14,470,400	14,470,300
31	Transfer to WRAP Fund	2,654,600	2,634,800	2,752,900	2,864,900	2,997,300
32	Transfer to Budget Stabilization Fund	2,654,000	2,654,000	0	0	0
33	Transfer to Extra. Repair and Repl. Fund	0	1,253,000	1,028,400	1,000,400	1,030,100
34	Lease Payment - Transfer to Detroit Local I&E	27,500,000	27,500,000	27,500,000	27,500,000	27,500,000
	Transfers to I&E Fund to Finance Capital Improvements					
35	Transfer to GLWA Regional I&E Account	21,701,800	26,331,800	38,247,800	46,441,600	64,550,900
36	Transfer to DWSD Local I&E Account	0	0	0	0	0
37	Total Transfers to I&E Fund	21,701,800	26,331,800	38,247,800	46,441,600	64,550,900
38	Transfer to Surplus Fund - Operating Reserve	0	1,733,000	1,343,200	1,334,800	1,374,300
39	**Total Revenue Requirements**	544,583,600	564,815,000	587,407,600	610,903,900	635,340,100
40	Indicated Balance (Deficiency)	0	0	0	(100)	(100)
	Debt Service Coverage Projections					
41	Senior Lien for Rate Covenant Purposes	218%	221%	223%	227%	254%
42	Second Lien for Rate Covenant Purposes	159%	162%	166%	168%	177%
43	SRF Junior Lien for Rate Covenant Purposes	128%	131%	133%	135%	142%
44	*Net Revenues (10) - (15)*	*313,489,300*	*325,367,100*	*341,103,900*	*357,930,700*	*375,499,600*
45	*Net Revenues Available after Debt Service (44)-(27)*	*68,980,800*	*76,577,000*	*85,342,700*	*93,612,000*	*111,922,800*
46	*Applied to MBO Reserve Funds (30,31,32,33)*	*(19,779,000)*	*(21,012,200)*	*(18,251,700)*	*(18,335,700)*	*(18,497,700)*
47	*Applied as Lease Payment to DWSD I&E Acct (34)*	*(27,500,000)*	*(27,500,000)*	*(27,500,000)*	*(27,500,000)*	*(27,500,000)*
48	*Applied to Operating Reserves (38)*	*0*	*(1,733,000)*	*(1,343,200)*	*(1,334,800)*	*(1,374,300)*
49	*Available for System CIP*	*21,701,800*	*26,331,800*	*38,247,800*	*46,441,500*	*64,550,800*

(a) From Table 3. Based on application of FY 2017 charges for 2017 through 2021.
(b) From Table 4.

The Authority's projected debt service is depicted on Lines 16 through 27, separated by priorities of lien. The debt service on outstanding bonds does not reflect potential savings provided by the refunding portion of the Series 2016 Bonds. Debt service on senior lien bonds is summarized on Lines 16 through 19, and includes existing debt service on outstanding bonds, plus estimated debt service on future bond sales indicated in Table 5. For purposes of these projections, a scale assuming level debt service based on a 30-year term and an interest rate of 4.75 percent has been assumed on all of these projected bond sales. While no strategic designation as to the lien status of future bonds has been made nor contemplated, for purposes of these projections it is assumed that any additional bonds would be issued as senior lien. A similar presentation of debt service on second lien bonds is presented on Lines 20 through 22. Projected repayments of CWRF Loans are stated on Lines 24 through 26. These figures reflect repayments of existing loans, including the recently closed transaction. CWRF Loans issued prior to 2000 are treated as Senior Lien Bonds. All subsequent CWRF Loans are treated as Junior Lien Bonds.

Transfers to the WRAP Fund, shown on Line 31, are established at 0.5% of total projected revenues from service charges. For purposes of these projections, we've assumed that annual amounts deposited into the WRAP Fund will be fully exhausted in the year they are transferred, and therefore these projections do not track WRAP Fund balances or activities.

Transfers to the Budget Stabilization Fund on Line 32 reflect those amounts necessary to establish a balance equivalent to twenty percent of the average annual bad debt expense for the City of Detroit retail customer class for the preceding two fiscal years. The Lease provides that the initial balance in this fund can be achieved over a three-year period. The projections are designed to fully fund the Budget Stabilization Fund (via rates and charges to the Detroit Retail class) by 2018, and to remain at that "fully funded" level thereafter. Actual future funding requirements will be determined by future levels of reported bad debt expense. To the extent that future bad debt expense increases, additional deposits to the Fund will be required. To the extent that future bad debt expense is reduced, the Budget Stabilization Fund balance may be reduced and funds "freed up" for other uses specific to the Detroit retail class.

Transfers to the Extraordinary Repair and Replacement Reserve ("ER&R") Fund are indicated in amounts equal to the lesser of three percent of that year's budgeted operation and maintenance expense (including both the GLWA Regional and DWSD Local operating expenses, but excluding transfers to the Pension O&M subaccounts) or that which is necessary to enable the aggregate value of the fund to equal 15 percent of that year's budgeted operation and maintenance expense. The beginning balance in this fund reflects a fully funded status, and projected transfers shown on Line 33 are those required to maintain this status as budgeted operating expenses increase.

The next revenue requirement relates to the Regional Sewer System's share of the $50 million Lease Payment. To the extent that the City of Detroit opts to direct the entire amount of the Lease Payment to finance capital improvements, a $27.5 million transfer of Authority revenues to the Detroit Local Water I&E Account of the Sewer System I&E Fund will occur. For purposes of these projections we have assumed that the City will select to direct the entirety of the Lease Payment to the Detroit Local I&E Account, as shown on Line 34.

Remaining balances are next available for transfer to the Authority Regional and Detroit Local I&E subaccounts of the I&E Fund held within the Trust. The biennial budget for 2017 and 2018 did not include any funding for the Detroit Local I&E Account, as indicated on Line 37. For purposes of these projections we have assumed no funding of the Detroit Local I&E Account (other than that provided by the Lease Payment) for the remainder of the projection period.

Line 38 of Table 6 presents a revenue requirement established to ensure adequate balances of operating reserves, or working capital. This reserve is established in a similar manner to the Extraordinary Repair and Replacement Reserve Fund and is summarized in detail in Table 7. Annual deposits are targeted to achieve a desired balance expressed in terms of a set amount of days of annual operation and maintenance expense. The June 30, 2016 balance of this reserve was established at a level equivalent to 90 days of annual Authority operation and maintenance expense, including the operating portion of the transfer to the GLWA Pension O&M Account. Projected amounts in 2018 and beyond are anticipated to maintain the total balance at 90 days of annual budgets, as they increase due to inflation.

All remaining revenues are assumed to be transferred to the GLWA Regional I&E Account (as shown on Line 34), and are included in the capital financing plan in Table 5. These projected amounts represent the difference between the total revenue requirements (as established by the overall assumption that the total budgeted revenue requirements will increase 4% annually) and the sum of the other revenue requirements discussed above. For instance, the 2018 revenue requirements are consistent with those contained in the biennial budget and total approximately $565 million. An increase of 4% results in total 2019 revenue requirements of approximately $587 million. After providing for all of the projected 2019 revenue requirements (other than the GLWA Regional I&E Account) in the manner delineated above, which total approximately $549 million, approximately $38 million remains, which is reflected as the transfer to the GLWA Regional I&E Account on Line 35.

Pursuant to the Rate Covenant of the Master Bond Ordinance, sewer service charges must be established to maintain debt service coverage ratios of at least 1.20 for Senior Lien Bonds, 1.10 for Second Lien Bonds, and 1.00 for SRF Junior Lien Bonds. The prior DWSD Board had established minimum policy targets that were 0.15 higher for each of these ratios, or at least 1.35 for Senior Lien Bonds, 1.25 for Second Lien Bonds, and 1.15 for SRF Junior Lien Bonds. While the Authority Board has yet to formally establish a new debt service coverage policy, the financial plans presented herein are designed to comply with the prior policy.

Projections of annual debt service coverage levels are summarized on Lines 41 through 43. These coverage levels are calculated on the same basis as required by the rate covenant contained in the Master Bond Ordinance. As indicated, annual coverage levels, assuming the revenue adjustments shown, are projected to be in excess of the amounts required by the Master Bond Ordinance and current policy.

The financial plan presented herein is designed to enhance the System's balance sheet, reverse the erosion in net assets that has occurred in recent years, and improve the Sewer System's liquidity position. Authority management has embraced this planning strategy, which results in increasing debt service coverage ratios, as indicated in the table.

Projected Fund Balances

Table 7 presents a summary of the projected cash and investment balances in the System's Operating, Budget Stabilization, ER&R, and I&E Funds. It does not reflect any of the funds that are effectively "exhausted" in the year they are transferred, such as the Debt Service Accounts within the Bond and Interest Redemption Funds, the Pension Obligation Payment Fund, and the WRAP Fund.

Table 7
Projected Cash and Investment Fund Balances

Line No.	Item	*Fiscal Year Ending June 30,* 2017	2018	2019	2020	2021
		$	$	$	$	$
	Operating Fund					
1	Beginning Balance	46,700,000	46,700,000	48,433,000	49,776,200	51,111,000
2	Deposit from Operations	0	1,733,000	1,343,200	1,334,800	1,374,300
3	Ending Balance	46,700,000	48,433,000	49,776,200	51,111,000	52,485,300
	Budget Stabilization Fund					
4	Beginning Balance	5,591,800	8,245,800	10,899,800	10,899,800	10,899,800
5	Deposits / (Withdrawals)	2,654,000	2,654,000	0	0	0
6	Ending Balance	8,245,800	10,899,800	10,899,800	10,899,800	10,899,800
	ER&R Fund					
7	Beginning Balance	32,609,200	32,609,200	33,862,200	34,890,600	35,891,000
8	Transfers from Revenues	0	1,253,000	1,028,400	1,000,400	1,030,100
9	Ending Balance	32,609,200	33,862,200	34,890,600	35,891,000	36,921,100
	I&E Fund *(a)*					
10	Beginning Balance	92,000,000	88,701,800	65,033,600	68,281,400	74,723,000
11	Deposits from Revenues *(b)*	21,701,800	26,331,800	38,247,800	46,441,600	64,550,900
12	Capital Expenditures	(25,000,000)	(50,000,000)	(35,000,000)	(40,000,000)	(45,000,000)
13	Ending Balance	88,701,800	65,033,600	68,281,400	74,723,000	94,273,900
	Total Revenue Generated Funds *(c)*					
14	Beginning Balance	176,901,000	176,256,800	158,228,600	163,848,000	172,624,800
15	Net Transfers	(644,200)	(18,028,200)	5,619,400	8,776,800	21,955,300
16	Ending Balance	176,256,800	158,228,600	163,848,000	172,624,800	194,580,100
	Other Funds					
17	Bond Reserve (*excludes Surety*)	89,587,100	97,687,100	97,687,100	105,787,100	105,787,100
18	Bond Redemption (*Average*)	81,502,800	82,930,000	85,253,700	88,106,200	87,858,900
19	Construction Fund	36,675,000	115,081,000	26,176,000	97,468,000	17,468,000
20	Total Funds	384,021,700	453,926,700	372,964,800	463,986,100	405,694,100
21	*Subtotal w/o Construction Funds*	*347,346,700*	*338,845,700*	*346,788,800*	*366,518,100*	*388,226,100*

(a) Only includes GLWA I&E Account

(b) Does not include Lease Payment transferred to DWSD Local I&E Account.

(c) Excludes MBO Funds that are funded and assumed to be fully expended each year, such as the Bond and Interest Redemption Funds, the Pension Obligation Payment Fund, and the WRAP Fund.

The figures on Lines 1 through 16 represent those funds that are entirely generated by revenues, and exclude any amounts funded by bond proceeds. The mechanics of these funds have already been discussed. For planning purposes, operating revenues generated to finance capital improvements are transferred to the I&E Fund and assumed to be not be eligible for capital financing until at least the following year. These funds are technically available to be transferred to a Surplus Fund and to other Sewer System funds for any Sewer System use.

The Bond Reserve and Construction Fund balances on Lines 17 and 19 are generated via issuance of debt. The Debt Service Accounts of the Bond and Interest Redemption Funds (while funded via revenues) are effectively cleared out as debt service payments are made. The amounts shown on Line 18 of the table reflect the average balances throughout the year. Table 7 illustrates the projected stability in cash and investment balances.

Compliance with Additional Bonds Test

The "Additional Bonds Test" (the "ABT") of the Master Bond Ordinance governing issuance of the Series 2016 Bonds provides two approaches for certifying eligibility to issue the bonds. For any bonds that are structured to provide new capital financing proceeds, the test requires a net revenues analysis to show coverage of maximum annual future debt service. An alternate test is available for bonds that are issued solely for refunding purposes.

Coverage Test

The coverage test portion of the Additional Bonds Test states that the Authority may not issue additional securities to finance system improvements unless the applicable net revenues of the Sewer System generate sufficient coverage of the maximum future annual principal and interest requirements on the outstanding bonds and on the additional bonds issued. The coverage requirement for each lien of priority includes debt service for the lien in question, plus debt service on all bonds (if any) of all higher lien priorities. Sufficient coverage is defined as being equal to or greater than 120 percent for Senior Lien Bonds, 110 percent for Second Lien Bonds, and 100 percent for all bonds, including Junior Lien Bonds. For purposes of determining the "applicable" net revenues, the Authority may utilize either (a) the historical net revenues for the most recently completed fiscal year for which there is an audit report (so long as the fiscal year has been completed within 16 months of the issuance date of the bonds in question); (b) the current fiscal year; or (c) the immediately succeeding fiscal year. To the extent that a historical year is chosen as the "applicable" year, and to the extent that any changes in rates, fees and charges has been authorized prior to the issuance of the bonds being evaluated, net revenues may be augmented by an amount reflecting the effect of such changes had the Sewer System's billings during such Fiscal Year been at the increased charges.

Table 8 presents the level of ABT coverage provided for the Series 2016 Bonds. For purposes of the test, we have prepared calculations of "ABT Net Revenues" for each of the three potentially available years defined by the test and described above. We have presented historical, augmented figures for 2015, which will remain eligible for the historical test up until October 31, 2016. These 2015 "ABT Net Revenues" reflect the "modified cash" basis (derived

from DWSD's accrual basis "Statement of Changes in Net Position" in the audited financial statements). We have also provided projected figures for 2017, the current fiscal year, and 2018, the succeeding fiscal year. The projected figures are consistent with those presented in Table 6. While the ABT technically only requires compliance with ANY ONE of the applicable years, this table presents capacity under ALL applicable test periods.

Table 8
Ability of the System to Meet the Additional Bonds Test for Issuance of the Bonds

Line No.			(1) Historical Test	(2) Prospective Test	(3) Prospective Test
			DWSD	Current Year	Succeeding Year
			FY 2015	FY 2017	FY 2018
			$	*$*	*$*
1	Revenues		506,902,900	544,583,600	564,815,000
2	Operating Expenses		(195,078,700)	(231,094,300)	(239,447,900)
3	Net Revenues		311,824,200	313,489,300	325,367,100
4	Augmentation *(a)*		**40,731,500**	***NA***	***NA***
5	Augmented Revenues		547,634,400	544,583,600	564,815,000
6	Augmented Net Revenues		352,555,700	313,489,300	325,367,100
	Alllowable Max Future Debt Service				
7	Senior Lien Bonds	*1.20*	293,796,400	261,241,100	271,139,300
8	Senior and 2nd Lien Bonds	*1.10*	320,505,200	284,990,300	295,788,300
9	All Bonds, Including SRF Jr Lien	*1.00*	352,555,700	313,489,300	325,367,100
	Maximum Future Debt Service				
10	Senior Lien Bonds	*in 2032*	156,193,100	156,193,100	156,193,100
11	2nd Lien Bonds	*in 2031*	237,368,200	237,368,200	237,368,200
12	SRF Jr Lien Bonds	*in 2031*	252,173,100	252,173,100	252,173,100
	Additional Bonds Test Coverage Ratio				
13	Senior Lien Bonds		2.26	2.01	2.08
14	2nd Lien Bonds		1.49	1.32	1.37
15	SRF Jr Lien Bonds		1.40	1.24	1.29

(a) Augmented Revenue Calculation		*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
		Reported	*Augmentation - % Charge Adjustment*			*Calculated*	*Augmented*
		Revenue	*FY 16 Charges*	*FY 17 Charges*	*Combined*	*Augmentation*	*Revenue*
					(2) & (3)	*(1)*(4)*	*(1) + (5)*
	FY 2015	*audited*					
16	*Wholesale Service Revenue*	*239,652,300*	*N/A*	*N/A*	*N/A*	*21,224,500*	***260,876,800***
17	*Retail Service Revenue*	*232,382,300*	*8.5%*	*3.5%*	*12.4%*	*28,736,700*	*261,119,000*
18	*Industrial Specific Svc. Revenue*	*28,652,900*	*N/A*	*N/A*	*N/A*	*(9,229,700)*	***19,423,200***
19	*Total Revenue from Charges*	*500,687,500*			*8.1%*	*40,731,500*	*541,419,000*

The applicable Net Revenues on Line 6 of Table 8 produce the various "allowable" maximum future debt service levels by lien on Lines 7 through 9. Subtracting the existing maximum future debt service by lien on Lines 10 through 12 (which includes debt service on the DWRF Loans that [closed] on September 16, 2016, but which does NOT include any potential savings associated with the Series 2016 Refunding Bonds) from the allowable figures indicates the effective capacity for any Authority new money bonds, and effectively defines sizing and

structure strategies for the capital financing plan. Our calculations indicate significant capacity to issue new money bonds, even though the Series 2016 Bonds do not include any such new money proceeds.

In footnote (a) to the table, we have illustrated the calculation of the augmented revenues for the historical test. The augmentation calculation for the 2015 revenues simply applies the average class "unit cost" increases for the 2016 and 2017 service charges to the audited 2015 revenues.

Alternate Test for Refundings

The alternate test simply requires that any bonds that are issued solely for refunding purposes may also be issued "without regard to" the coverage test summarized above, so long as debt service savings can be illustrated in all future years. To the extent that any the Series 2016 Bonds are issued solely as refunding bonds, compliance with the "ABT" of the Bond Ordinance can be achieved if such savings can be demonstrated.

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Opinions

As a result of our investigations and analyses, we have formulated the following opinions:

1. While faced with additional capital expenditures to ensure reliability of service and implement potential findings from the pending update to the Authority's Sewer System master plan, the projected increases in the Authority's wholesale sewer charges through 2021 are expected to be comparable to what will be experienced in other large wholesale providers.

2. The Authority's organizational documents establish financial planning guiding principles that are designed to ensure responsible financial performance, balancing service requirements and impacts on Customers, and to result in continued improvements in the current financial position of the Sewer System, including reported debt service coverage and liquidity balances.

3. The Authority's financial plan is sound, supported by gradual revenue adjustments, and is expected to be sufficient to adequately fund the CIP and other programs necessary to meet Sewer System obligations.

4. The revenues pledged as security for the Series 2016 Bonds are projected to be sufficient to comply with rate covenants required by the Master Bond Ordinance and the targets established by Authority policy.

5. The requirements contained in the Master Bond Ordinance authorizing the issuance of the Series 2016 Bonds will be met so long as after issuance of the Series 2016 Bonds, refunding savings can be demonstrated in all future years.

GLWA
Great Lakes Water Authority

Financial Services Group
Audit Committee Communication

Appendix A to Meeting Binder for Friday, September 9, 2016 at 8:00 a.m.

6A. Proposed Parameters for the Water & Sewer Refunding Transaction Structure (Page 1)
Resolution

6B. Proposed Revenue Requirement Policy (Page 5)

GLWA
Great Lakes Water Authority

Financial Services Group
Audit Committee Communication

Date: September 9, 2016

To: Great Lakes Water Authority Audit Committee

From: Jon Wheatley, Public Finance Manager

Re: Proposed Parameters for the 2016 Inaugural Water & Sewer Refunding Transaction Structure Resolution

Background: The Great Lakes Water Authority ("GLWA") Debt Management Policy ("the Policy") was approved by the GLWA Board on December 9, 2015. The lens through which this policy was written was long-term in nature where GLWA is no longer a new entity, but a mature organization. Accordingly, the policy contains a section relating to "Refinancing Outstanding Debt" and the parameters in which a refunding would be considered by GLWA. Specifically related to the annual debt service savings on a refunding transaction, ***"A structure which takes savings on an upfront or deferred basis must be explicitly approved by GLWA***. "

A foundational premise among stakeholders for the formation of the GLWA regional authority was the opportunity to refund debt at a lower cost of borrowing in the first years of GLWA's existence. Potential debt service relief was seen as a way to lessen the burden of advance payment of the closed City of Detroit General Retirement System obligation being paid in advance over a ten year time period as well to lessen future borrowings.

Analysis: As GLWA evaluates the alternatives for both the water and sewer system refunding bonds, one of the alternatives presented by the financing team is a refunding debt service structure that would achieve a larger portion of the savings on an "upfront" basis. This structure would allow GLWA to mitigate some of the projected revenue short-fall when Flint and Genesee County leave the Water System and allow GLWA to manage the impact to customer charges more effectively during that time period. On the Sewer System, the same "upfront" savings structure could offset the increases in the accelerated General Retirement System legacy contributions through 2024.

In a preliminary analysis, for example, the GLWA's Senior Underwriter (Citigroup) has provided a preliminary savings impact based on three scenarios.

1. Level debt service structure (i.e. proportionately equal savings over the life of the refunded bonds)
2. Moderate upfront savings structure where, in the initial analysis, the upfront savings would realize about 80% of the cash-flow savings in the first eleven years (based on the weighted

average maturity) of a twenty year maturity schedule as compared to about 60% in a level debt service structure.

3. An "optimized" savings structure in which the savings are about 58% upfront in the first eleven years, a leveled total debt service structure over the remaining 20 years, and also reduces the bond reserve funding requirement. Based on the initial analysis, the optimized structure would result in a slightly lower total savings compare to a level structure, but more than the upfront savings structure.

It should be noted that each savings structure provides positive cash flow savings for the life of the bonds being refunded.

The request being presented to the Audit Committee is to authorize the GLWA Chief Executive Officer and Chief Financial Officer/Treasurer to evaluate the financial advisor's (PFM, Inc.) and underwriter's (Citigroup) recommendation of a level, upfront, or optimized savings structure, to achieve the most beneficial savings structure based on the market conditions at the time of pricing.

Proposed Action: Audit Committee recommends that the Great Lakes Water Authority Board approve the resolution related to potential refunding savings amended structure parameters for the inaugural 2016 water and sewer system bond refunding as presented.

Great Lakes Water Authority
Resolution 2016 -09 -XX
Resolution regarding Bond Refunding Savings Structure for the 2016 Refunding

By Board member: _____:

Whereas The Great Lakes Water Authority ("GLWA") adopted its Debt Management Policy on December 9, 2015 (the "Policy") which became effective on January 1, 2016; and

Whereas A provision of the Policy states, *"A structure which takes savings on an upfront or deferred basis must be explicitly approved by GLWA"*; and

Whereas The GLWA management is working with its registered municipal advisor, Public Financial Management, Inc. ("PFM"), its underwriter, Citigroup and its bond counsel, Dickinson Wright (collectively "the Financing Team") to develop a financing strategy for the inaugural 2016 GLWA water and sewer refunding bonds, as authorized by Ordinance No. 2016-08 and Ordinance No. 2016-09 adopted by the Board on August 10, 2016 (the "Series Ordinances"), to achieve savings that is consistent with the GLWA financial plan; and

Whereas The Financing Team presented a level savings structure, upfront savings structure, and an optimized savings structure; and

Whereas Each savings structure provides positive cash flow savings for the life of the bonds being refunded; and

Whereas Deviation from a level savings structure require the approval of the GLWA Board of Directors; and

Whereas The proposed upfront refunding savings structure is consistent with a foundational premise among stakeholders for the formation of the GLWA which is , the opportunity to refinance outstanding debt at a lower cost of borrowing to lessen the burden of advance payment of the closed City of Detroit General Retirement System obligation; and

Whereas The proposed optimized refunding savings structure provides for more flexibility for future financings and creates a more level total annual debt service requirement and as a result reduces the impact on the bond reserve funds; and

Whereas The GLWA Audit Committee at its meeting on September 9, 2016 recommended that the Board approve alternate refunding savings structure parameters to provide flexibility for the inaugural 2016 water and sewer system bond refunding, as presented.

NOW THEREFORE BE IT:

RESOLVED That in connection with the issuance of the 2016 water and sewer system refunding bonds as authorized by the Series Ordinances, the GLWA Board explicitly approves a refunding structure that takes into account savings on an upfront or optimized basis, and authorizes either the Chief Executive Officer or the Chief Financial Officer, as an Authorized Officer under the Series Ordinances, to execute such documents as are necessary to approve a refunding bond structure that provides for savings on an upfront or optimized basis if such structure is determined to be in the best interests of GLWA.

RESOLVED That the Chief Executive Officer or the Chief Financial Officer is authorized to take such other action as may be necessary to accomplish the intent of this Resolution.

RESOLVED That an affirmative vote of at least five members of the Board is necessary for the passage of this Resolution.

GLWA
Great Lakes Water Authority

Financial Services Group
Audit Committee Communication

Date: September 9, 2016

To: Great Lakes Water Authority Audit Committee

From: Nicolette N. Bateson, CPA, Chief Financial Officer/Treasurer

Re: Proposed Revenue Requirement Policy

Background: At the August 5, 2016 Audit Committee meeting, the topic of formalizing implementation parameters related to the 4% Revenue Requirement commitment originating in the Memorandum of Understanding and carried forward to the Articles of Incorporation for the Great Lakes Water Authority (GLWA) was discussed.

Analysis: The following are attached.

1. Discussion draft – Revenue Requirement Policy
2. Memo from August 5, 2016 Audit Committee meeting binder
3. Memo from The Foster Group providing further analysis related to implementation points related to the 4% Revenue Requirement Commitment

The rationale for establishing a policy includes the following.

A. Demonstrate GLWA's commitment to adjust the revenue requirement based on the needs of the system. The message sent to key stakeholders, including customers and rating agencies, is that the GLWA is committed to establishing the revenue requirement through a meaningful and responsible process.
B. Demonstrate alignment between the GLWA Board and the management team's efforts to control the revenue requirement while recognizing that there is room to address unforeseen circumstances.
C. Documents the rationale and implementation of the Revenue Requirement in year one for consistency in application over future years.
D. Define transparent and accountable disclosure of the 4% Revenue Requirement commitment.

An example of the transparency disclosure on shown on the next page.

In this table, the first set of columns presents the annual and cumulative impact of a 4% ceiling. The "Example Data" columns present amounts for demonstration purposes related to the effect of providing room for variability over a ten year period. A long term view leads to flexibility while balancing opportunities to optimize revenue requirements including operations and maintenance costs as well as debt refunding savings.

Revenue Requirement Ceiling			**Example Data** Demonstration Purposes		**Example Variance** Demonstration Purposes	
	Annual	**Cumulative**	**Annual**	**Cumulative**	**Annual**	**Cumulative**
Base Year		100.0%		100.0%		
FY 2017	4.0%	104.0%	4.0%	104.0%	0.0%	0.0%
FY 2018	4.0%	108.2%	3.5%	107.6%	0.5%	0.5%
FY 2019	4.0%	112.5%	2.5%	110.3%	1.5%	2.2%
FY 2020	4.0%	117.0%	2.5%	113.1%	1.5%	3.9%
FY 2021	4.0%	121.7%	5.0%	118.7%	-1.0%	2.9%
FY 2022	4.0%	126.5%	6.0%	125.9%	-2.0%	0.7%
FY 2023	4.0%	131.6%	2.5%	129.0%	1.5%	2.6%
FY 2024	4.0%	136.9%	2.5%	132.2%	1.5%	4.6%
FY 2025	4.0%	142.3%	2.5%	135.5%	1.5%	6.8%
FY 2026	4.0%	148.0%	2.5%	138.9%	1.5%	9.1%

Proposed Action: Audit Committee considers the Revenue Requirement policy.

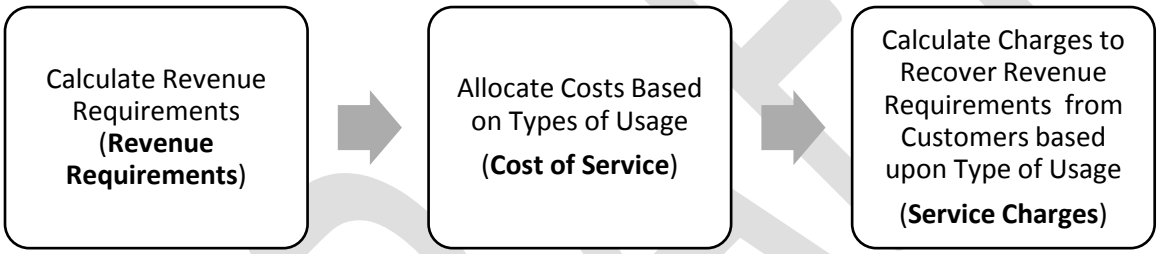
Revenue Requirement Policy

Objectives: There are three primary objectives for this policy.

1. Define Revenue Requirement for the purpose of establishing system service charges.
2. Codify the meaning of the four percent revenue pledge established in the Regional Water Supply System Lease between City of Detroit and Great Lakes Water Authority dated June 12, 2015 (and the related Sewer System Lease) establishing the Great Lakes Water Authority.
3. Outline transparency measures related to the Revenue Requirement.

Objective 1. Define Revenue Requirement for the purpose of establishing system service charges.

Developing a system of customer charges for services is based upon three distinct tasks performed in a sequential manner which begins with the calculation of the revenue requirement.



Revenue Requirement represents the amount of revenues sufficient to recover the utility's annual costs. This includes operations and maintenance costs, annual costs of financing capital improvements, debt service, and non-operating costs contained in legislation or contractual agreements. This foundation for defining revenue requirements is consistent with industry standards guiding development of water and wastewater charges. For Great Lakes Water Authority, the revenue requirement specifically includes debt service coverage reserves, an allotment for revenue-financed capital reserves, payment of legacy pension commitments for the City of Detroit General Retirement System closed defined benefit plan, funding for the water residential assistance program (WRAP), and the lease payment to the City of Detroit via the Detroit Water & Sewerage Department for use of the regional assets. These gross revenue requirements are commonly referred to as the "BUDGET" to which the 4% commitment applies. Before the gross BUDGET is allocated to customers, it is reduced by non-operating revenue. This results in the "net revenue requirement".

Cost of Service is the method to equitably allocate the net revenue requirement between the various customer classes of service. In general, costs are allocated to "cost pools" that align with characteristics that define each customer's use of the system. Each customer is allocated costs within each cost pool based upon their relative use of the systems as measured by the characteristic (i.e. volume, peak demand, etc.) that define the cost pool.

Service Charges to municipal customers, in its most basic definition, represents cost allocation among customers based upon units of service provided to that customer. For municipal water customers,

service charges represents a commodity allocation of costs based on units of service (consumption) plus a fixed cost portion designed to recover 60% of the total revenue requirement allocated to each customer. For municipal sewer system customers, service charges consist entirely of fixed monthly charges designed to recover each customers annual revenue requirement allocation as determined by their "SHARE". SHAREs represent each customer's contribution of wastewater to the system based on the three components of flow (sanitary, stormwater, and inflow/infiltration) and related pollutant loadings. GLWA also allocates a portion of the sewer Revenue Requirement to industrial waste control and industrial surcharge customer classes and develops service charges to recover allocated costs from those customers.

Rates represent usage charges to the end consumer (retail customers). GLWA presently is not a retail provider of service to consumers. The GLWA service charges to its municipal customers are one element of what that local community's consumers see on their bill because each municipality has its own costs to maintain that local system.

Objective 2. Codify the meaning of the four percent revenue requirement pledge established in the Lease establishing the Great Lakes Water Authority.

The Lease establishing the Great Lakes Water Authority (MOU), effective on January 1, 2016, included the following provision.

> *"(Each) System is assumed to experience annual increases in the Authority Revenue Requirement of not more than 4%; provided however, this limitation shall not be applicable if the Authority Revenue Requirement must increase beyond the 4% assumption in order to satisfy the Rate Covenant or to pay the cost of improvements to the Leased Water Facilities that are required to be made by Applicable Laws."*

System refers to the water or sewer system.

Revenue Requirement for the purposes applying a four percent ceiling is defined in Objective 1 above.

Not more than 4% for each of the first ten years is interpreted to establish a parameter that fosters regional water utility sustainability through responsible fiscal management over the foreseeable future. The revenue requirement commitment is not intended to establish a disincentive to the GLWA management to propose a budget that is less than 4% in any given year. Rather, the management team is encouraged to propose a budget with less than a 4% increase, sufficient to meet system needs, knowing that if an unforeseen event arises, sufficient flexibility exists to propose a budget greater than 4% with the preferred, maximum ceiling of 4% per over a ten year period through Fiscal Year 2026. Further, the Revenue Requirement commitment is intended to be compatible with the GLWA Master Bond Ordinance and overall sound financial and operational management practices.

Objective 3. Outline transparency measures related to the Revenue Requirement.

At a minimum, the following information should be presented in conjunction with the annual biennial budget cycle and be publicly available on the GLWA website.

A. Biennial budget document with the calculation of the Revenue Requirement clearly identified.
B. Life-to-date status report of the 4% Revenue Requirement pledge. This may be included in the biennial budget document.
C. Cost of Service study

Date: August 5, 2016

To: Great Lakes Water Authority Audit Committee

From: Nicolette N. Bateson, CPA, Chief Financial Officer/Treasurer

Re: Discussion: Application of the 4% Revenue Requirement Provision in the *Memorandum of Understanding Regarding the Formation of the Great Lakes Water Authority*

Background: The *Memorandum of Understanding Regarding the Formation of the Great Lakes Water Authority (MOU)*, executed on September 9, 2014, included the following provision.

> *Each System, as a whole, is assumed to experience revenue requirement increases of not more than 4% for each of the first ten years under Authority management*.

A few items of note related to this language.

1. Within the context of the MOU, "system" refers to the water and sewer system.
2. "Revenue Requirement", in general, is the sum of a) operations and maintenance expense, b) debt service, c) reserve funds, and less other non-operating revenue.
3. A source of the 4% is that it represented the pledge of the management team, since 2012, to operate the systems more efficiently through ongoing optimization. A goal of the optimization effort was to limit the increase in the revenue requirement to no more than 4%. This feasibility of this pledge was validated through a number of independent financial forecasts during the formation of the Authority. The foundation of those forecasts was applying a simple base year plus 4% per year for each year thereafter.

Analysis: As we begin to effectuate new financial opportunities that a regional authority presents, namely debt refunding savings, the need to define how to apply the 4% revenue requirement becomes evident. If the 4% is applied as an annual "year-to-year" ceiling, then there are some unintended consequences that could lead to alter preferred financial decisions. This became evident when evaluating how best to structure refunding savings. If savings are structured with a higher amount in early years (to offset revenue losses, for example), then the year to year approach, produces an overall artificial savings pattern. This is because refunding

savings opportunities are on multiple year cycles. The overly simplified table below attempts to portray this mathematical challenge.

Table 1: Demonstration of Year-to-Year vs. Cumulative Interpretation of the 4% Revenue Requirement Ceiling

Revenue Requirement Elements	Base Year Budget	Year Two Budget (Base Year Plus 4 %)	Year Three Budget (Refunding Savings; O&M at 3%)	Decision Point: Year Four Ceiling
Operations & Maintenance	40.00	41.60	42.85	Allocation among the elements produces potential unintended consequences
Debt Service	50.00	52.00	48.00	
Reserves	10.00	10.40	10.82	
Scenario 1: Revenue Requirement Ceiling based on Year to Year Fluctuation	100.00	104.00	101.66	105.73
Variance		4.00	(2.34)	
Scenario 2: Revenue Requirement Ceiling based on 4% Cumulative	100.00	104.00	108.16	112.49

In *Scenario 1: Revenue Requirement Ceiling based on Year to Year Fluctuation*, the refunding savings are shown in year three. The conundrum for year four is the impact of a material positive variance in one of the elements from year three, placing a mathematical downward pressure on year four. One downside would be pressure to restructure the savings to artificially preserve a higher revenue requirement when the optimal solution is increased allocation of refunding savings to accelerate the improvement of financial performance.

In Scenario 2: Revenue Requirement Ceiling based on 4% Cumulative, a ceiling is established based on 4% over time. The difference between the base year plus 4% annually and actual revenue requirement provides a clear measure of the GLWA's financial performance over time. That delta can be viewed as a quantifiable measure of the Authority achieving its intended financial purpose.

This matter has been reviewed with GLWA's bond counsel and feasibility consultant. Bond counsel will be present at the Audit Committee for this discussion and the feasibility consultant will have presentation materials. The consensus is that a 4% cumulative ceiling is consistent with the intent of the MOU and analysis prepared in support of the creation of the Authority.

Subject to discussion with the Audit Committee, staff proposes that practices already in place and subsequent clarifications should be formalized in a policy. Other topics to include in that policy include FY 2016 Revenue Requirements as the base year, define revenue requirement consistent with other documents, quantify the 4% applied to the ten year period in the MOU and describe non-budgetary revenue variances.

Proposed Action: Receive and file report. Schedule consideration of a board policy at the September 2016 Audit Committee meeting.

TFG

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MEMORANDUM

Illustration of the 4% Commitment Implementation August 4, 2016

To: Nickie Bateson

From: Bart Foster

You have asked for commentary and observations regarding potential implementation policies and strategies to honor the commitment in the Memorandum and the Lease(s) that "*the (Water and/or Sewer) System is assumed to experience annual increases in the Authority Revenue Requirement of not more than 4%*" – which we refer to herein as the "***4% Commitment***".

Background

In our opinion, the origin of the ***4% Commitment*** can be traced back to the appointment of Sue McCormick as DWSD Director in January 2012. At that time, DWSD was in the midst of issuing Water and Sewer Revenue Bonds, disclosure for which indicated forecasted annual increases in water and sewer charges of approximately 8 percent each year for the five year planning period starting with FY 2014. (Charges for FY 2013 were already proposed and in the approval stage when Ms. McCormick assumed the role as Director.) Ms. McCormick introduced a strategic initiative designed to optimize system operations, reduce operating costs, apply portions of the savings to finance capital improvements from revenues (and thereby reduce the reliance on debt), improve the financial position of the utilities, all while cutting the forecasted increases in revenues from charges in half. The DWSD Board of Water Commissioners embraced the overall philosophy and strategic optimization plan that supported it.

The core philosophy clearly indicated a commitment to limit the annual increases to the "controllable" elements of the financial plan, or the total budgeted revenue requirements. That philosophy did not apply to items that were not directly controllable by management, including revenues from water sales and sewage disposal services that were subject to declining usage being experienced nationwide. As such, the ***4% Commitment*** applied to the overall annual budgeted revenue requirements not the "unit charge" necessary to produce the increased revenues. In other words, the commitment was to limit the increase in the *numerator* in the "unit charge" equation to 4%, irrespective of changes in the *denominator*.

This fundamental principle was originally enacted in charges developed for both FY 2014 and FY 2015, for which annual increases in the "unit charge" were limited to 4%, despite decreases in projected usage volumes.

By the time the FY 2015 charges took effect, negotiations towards establishing the MOU and the subsequent Lease(s) were underway. The principle of maintaining the 4% limitation while assessing the feasibility of the Lease Payment and the separation of the DWSD system into wholesale and retail service organizations was fundamental to the success of the negotiations, and led to the inclusion of the ***4% Commitment*** into the documents. The language was carefully crafted to emphasize that it applied to increases in budgeted revenue requirements, not increases in unit charges (or "rates").

FY 2016 was the first year for which the ***4% Commitment*** was "officially" applied in annual financial plans and budgets. Initially, one would presume that application of a uniform guideline would seem to be a fairly straightforward process – simply increase the FY 2015 overall budgeted revenue requirements to establish an "upper limit" for the FY 2016 overall budgeted revenue requirements. However, the dynamic nature of the DWSD organization produced many complications, including:

- Immediately following approval of the FY 2015 budget and user charges, Flint announced that it was leaving the Water System prior to the beginning of FY 2015. This resulted in a revised expected level of revenues, and therefore revenue requirements associated with anticipated deposits to the I&E Fund;
- Similarly, it became readily apparent that sales and collections from other customers were perhaps overstated in the FY 2015 budget;
- The City of Detroit's bankruptcy proceedings began to indicate preliminary restructured revenue requirements associated with employee benefit costs at levels that were not consistent with the approved FY 2015 budget;
- The bankruptcy proceedings also resulted in a major ***tender*** of existing DWSD outstanding revenue bonds, which resulted in materially lower debt service payments than were included in the FY 2015 budget.

While DWSD did not formally amend its official budget to reflect these factors, the ***forecast*** for FY 2015 financial activity that was included in the documents supporting the tender transaction that closed in September 2014 did reflect them. So when planning for the FY 2016 Budget was initiated in the fall of 2014, the DWSD Board was faced with a policy decision: to which version of the FY 2015 "budgeted revenue requirement" does the ***4% Commitment*** apply? The original approved budget? Or the revised forecast? After much consideration the ***4% Commitment*** was ultimately applied to the revised forecast.

A similar dilemma arose during planning for FY 2017 budget and financial plan. The DWSD Board approved a FY 2016 Budget in March 2015 that reflected the old "consolidated" DWSD organization. While that budget contemplated certain of the separation concepts that

were being considered in the final Lease negotiations, it could not fully anticipate the final result of those negotiations. Following adoption of the DWSD budget for FY 2016, the Lease negotiations were finalized and resulted in changes to the originally approved amounts. These changes, which had the effect of reducing and "reconfiguring" the original FY 2016 budget, while not resulting in a formal budget amendment included:

- Establishment of the Budget Stabilization Fund, which was not contemplated during development of the FY 2015 Budget;
- Decisions by the City of Detroit regarding application of a portion of the Lease Payment to debt service, rather than depositing all of it to the Local I&E Account;
- An overall system reduction in total revenues and revenue requirements associated with each of the above two elements;
- Efforts to "bifurcate" the FY 2016 Budget into wholesale and retail elements, including establishment of dual resources for certain management functions for both entities and incorporation of a shared services concept;
- The necessity to establish "stub year" budgets – based on the decision to implement the separation on January 1, 2016.

Once again, management and board members were faced with a policy decision: from which depiction of the FY 2016 "Budget" and financial plan should the ***4% Commitment*** apply for purposes of establishing the FY 2017 budgeted revenue requirements? Only this time the policy decision rested with GLWA principals. Given the complexities of the FY 2016 Budget, GLWA management proposed, and the GLWA Board approved, application of the ***4% Commitment*** to the originally approved DWSD Budget for FY 2016.

While it is perhaps convenient to presume that each of these years were "non-recurring exceptions" in the normal course of business, we submit that it is likely that similar "exceptions" will occur on a fairly routine basis in the future - particularly given the stated intent of GLWA management and Board to embrace budget amendments and/or fiscal note concepts. As such we believe it is prudent to consider possible implementation guidelines and policies when interpreting the ***4% Commitment***.

Preliminary Recommendation and Discussion

First, we acknowledge that the "Preliminary Recommendation" set forth herein is actually your concept, which we consider to be a quite elegant approach to codify a complex concept. You have suggested that the ***4% Commitment*** is most appropriately evaluated, implemented, and measured, by:

- Establishing a baseline "budgeted revenue requirements" representation;
- Applying annual 4% increases to the baseline year to establish a "benchmark" forecast of future revenue requirements, which effectively represent the forecasted

cumulative impact of annual 4% revenue requirement increases, and against which to evaluate future "actual budgeted" revenue requirements;

- Evaluating future budgeted revenue requirements against the benchmark projection, and;
- Interpreting the ***4% Commitment*** as having been met so long as the budgeted annual revenue requirements for any year do not exceed the projected benchmark established via application of the annual 4% vs. the original benchmark.

We believe that your concept is very sound, particularly since future revenue requirements are likely to be materially impacted by various factors which (while arguably not as dramatic as those experienced recently related to the bankruptcy and bifurcation) could include:

- Revenue fluctuations associated with customer exits and additions;
- Debt service savings associated with upcoming refunding opportunities;
- Potential cost impacts of modifications to current understanding regarding shared services and related allocations.

We believe the appropriate baseline for purposes of evaluating this approach is FY 2016, which was the first year for which GLWA principals controlled budget decisions. We further believe that the most appropriate depiction of FY 2016 is the original budget, prior to final modifications related to the Lease negotiations. We have modeled the forecasted financial performance of applying the concept introduced above, and applied annual 4% increases to the baseline year to establish a "benchmark" projection. The preliminary results (for the Water System for illustrative purposes) are depicted on the first page of the attached exhibits.

In the Baseline Condition, we've assumed that the total revenue requirement will increase 4% annually, and established that as the "benchmark" measured by the red line. We've also assumed 4% annual increases in the O&M budget and modeled the preliminary debt service projections from long term CIP planning. The Lease Payment is fixed, and the pension reimbursement is fixed through FY 2023 (we've assumed complete removal in FY 2024 for purposes of this illustration). Since overall revenue requirements increase 4% annually, and since there are fixed elements amongst some of the non-operating expenses, the amounts available to the I&E Fund (to fund capital improvements) and/or reserves steadily grows, as does the debt service coverage ratio. This "trajectory" illustrates the basic philosophy original established via Ms. McCormick's optimization plan.

Exhibit Page 2 illustrates a ***hypothetical*** alternative scenario in FY 2020 in which we assume:

- A "flat" O&M budget – no change from FY 2019;
- Refunding savings to reduce debt service by 5%;
- Maintaining the overall 4% revenue requirement increase.

In this scenario, revenues that were formerly targeted to O&M and debt service are applied to enhanced contributions to the I&E Fund (to fund capital improvements) and/or reserves, and more material increases in the debt service coverage ratio.

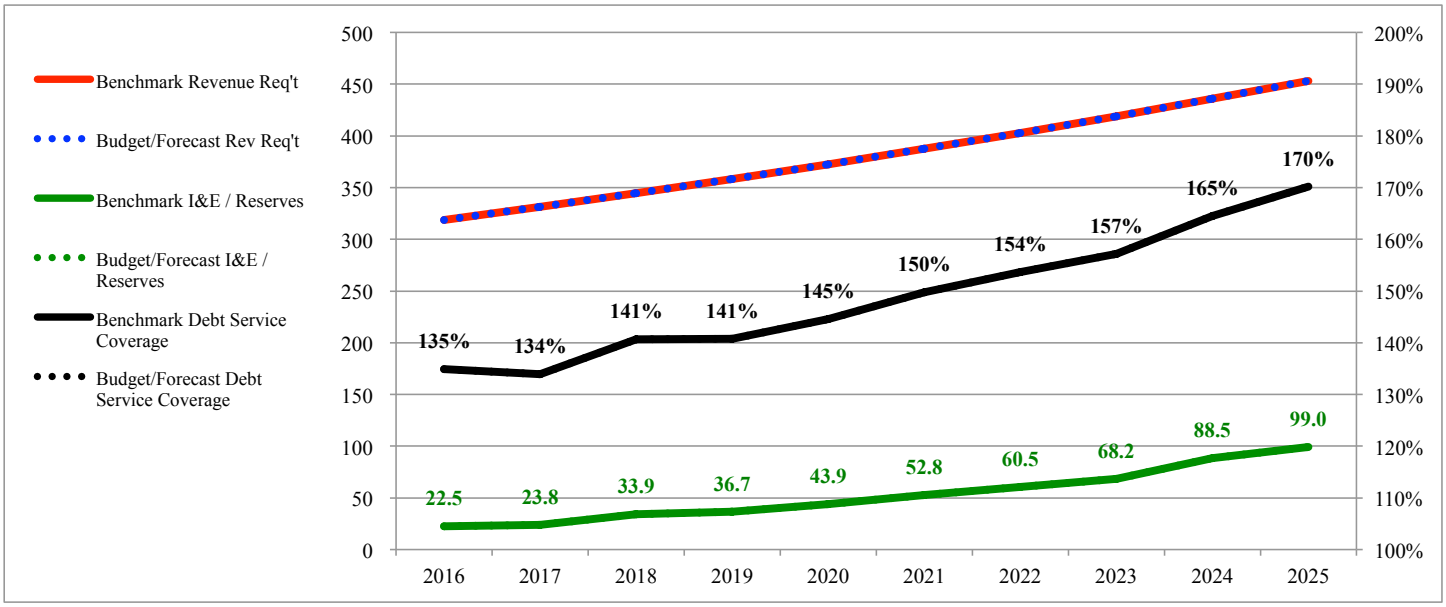
Next, we've introduced a second scenario, in which the O&M and debt service budget savings from Alternative Scenario 1 are maintained, and in which the overall 4% is NOT implemented. In effect, this ***hypothetical*** Alternative Scenario 2 applies the budget savings from individual budget elements to forgo the need to increase charges to customers for FY 2020. Compared to the Baseline Condition, the forecasted reserve amounts and debt service coverage ratios still represent improvements, although to a lesser degree. Importantly, the overall revenue requirement is now below the benchmark ***4% Commitment.***

Finally, let's illustrate the overall concept with an Alternative Scenario 3. In this ***hypothetical*** circumstance regulatory pressures have resulted in the need to increase the FY 2022 O&M budget by more that 4%, and revenue shortfalls in a prior year have pressured actual reserve balances. GLWA management proposes a 6% increase in the overall revenue requirement in order to address these unique occurrences. The resulting metrics are still positive related to the Baseline Condition, and – most importantly – the overall cumulative revenue requirement is still lower than the benchmark, and the ***4% Commitment*** continues to be honored under the interpretation you have suggested.

We are prepared to present this material and discuss this matter at your convenience.

Illustration of the 4% Commitment Implementation - *$ millions*
WATER GLWA Wholesale Only - Baseline Condition

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Annual Revenue Req't Benchmark	318.5	331.2	344.5	358.2	372.6	387.5	403.0	419.1	435.9	453.3
Budget/Forecast Rev Req't	318.5	331.2	344.5	358.2	372.6	387.5	403.0	419.1	435.9	453.3



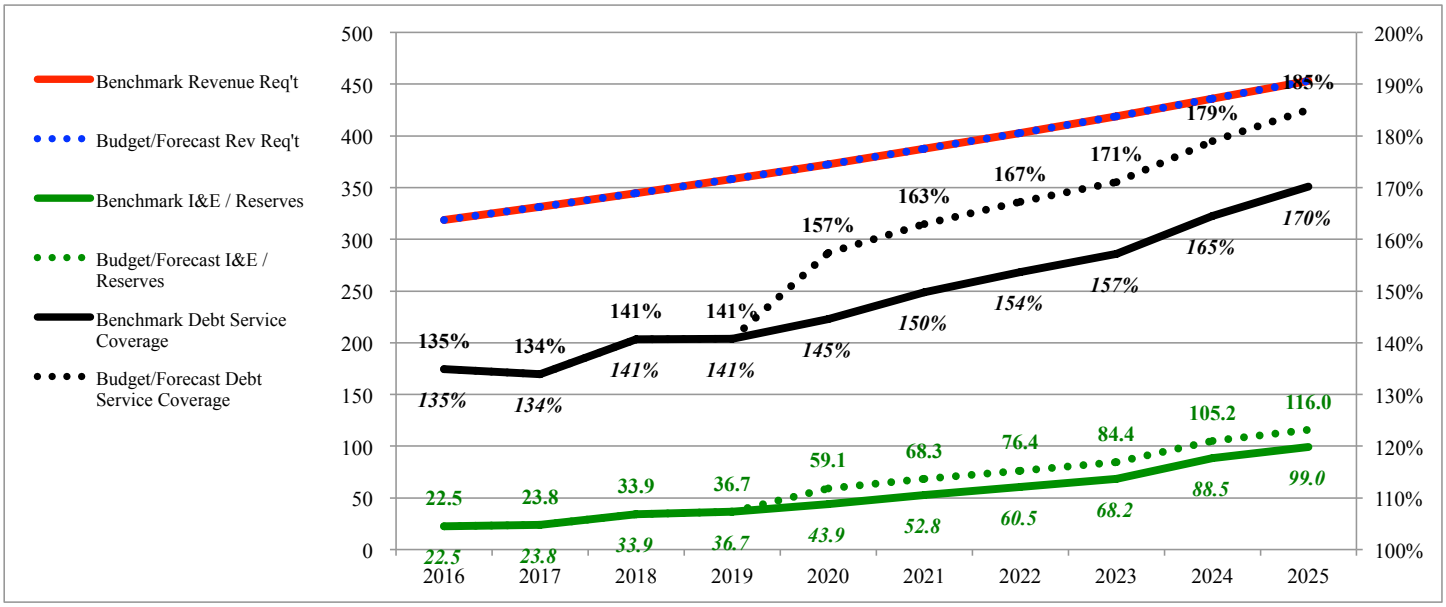
Annual Increase - Benchmark		*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*
Cumulative Increase - Benchmark		*4.0%*	*8.2%*	*12.5%*	*17.0%*	*21.7%*	*26.5%*	*31.6%*	*36.9%*	*42.3%*
Annual Increase - "Actual"		*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*
Cumulative Increase - "Actual"		*4.0%*	*8.2%*	*12.5%*	*17.0%*	*21.7%*	*26.5%*	*31.6%*	*36.9%*	*42.3%*

	WATER										
	GLWA Wholesale Only										
1	Annual O&M Budget	107.6	111.9	116.4	121.0	125.8	130.9	136.1	141.6	147.2	153.1
2	O&M Pension Reimbursement	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.0	0.0
3	Debt Service	151.8	159.3	157.9	164.2	166.4	167.3	169.7	172.7	175.4	176.4
4	Non-Operating Pension Reim	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.0	0.0
5	WRAP Fund	2.0	1.6	1.7	1.8	1.9	1.9	2.0	2.1	2.2	2.3
6	Budget Stabilization Fund	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Lease Payment	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
8	**System I&E / Reserves**	**22.5**	**23.8**	**33.9**	**36.7**	**43.9**	**52.8**	**60.5**	**68.2**	**88.5**	**99.0**
9	Gross Revenue Req'ts	318.5	331.2	344.5	358.2	372.6	387.5	403.0	419.1	435.9	453.3
10	Debt Service Coverage	135%	134%	141%	141%	145%	150%	154%	157%	165%	170%

	Forecast Assumptions									
11	Total Revenue Req't Increase		**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**
12	Annual O&M Budget		**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**
13	O&M Pension Reimbursement		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**-100.0%**	0.0%
14	Debt Service		**4.0%**	**4.0%**	**1.3%**	**0.5%**	**1.4%**	**1.8%**	**1.6%**	**0.6%**
15	Non-Operating Pension Reim		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**-100.0%**	0.0%
16	WRAP Fund		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
17	Budget Stabilization Fund		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
18	Lease Payment		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
19	*System I&E / Reserves Results*		*42.3%*	*8.1%*	*19.7%*	*20.3%*	*14.8%*	*12.6%*	*29.9%*	*11.8%*

Illustration of the 4% Commitment Implementation - *$ millions*
WATER GLWA Wholesale Only - Alternative Scenario 1

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Annual Revenue Req't Benchmark	318.5	331.2	344.5	358.2	372.6	387.5	403.0	419.1	435.9	453.3
Budget/Forecast Rev Req't	318.5	331.2	344.5	358.2	372.6	387.5	403.0	419.1	435.9	453.3



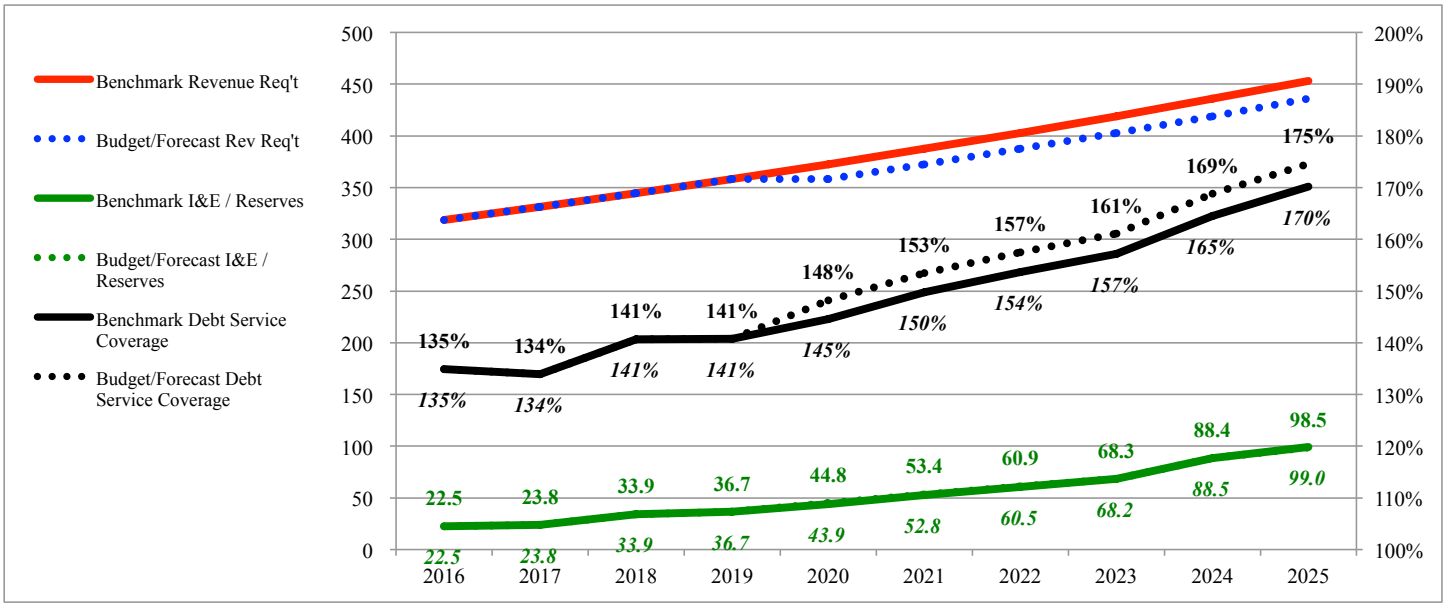
Annual Increase - Benchmark		*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*
Cumulative Increase - Benchmark		*4.0%*	*8.2%*	*12.5%*	*17.0%*	*21.7%*	*26.5%*	*31.6%*	*36.9%*	*42.3%*
Annual Increase - "Actual"		*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*
Cumulative Increase - "Actual"		*4.0%*	*8.2%*	*12.5%*	*17.0%*	*21.7%*	*26.5%*	*31.6%*	*36.9%*	*42.3%*

	WATER										
	GLWA Wholesale Only										
1	Annual O&M Budget	107.6	111.9	116.4	121.0	121.0	125.8	130.9	136.1	141.6	147.2
2	O&M Pension Reimbursement	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.0	0.0
3	Debt Service	151.8	159.3	157.9	164.2	156.0	156.9	159.1	161.9	164.4	165.4
4	Non-Operating Pension Reim	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.0	0.0
5	WRAP Fund	2.0	1.6	1.7	1.8	1.9	1.9	2.0	2.1	2.2	2.3
6	Budget Stabilization Fund	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Lease Payment	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
8	**System I&E / Reserves**	**22.5**	**23.8**	**33.9**	**36.7**	**59.1**	**68.3**	**76.4**	**84.4**	**105.2**	**116.0**
9	Gross Revenue Req'ts	318.5	331.2	344.5	358.2	372.6	387.5	403.0	419.1	435.9	453.3
10	Debt Service Coverage	135%	134%	141%	141%	157%	163%	167%	171%	179%	185%

	Forecast Assumptions									
11	Total Revenue Req't Increase		**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**
12	Annual O&M Budget		**4.0%**	**4.0%**	**0.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**
13	O&M Pension Reimbursement		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**-100.0%**	0.0%
14	Debt Service		**4.0%**	**4.0%**	**-5.0%**	**0.5%**	**1.4%**	**1.8%**	**1.6%**	**0.6%**
15	Non-Operating Pension Reim		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**-100.0%**	0.0%
16	WRAP Fund		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
17	Budget Stabilization Fund		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
18	Lease Payment		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
19	*System I&E / Reserves Results*		*42.3%*	*8.1%*	*61.3%*	*15.5%*	*11.9%*	*10.5%*	*24.6%*	*10.2%*

Illustration of the 4% Commitment Implementation - *$ millions*
WATER GLWA Wholesale Only - Alternative Scenario 2

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Annual Revenue Req't Benchmark	318.5	331.2	344.5	358.2	372.6	387.5	403.0	419.1	435.9	453.3
Budget/Forecast Rev Req't	318.5	331.2	344.5	358.2	358.2	372.6	387.5	403.0	419.1	435.9



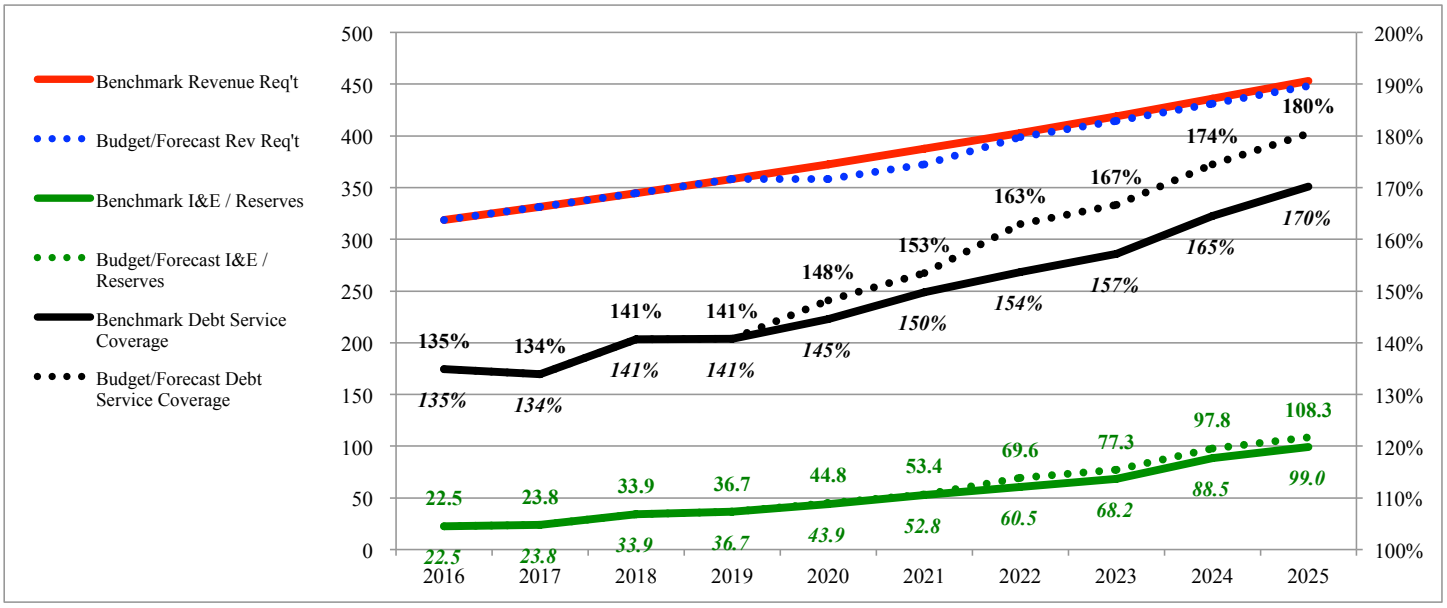
Annual Increase - Benchmark		*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*
Cumulative Increase - Benchmark		*4.0%*	*8.2%*	*12.5%*	*17.0%*	*21.7%*	*26.5%*	*31.6%*	*36.9%*	*42.3%*
Annual Increase - "Actual"		*4.0%*	*4.0%*	*4.0%*	*0.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*
Cumulative Increase - "Actual"		*4.0%*	*8.2%*	*12.5%*	*12.5%*	*17.0%*	*21.7%*	*26.5%*	*31.6%*	*36.9%*

	WATER										
	GLWA Wholesale Only										
1	Annual O&M Budget	107.6	111.9	116.4	121.0	121.0	125.8	130.9	136.1	141.6	147.2
2	O&M Pension Reimbursement	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.0	0.0
3	Debt Service	151.8	159.3	157.9	164.2	156.0	156.9	159.1	161.9	164.4	165.4
4	Non-Operating Pension Reim	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.0	0.0
5	WRAP Fund	2.0	1.6	1.7	1.8	1.9	1.9	2.0	2.1	2.2	2.3
6	Budget Stabilization Fund	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Lease Payment	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
8	**System I&E / Reserves**	**22.5**	**23.8**	**33.9**	**36.7**	**44.8**	**53.4**	**60.9**	**68.3**	**88.4**	**98.5**
9	Gross Revenue Req'ts	318.5	331.2	344.5	358.2	358.2	372.6	387.5	403.0	419.1	435.9
10	Debt Service Coverage	135%	134%	141%	141%	148%	153%	157%	161%	169%	175%

	Forecast Assumptions									
11	Total Revenue Req't Increase		**4.0%**	**4.0%**	**0.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**
12	Annual O&M Budget		**4.0%**	**4.0%**	**0.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**	**4.0%**
13	O&M Pension Reimbursement		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**-100.0%**	0.0%
14	Debt Service		**4.0%**	**4.0%**	**-5.0%**	**0.5%**	**1.4%**	**1.8%**	**1.6%**	**0.6%**
15	Non-Operating Pension Reim		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**-100.0%**	0.0%
16	WRAP Fund		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
17	Budget Stabilization Fund		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
18	Lease Payment		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
19	*System I&E / Reserves Results*		*42.3%*	*8.1%*	*22.2%*	*19.1%*	*14.1%*	*12.1%*	*29.5%*	*11.4%*

Illustration of the 4% Commitment Implementation - *$ millions*
WATER GLWA Wholesale Only - Alternative Scenario 3

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Annual Revenue Req't Benchmark	318.5	331.2	344.5	358.2	372.6	387.5	403.0	419.1	435.9	453.3
Budget/Forecast Rev Req't	318.5	331.2	344.5	358.2	358.2	372.6	398.6	414.6	431.2	448.4



Annual Increase - Benchmark		*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*	*4.0%*
Cumulative Increase - Benchmark		*4.0%*	*8.2%*	*12.5%*	*17.0%*	*21.7%*	*26.5%*	*31.6%*	*36.9%*	*42.3%*
Annual Increase - "Actual"		*4.0%*	*4.0%*	*4.0%*	*0.0%*	*4.0%*	*7.0%*	*4.0%*	*4.0%*	*4.0%*
Cumulative Increase - "Actual"		*4.0%*	*8.2%*	*12.5%*	*12.5%*	*17.0%*	*25.2%*	*30.2%*	*35.4%*	*40.8%*

WATER
GLWA Wholesale Only

1	Annual O&M Budget	107.6	111.9	116.4	121.0	121.0	125.8	133.4	138.7	144.3	150.1
2	O&M Pension Reimbursement	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.0	0.0
3	Debt Service	151.8	159.3	157.9	164.2	156.0	156.9	159.1	161.9	164.4	165.4
4	Non-Operating Pension Reim	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.0	0.0
5	WRAP Fund	2.0	1.6	1.7	1.8	1.9	1.9	2.0	2.1	2.2	2.3
6	Budget Stabilization Fund	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Lease Payment	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
8	**System I&E / Reserves**	**22.5**	**23.8**	**33.9**	**36.7**	**44.8**	**53.4**	**69.6**	**77.3**	**97.8**	**108.3**
9	Gross Revenue Req'ts	318.5	331.2	344.5	358.2	358.2	372.6	398.6	414.6	431.2	448.4
10	Debt Service Coverage	135%	134%	141%	141%	148%	153%	163%	167%	174%	180%

Forecast Assumptions

11	Total Revenue Req't Increase	**4.0%**	**4.0%**	**0.0%**	**4.0%**	**7.0%**	**4.0%**	**4.0%**	**4.0%**
12	Annual O&M Budget	**4.0%**	**4.0%**	**0.0%**	**4.0%**	**6.0%**	**4.0%**	**4.0%**	**4.0%**
13	O&M Pension Reimbursement	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**-100.0%**	0.0%
14	Debt Service	**4.0%**	**4.0%**	**-5.0%**	**0.5%**	**1.4%**	**1.8%**	**1.6%**	**0.6%**
15	Non-Operating Pension Reim	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**-100.0%**	0.0%
16	WRAP Fund	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
17	Budget Stabilization Fund	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
18	Lease Payment	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
19	*System I&E / Reserves Results*	*42.3%*	*8.1%*	*22.2%*	*19.1%*	*30.4%*	*11.1%*	*26.5%*	*10.7%*

GLWA
Great Lakes Water Authority

Financial Services Group
Audit Committee Communication

Appendix B to Meeting Binder for Friday, September 9, 2016 at 8:00 a.m.

Agenda Item # 9D – CFO Update

GLWA
Great Lakes Water Authority

Financial Services Group
Audit Committee Communication

Date: September 9, 2016

To: Great Lakes Water Authority Audit Committee

From: Nicolette Bateson, CPA
Chief Financial Officer & Treasurer

Re: Monthly CFO Update

It is hard to believe that one year ago we were diligently racing toward a January 1, 2016 deadline to achieve significant conditions precedent to stand up the Great Lakes Water Authority. It was also this time last year when we received game changing news on the selection of a financial system from our partners. We were able to quickly recover and moved forward with a BS&A project launch in late December 2015 and the first live application in March 2016. And, it was only ten months ago that the need to staff a new GLWA Financial Services Group as a result of the bifurcation became evident. As 2016 has unfolded our agility has turned to executing the many details of the leases, water/sewer services agreement, and shared services agreement, but also standing up a new organization and continuing to transform the legacy organization – all while preparing for a material bond refunding transaction within the first ten months of this new organization.

Every day I am thankful for the passionate and change oriented team that we have recruited. If we don't have the right people in place, we will never be able to tackle the many opportunities to achieve the best practices state for our region's water utility. They heavy lifting will continue for the foreseeable future, but our efforts to actively manage and take stock of the progress will ensure our continued success. The table below is a partial inventory of the Financial Services Group initiatives underway, many of which are with our organizational partners and stakeholders. At today's meeting, I would like to provide you with a brief update on our progress.

1. Developing and deploying the Effective Utility Management (EUM) framework
   EUM is the outcome of the "EPA and six national water and wastewater associations signed an historic agreement in 2007 to jointly promote effective utility management based on the Ten Attributes of Effectively Managed Water Sector Utilities and five Keys to Management Success"

http://www.amwa.net/galleries/default-file/Effective-Utility-Management-4color.pdf

2. Key Performance Indicators (KPIs) Capstone Team
   A cross-functional team developing KPIs in alignment with EUM launched in August 2016

3. Lean and Continuous Improvement Team
   In August 2016, a new resource was recruited and actively engaged in operational lean initiatives

4. Savings, Cost Optimization, and Revenue Enhancement Report (SCORE)
   Initial report on FY 2016 will be presented next month

5. Financial Services Group Three Year Strategic Plan
   Utilizes EUM framework; ensures that we stay focused on a vision; will be seeking internal and external customer participation over next 30 days

6. Opening Balance Sheet Bifurcation

7. FY 2016 Year-end Close

8. Capital Asset valuation and Inventory
   Project Kick-off last week with Duff & Phelps

9. Capital Project Accounting & Financial Reporting
   Year-to-date spend database and report in draft format; Additional Transition Services FTE starting on Monday – critical to Phase II

10. Internal Control Documentation & Risk Assessment Framework
    Over 25 processes in various stages of documentation

11. Phase II BS&A Implementation

12. Phase II WAM Two Plant Implementation

13. Assessing Closure of Ceridian/Dayforce Phase I and “Steady State”

14. External Audit RFP Development
    A new resource (CPA, CFE, CIA) joined us this week to assist in facilitating this process

15. Internal Audit Framework Research Report for CEO
    Benchmarking report of internal audit structure and scope with other large water authorities; new resource will complete and present to CEO to support that effort

16. Implementation of leases and related agreements including a Memorandum of Understanding to document points of clarification.

Proposed Action: Receive and file report.

GLWA BS&A Implementation Subprojects Monthly Status Report

Period	July 1, 2016 – August 15, 2016
Preparers	Christopher Blough & Jessica Dilworth (Plante Moran)

Project Team Leads

Project Sponsor Mike Huber, Finance Director
Project Manager Plante Moran
Project Sponsor Jenny Casler, Finance Applications Analyst

Executive Sponsors

Nicolette Bateson, Chief Finance Officer
Jeff Small, Chief Information Officer
Mike Mamros, IT Manager – Applications Delivery

Project Dashboard

●	Progressing as planned
▽	Impacting project: Project Management Office (PMO) mitigating
●	Seriously impacting project: Requires escalation beyond the PMO

Status	Project ID and Name | Subproject Team Lead Key Milestone(s)	Baseline	Forecast	Actual
●	**1.0 WAM Stock Checkout | David Kubicek**	**12/31/16**	**12/31/16**	
	1.1 Identify Fixed Asset and Project GL Strings (Dependency on Milestone 7.1)	8/31/16	8/31/16	
	1.2 HP Team SCR Process Map (Accounting Perspective)	8/31/16	8/31/16	
	1.3 Prepare Process Maps Detailing Current State / Future States	9/16/16	9/16/16	
	1.4 Develop Process Enter BS&A Journal Entries for WAM Stock Checkout	10/15/16	10/15/16	
	1.5 Identify and Implement Controls for Stock Checkout Requests	10/31/16	10/31/16	
●	**2.0 AP Invoice Approvals & Blanket Purchase Orders | Mike Huber**	**10/15/16**	**10/15/16**	
	2.1 Identify Invoice Approvers Across GLWA	8/15/16	8/15/16	8/15/16
	2.2 Document Invoice Approval Processes and Approval Pathways	8/15/16	8/15/16	8/15/16
	2.3 Document Blanket Purchase Order Setup and Approval Process	9/20/16	9/20/16	
	2.4 Provide Invoice Approvers with BS&A Training	10/15/16	10/15/16	
	2.5 PO Closeout	TBD	TBD	
	2.6 Upload Bifurcation entries to Oracle (also required for BB)	TBD	TBD	
●	**3.0 P-Card Imports | Jacqueline Morgan**	**9/30/16**	**9/30/16**	
	3.1 Record all Prior P-Card Transactions in BS&A for FY Ending June 2016	9/30/16	9/30/16	
	3.2 Establish Process to Interface Comerica's System with BS&A	9/30/16	9/30/16	
●	**4.0 Beginning GL Balances, Recurring JE, Month End Close | Jill Kosters**	**10/31/16**	**10/31/16**	
	4.1 Create Crosswalk of Internal Accounts from DRMS to BS&A	8/31/16	8/31/16	
	4.2 Determine Approach and Ownership for Beginning Budget Balances	8/31/16	8/31/16	
	4.3 Determine Beginning Balances for Each GL Account	10/31/16	10/31/16	
	4.4 Identify all Types of Journal Entries to be Recorded on Recurring Basis	8/31/16	8/31/16	
	4.5 Develop Process for Recording Entries	9/30/16	9/30/16	
	4.6 Using TB, determine level of accrual necessary for stakeholders(M,Q,A)	TBD	TBD	
	4.7 Create and Doc 10 day monthly close using info from 4.6	TBD	TBD	
●	**5.0 Bank Reconciliation | Deirdre Henry**	**9/30/16**	**9/30/16**	
	5.1 Establish Bank Account Transfer Definitions in BS&A	8/31/16	8/31/16	
	5.2 Document Current and Future Bank Reconciliation Processes	9/16/16	9/16/16	
	5.3 Establish Bank Account Transfer Processes for AP/AR Activities	9/30/16	9/30/16	
●	**6.0 Ceridian JE | Carl Kruger**	**12/31/16**	**12/31/16**	
	6.1 Update GL Strings in Ceridian	9/01/16	9/01/16	
	6.2 Create Journal Export From Ceridian in BS&A's Format	10/01/16	10/01/16	
	6.3 Design and Test Excel Pivot Tables to Format BS&A Data	10/16/16	10/16/16	
	6.4 Execute Process to Export Journal Entries From Ceridian and Import into	12/31/16	12/31/16	
●	**7.0 Fixed Assets | Joseph McMichael**	**12/31/16**	**12/31/16**	
	7.1 Define Fixed Asset and Project GL Strings	8/31/16	8/31/16	
	7.2 Conversion of Asset Data from DRMS to BS&A Prior to Dec 31, 2015	12/31/16	12/31/16	
	7.3 Backlog Conversion of Fixed Assets Since January 1, 2016	11/30/16	11/30/16	
	7.4 Deploy BS&A Fixed Asset Module and Provide End User Training	11/30/16	11/30/16	

GLWA BS&A Implementation Subprojects Monthly Status Report	
Period	July 1, 2016 – August 15, 2016
Preparers	Christopher Blough & Jessica Dilworth (Plante Moran)

	11.0 Budget Rollout | Lisa Mancini	**9/30/16**	**9/30/16**	
	11.1 Develop Budget Reports for Managers	8/31/16	8/31/16	
	11.2 Provide Templates for Budget Development for Managers	8/31/16	8/31/16	
	11.3 Implement BS&A Customization to Limit Access in GL Module	8/31/16	8/31/16	
	11.4 Provide Training for Budgeting Capabilities	9/15/16	9/15/16	
	12.0 BS&A Process Mapping Project | Mike Huber	**9/01/16**	**9/01/16**	
	12.1 Initial Review Meetings Held	8/19/19	8/19/16	
	12.2 Procedural Docs and Flowcharts Available for GLWA Manager Review	8/19/19	8/26/16	
	12.3 GLWA Management Staff Approvals Provided	8/26/19	9/01/16	
	13.0 Server and Infrastructure Support | Jenny Casler	**8/31/16**	**8/31/16**	
	13.1 Prepare BS&A Application Environment Diagrams	8/31/16	8/31/16	
	14.0 Service Desk Activities | Jenny Casler			
	14.1 Create BS&A Procedures Document for Service Desk Knowledge Base	9/15/16	9/15/16	
	14.2 Establish BS&A Functional Leads / Points of Contact for Service Desk	9/15/16	9/15/16	

General Subproject Updates

Subproject Team Leaders
Plante Moran Project Management Team

New Risks Requiring Escalation this Period | Avoid, Mitigate, Transfer, and/or Accept

- Accept (recommend): The BS&A application cannot determine the number of staff members currently logged into the application due to the network security scheme currently in place.

Approved Project Change Orders this Period | Scope, Schedule, and/or Resource

- Resources: Plante Moran project management support hours increased to average of 30 hours per week to support 10 core subprojects and peripheral items.
- Resources: BS&A support contract support hours increased by one on-site week per quarter.

Significant Decisions this Period | Typically Involving Multiple Service Areas or Departments

- The AP Invoice Approvals Subproject team lead was reassigned from Jill Kosters to Mike Huber.
- The AP Invoice Approvals Subproject scope was expanded to include blanket purchase orders.
- The Beginning GL Balances and Recurring Journal Entries Subprojects were combined. The subproject team lead was reassigned from Mike Huber to Jill Kosters.
- The Budget Rollout Subproject team lead was reassigned from Mike Huber to Lisa Mancini.
- The BS&A Process Mapping Project was added as a new subproject.
- The Server and Infrastructure Support Project was added as a new subproject.
- The Service Desk Activities Project was added as a new subproject.

Attribute	Attribute Component	Illustrative KPIs	Example Metrics	Owner	Propose Capstone KPI	Tangential Impact
Employee and Leadership Development	• Recruits and retains component workforce • Collaborative organization dedicated to continual learning and improvement • Employee institutional knowledge retained and improved • Opportunities for professional and leadership development • Integrate and well-coordinated senior leadership team	1. Vacancy Rate (recruitment, retention, attrition rate) 2. Skill level improvement	1. Employee Retention and Customer Satisfaction 2. Management Core Competencies	• Karen Darty	Employee Engagement	
Operational Optimization	• Ongoing performance improvements • Minimizes resources use and loss from day-to-day operations • Awareness and timely adoption of operational and technology improvements	Operating Cost/MG (incl. pumpage)	1. Resource Optimization 2. Water Management Efficiency	• **Shaker Mann**	**Cost Per Million Gallons**	
Financial Visibility	• Understands full life-cycle of cost utility • Effective balance between long-term debt, asset values, operations and maintenance expenditures and operating revenues • Predictable and adequate rates	1. Marketing metric - # new customers and contract renewals 2. Revenue: Actual to budget monthly (cumulative?) 3. Expenses: Actual to budget monthly (cumulative?) 4. Average Cost of Capital/Rating 5. Procurement process metric % within guarantee by procurement type 6. Capital Program On time/On Budget	1. Budget management effectiveness 2. Financial procedure integrity 3. Bond Ratings 4. Rate Adequacy	• **Mike Huber**	**Bond Rating**	
Infrastructure Stability	• Understands the condition of and costs associated with critical infrastructure assets • Maintains and enhance assets over the long term at the lowest possible life-cycle cost and acceptable risk • Repair efforts are coordinated within the community to minimize disruptions	Asset Management - % CM and % PMs completed (coming life cycle cost reduction)	1. Asset inventory 2. Asset (system) renewal/replacement 3. Water distribution and collection 4. System Integrity 5. Planned Maintenance	• **Shaker Mann**		
Operational Resiliency	• Staff work together to anticipate and avoid problems • Proactively establishes tolerance levels and effectively manages risks, including legal, regulatory, financial, environmental, safety, security and natural disaster Related	1. % current customer community contracts 2. Avoided Cost 3. Workers Compensation 4. MIOSHA Compliance	1. Recordable incidents of injury or illness 2. Insurance claims 3. Risk assessment and response 4. Ongoing operational resiliency 5. Operational resiliency under emergency conditions	• **Terry Daniel** • **Biren Saparia** • **Wendy Barrott**		
Product Quality	• Complies with regulatory and reliability requirements • Consistent with customer, public health and ecological needs	Water Quality (compliance)	1. Product quality regulatory compliance 2. Product quality service delivery	1. Terry Daniel **2. Biren Saparia** 3. Wendy Barrott	1. Water Quality 3. Environmental Impacts	
Customer Satisfaction	• Provides reliable, responsive and affordable services • Receives timely customer feedback • Responsive to customer needs and emergencies	Consumer Confidence	1. Customer complaints 2. Customer Service Delivery 3. Customer Satisfaction	**Shaker Mann**		

Attribute	Attribute Component	Illustrative KPIs	Example Metrics	Owner	Propose Capstone KPI	Tangential Impact
Community Sustainment	• Attentive to impacts on community and watershed health and welfare • Operations enhance natural environment • Efficiently use water and energy resources • Promote economic vitality; and engender overall community improvement • Maintain and enhance ecological and community sustainability including pollution prevention, watershed and source water protection	1. Waste water Quality (compliance) phosphorous; CSO and SSO discharges 2. Solids handling-%beneficial re-use (track sources)	1. Watershed-based infrastructure planning 2. Green infrastructure 3. Greenhouse gas emissions 4. Service affordability	1. Terry Daniel **2. Biren Saparia** 3. Wendy Barrott	1. Water Quality 3. Environmental Impacts	
Water Resource Adequacy	• Ensures water availability through long-term resource supply and demand analysis, conversation and public education • Manage operations to provide for long term aquifer and surface water sustainability and replenishment		1. Water Supply Adequacy	1. Terry Daniel **2. Biren Saparia**	1. Water Quality	
Stakeholder Understanding and Support	• Engenders understanding and support from oversight bodies, community and watershed interests and regulatory bodies for service levels, rate structures, operating budgets, capital improvement programs, and risk management decisions. • Actively involves stakeholders in decisions that will affect them	1. Outreach Metric 2. Media-rating (neg./neut./pos.) 3. Brand Recognition	1. Stakeholder Consultation 2. Stakeholder Satisfaction 3. Internal Benefits from Stakeholders 4. Comparative Rate Rank 5. Media/Press Coverage	Michelle Zdrodowski	Brand Promise	

Effective Utility Management

A Primer for Water and Wastewater Utilities

June 2008

United States Environmental Protection Agency
Association of Metropolitan Water Agencies
APWA
American Water Works Association
NACWA
NAWC National Association of Water Companies
Water Environment Federation®

Foreword

Water and wastewater utilities across the country are facing many common challenges, including rising costs, aging infrastructure, increasingly stringent regulatory requirements, population changes, and a rapidly changing workforce. Effective utility management can help utilities respond to both current and future challenges and support utilities in their common mission of being successful 21st century service providers.

Based on these challenges, EPA and six national water and wastewater associations signed an historic agreement in 2007 to jointly promote effective utility management based on the *Ten Attributes of Effectively Managed Water Sector Utilities* and five *Keys to Management Success*.

This Primer is an outgrowth of that agreement and distills the experience of a group of leaders in water and wastewater utility management into a framework intended to help utility managers identify and address their most pressing needs through a customized, incremental approach that is relevant to the day-to-day challenges utilities face. In the future, the Collaborating Organizations will continue to work collectively and individually to implement a range of short-term and long-term actions designed to promote and recognize excellence in utility management based on the principles and practices described in the Primer throughout the water sector.

We, the Utility Advisors and Collaborating Organization representatives who participated in this ground-breaking effort, believe that this Primer will be helpful to both individual utilities and the water utility sector on the whole. Based on our own experience, as well as the experience of others across the country, it is clear that effective utility management is critical to helping utilities address challenges, improve performance, and be successful in the long run. We strongly encourage all utility managers, regardless of their utility's size, budget, and unique circumstances, to read, consider, and implement the strategies and approaches outlined in this Primer.

Sincerely,

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Table of Contents

I. Effective Utility Management 1

II. Ten Attributes of Effectively Managed Water Sector Utilities 3

Ten Attributes of Effectively Managed Water Sector Utilities 4

III. Keys to Management Success 6

1. Leadership 6

2. Strategic Business Planning 6

3. Organizational Approaches 7

4. Measurement 7

5. Continual Improvement Management Framework 8

IV. Where to Begin 10

Step 1: Assess Current Conditions 10

Step 2: Rank Importance of Attributes 11

Step 3: Graph Results 13

Step 4: Choose Attributes 14

Step 5: Develop and Implement an Improvement Plan 15

V. Utility Measures 16

Approaching Measurement 16

Attribute-Related Measures 17

List of Attribute-Related Utility Measures 18

VI. Utility Management Resources 19

VII. For More Information 20

VIII. Appendix A: Definitions 21

IX. Appendix B: Self Assessment 23

Step 1: Assess Current Conditions 23

Step 2: Rank Importance of Attributes 23

Step 3: Graph Results 24

X. Appendix C: Attribute-Related Water Utility Measures 25

I. Effective Utility Management

Water and wastewater utilities across the country face common challenges. These include rising costs, aging infrastructure, increasingly stringent regulatory requirements, population changes, and a rapidly changing workforce. While many utility managers find themselves turning from one urgent priority to the next, others have systematically applied effective utility management approaches that have helped them improve their products and services, increase community support, and ensure a strong and viable utility long into the future.

Effective utility management can help water and wastewater utilities enhance the stewardship of their infrastructure, improve performance in many critical areas, and respond to current and future challenges. Addressing these challenges also requires ongoing collaboration between government, industry, elected officials, and other stakeholders.

In May, 2007, six major water and wastewater associations and the U.S. Environmental Protection Agency (EPA) signed an historic agreement pledging to support effective utility management collectively and individually throughout the water sector and to develop a joint strategy to identify, encourage, and recognize excellence in water and wastewater utility management. This Effective Utility Management Primer (Primer) is the result of the agreement among the following organizations:

- Association of Metropolitan Water Agencies (AMWA)
- American Public Works Association (APWA)
- American Water Works Association (AWWA)
- National Association of Clean Water Agencies (NACWA)
- National Association of Water Companies (NAWC)
- United States Environmental Protection Agency (EPA)
- Water Environment Federation (WEF)

Effective utility management is essential to sustaining our nation's water and wastewater infrastructure.

This Primer is designed to help water and wastewater utility managers make practical, systematic changes to achieve excellence in utility performance. It was produced by water and wastewater utility leaders who are committed to helping utility managers improve water and wastewater management. The Primer distills the expertise and experience of these utility leaders into a framework intended to help a utility manager identify and address their most pressing needs through a customized, incremental approach that is relevant to the day-to-day challenges utilities face.

Rather than focusing on just financial or operational goals, this Primer considers all significant aspects of water and wastewater utility management. The Primer has three primary components:

- *The Ten Attributes of Effectively Managed Water Sector Utilities (Attributes).* These Attributes provide a clear set of reference points and are intended to help utilities maintain a balanced focus on all important operational areas rather than quickly moving from one problem to the next (Section II).
- *Keys to Management Success.* These proven approaches help utilities maximize their resources and improve performance (Section III).
- *Where to Begin—A Self-Assessment Tool.* A utility-tailored self assessment tool helps utility managers identify where to begin improvement efforts. By assessing how a utility performs relative to the Attributes, utility managers can gain a more balanced and comprehensive picture of their organization (Section IV).

Photo by Ryan Hofmeister/Heaven's View

Effective utility management is applicable to all utilities, regardless of size or circumstance

In addition, the Primer provides a set of sample measures to help utility managers gauge performance and assess improvement progress (Section V). It also provides links to a web-based "resource toolbox" which offers additional information and guidance on effective utility management (Section VI).

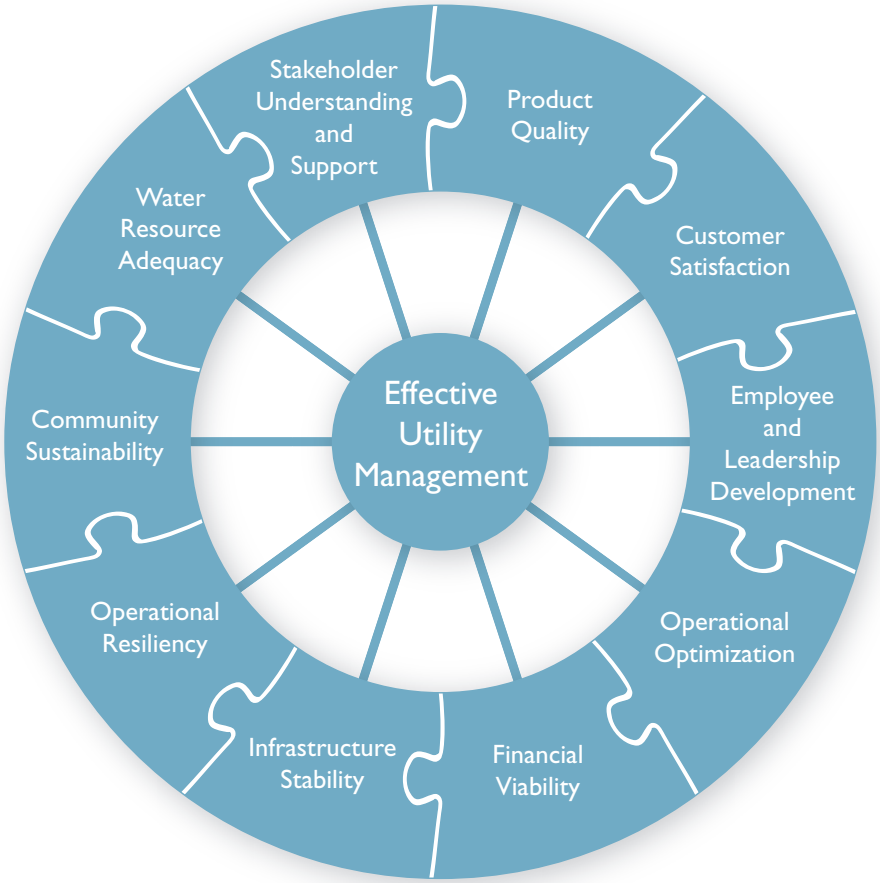
Utility managers and stakeholders can use this Primer in a variety of ways. At one end of the spectrum, the Primer can educate utility staff and stakeholders regarding the range of responsibilities faced by water and wastewater managers. At the other end of the spectrum, it can provide a framework for a utility's long-term strategic planning efforts. Regardless of where a utility is in the spectrum, this Primer can help integrate the Attributes of effective utility management with existing strategic, business, and/or asset management plans.

All water and wastewater utilities can benefit from applying this Primer. Each utility has unique management opportunities and challenges, and this Primer provides guidelines and tools that are relevant to any utility, regardless of size, budget, or circumstance. This Primer's aim is to support all water and wastewater utilities in their common mission of being successful 21st century service providers.

II. Ten Attributes of Effectively Managed Water Sector Utilities

The Ten Attributes of Effectively Managed Water Sector Utilities provide useful and concise reference points for utility managers seeking to improve organization-wide performance. The Attributes describe desired outcomes that are applicable to all water and wastewater utilities. They comprise a comprehensive framework related to operations, infrastructure, customer satisfaction, community welfare, natural resource stewardship, and financial performance.

Water and wastewater utilities can use the Attributes to select priorities for improvement, based on each organization's strategic objectives and the needs of the community it serves. The Attributes are not presented in a particular order, but rather can be viewed as a set of opportunities for improving utility management and operations. Section IV (Where to Begin), provides a basic self-assessment tool to help utilities easily identify needs and opportunities. However, utilities will be able to deliver increasingly efficient, high-quality service by addressing more, and eventually all, of the Attributes. Section V provides several sample performance measures for each of the Attributes.



Ten Attributes of Effectively Managed Water Sector Utilities

Ten Attributes of Effectively Managed Water Sector Utilities

Product Quality
Produces potable water, treated effluent, and process residuals in full compliance with regulatory and reliability requirements and consistent with customer, public health, and ecological needs.

Customer Satisfaction
Provides reliable, responsive, and affordable services in line with explicit, customer-accepted service levels. Receives timely customer feedback to maintain responsiveness to customer needs and emergencies.

Employee and Leadership Development
Recruits and retains a workforce that is competent, motivated, adaptive, and safe-working. Establishes a participatory, collaborative organization dedicated to continual learning and improvement. Ensures employee institutional knowledge is retained and improved upon over time. Provides a focus on and emphasizes opportunities for professional and leadership development and strives to create an integrated and well-coordinated senior leadership team.

Operational Optimization
Ensures ongoing, timely, cost-effective, reliable, and sustainable performance improvements in all facets of its operations. Minimizes resource use, loss, and impacts from day-to-day operations. Maintains awareness of information and operational technology developments to anticipate and support timely adoption of improvements.

Financial Viability
Understands the full life-cycle cost of the utility and establishes and maintains an effective balance between long-term debt, asset values, operations and maintenance expenditures, and operating revenues. Establishes predictable rates—consistent with community expectations and acceptability—adequate to recover costs, provide for reserves, maintain support from bond rating agencies, and plan and invest for future needs.

Infrastructure Stability
Understands the condition of and costs associated with critical infrastructure assets. Maintains and enhances the condition of all assets over the long-term at the lowest possible life-cycle cost and acceptable risk consistent with customer, community, and regulator-supported service levels, and consistent with anticipated growth and system reliability goals. Assures asset repair, rehabilitation, and replacement efforts are coordinated within the community to minimize disruptions and other negative consequences.

Operational Resiliency
Ensures utility leadership and staff work together to anticipate and avoid problems. Proactively identifies, assesses, establishes tolerance levels for, and effectively manages a full range of business risks (including legal, regulatory, financial, environmental, safety, security, and natural disaster-related) in a proactive way consistent with industry trends and system reliability goals.

Community Sustainability
Is explicitly cognizant of and attentive to the impacts its decisions have on current and long-term future community and watershed health and welfare. Manages operations, infrastructure, and investments to protect, restore, and enhance the natural environment; efficiently uses water and energy resources; promotes economic vitality; and engenders overall community improvement. Explicitly considers a variety of pollution prevention, watershed, and source water protection approaches as part of an overall strategy to maintain and enhance ecological and community sustainability.

Water Resource Adequacy
Ensures water availability consistent with current and future customer needs through long-term resource supply and demand analysis, conservation, and public education. Explicitly considers its role in water availability and manages operations to provide for long-term aquifer and surface water sustainability and replenishment.

Stakeholder Understanding and Support
Engenders understanding and support from oversight bodies, community and watershed interests, and regulatory bodies for service levels, rate structures, operating budgets, capital improvement programs, and risk management decisions. Actively involves stakeholders in the decisions that will affect them.

III. Keys to Management Success

The Keys to Management Success are comprised of frequently used management approaches and systems that experience indicates help water and wastewater utilities manage more effectively. They create a supportive climate for a utility as it works towards the outcomes outlined in the Attributes, and they can help integrate the utility's improvement efforts across the Attributes. The Keys to Management Success are listed below.

Effective leadership produces organizational alignment and clear direction

1. Leadership

Leadership is critical to effective utility management, particularly in the context of driving and inspiring change within an organization. "Leadership" refers both to individuals who can be effective champions for improvement, and to teams that provide resilient, day-to-day management continuity and direction. Effective leadership ensures that the utility's direction is understood, embraced, and followed on an ongoing basis throughout the management cycle. Leadership has an important responsibility to communicate with the utility's stakeholders and customers. It further reflects a commitment to organizational excellence, leading by example to establish and reinforce an organizational culture that embraces positive change and strives for continual improvement. Organizational improvement efforts require commitment from the utility's leadership.

2. Strategic Business Planning

Strategic business planning is an important tool for achieving balance and cohesion across the Attributes. A strategic plan provides a framework for decision making by:

- Assessing current conditions, strengths and weaknesses;
- Assessing underlying causes and effects; and
- Establishing vision, objectives, and strategies.

It establishes specific implementation steps that will move a utility from its current level of performance to achieving its vision.

Preparation of a strategic business plan involves taking a long-term view of utility goals and operations and establishing a clear vision and mission. When developed, the strategic business plan will drive and guide utility objectives, measurement efforts, investments, and operations. A strategic plan can help explain the utility's conditions, goals, and plans to staff and stakeholders, stimulate change, and increase engagement in improvement efforts.

After developing a strategic business plan, it is important that the utility integrates tracking of progress into its management framework.

3. Organizational Approaches

There are a variety of organizational approaches that contribute to overall effective utility management and that are critical to the success of management improvement efforts. These include:

- Actively engaging employees in improvement efforts (helping to identify improvement opportunities, participating in cross-functional improvement teams, etc.);
- Deploying an explicit change management process that anticipates and plans for change and encourages staff at all levels to embrace change; and
- Utilizing implementation strategies that seek, identify, and celebrate early, step-by-step victories.

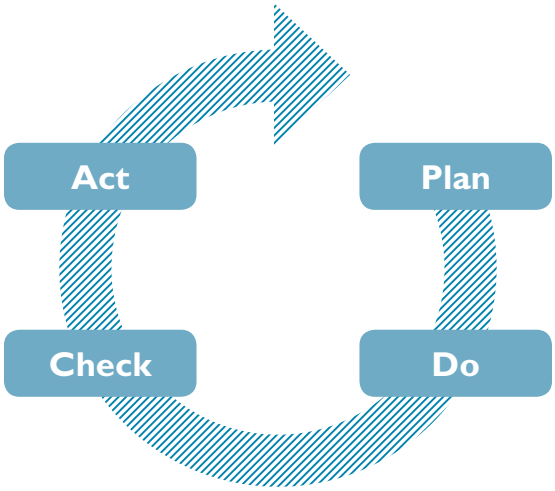
4. Measurement

Measurement is critical to management improvement efforts associated with the Attributes and is the backbone of successful continual improvement management and strategic business planning. A measurement system serves many vital purposes, including focusing attention on key issues, clarifying expectations, facilitating decision making, and, most importantly, learning and improving. As one utility manager put it, "You can't improve what you don't measure." Successful measurement efforts often are:

"You can't improve what you don't measure."

- Viewed as a continuum starting with basic internal tracking, and, as needed and appropriate, moving to more sophisticated baselining and trend analysis, development of key performance indicators, and inclusion of externally oriented measures which address community sustainability interests;
- Driven by and focused on answering questions critical to effective internal management and external stakeholder needs (e.g., information needed to allow governing bodies to comfortably support large capital investments); and
- Supported by a well-defined decision framework assuring results are evaluated, communicated, and responded to in a timely manner.

Deciding where to start and what to measure can be challenging. Measures can also be taken out of context. Therefore, while an essential tool in the self-improvement process, measurement is not the only tool and should be approached, structured, and used thoughtfully. Section V includes sample performance measures that can be used in conjunction with utility-specific baselines and targets.



5. Continual Improvement Management Framework

A continual improvement management framework is usually implemented through a complete, start-to-finish management system, frequently referred to as a "Plan-Do-Check-Act" framework. This framework plays a central role in effective utility management and is critical to making progress on the Attributes. Continual improvement management includes:

- Conducting an honest and comprehensive self-assessment to identify management strengths, areas for improvement, priority needs, etc.;
- Conducting frequent sessions among interested parties to identify improvement opportunities;
- Following up on improvement projects underway;
- Establishing and implementing performance measures and specific internal targets associated with those measures;
- Defining and implementing related operational requirements, practices, and procedures;
- Establishing supporting roles and responsibilities;
- Implementing measurement activities such as regular evaluation through operational and procedural audits; and
- Responding to evaluations through the use of an explicit change management process.

This "Plan-Do-Check-Act" continual improvement framework is quite effective when applied internally. It can also be enhanced by using gap analysis, establishment of standard operating procedures, internal trend analysis and external benchmarking, best practice review, and other continual improvement tools. The framework can help utilities understand improvement opportunities and establish explicit service levels, guide investment and operational decisions, form the basis for ongoing measurement, and provide the ability to communicate clearly with customers and key stakeholders.

The Resource Toolbox described in Section VI, Utility Management Resources, provides links to resources that support utilization of the Keys to Management Success.

IV. Where to Begin

Step 1
Candidly Assess Current Conditions

Step 2
Rank Importance of Each Attribute to Your Utility

Step 3
Graph Attributes to Determine Importance and Level of Achievement

Step 4
Choose Attributes

Step 5
Develop and Implement an Improvement Plan

There are many ways to improve utility performance and each utility is unique. Many utilities may choose to start small and make improvements step by step, perhaps by working on projects that will yield early successes. Other utilities may choose to take on several ambitious change efforts simultaneously. Some may prefer to enhance their strengths, while others will prefer to focus on addressing weaknesses. Each utility should determine for itself the most important issue to address, based on its own strategic objectives, priorities, and the needs of the community it serves.

A candid assessment of current performance is often a useful first step in identifying options for improvement. It also establishes a quantifiable baseline from which to measure progress. As conditions change, future reassessments will reveal new opportunities and new priorities.

The following self assessment tool can help water and wastewater managers evaluate their utility's current performance against internal goals or specific needs and determine where to focus improvement efforts. It can be completed by an individual manager, but would also be useful as a vehicle for conversation and consensus building among the utility's management team and other appropriate stakeholders, such as oversight bodies, community and watershed interests, and regulatory authorities.

The assessment tool has five steps: 1) Assess current conditions; 2) Rank the importance of each Attribute for your utility; 3) Chart the results; 4) Choose one or more Attributes to focus on; and 5) Develop and implement an improvement plan.

The Self Assessment can also be found in Appendix B.

Step 1: Assess Current Conditions

On a 1-to-5 scale, assess current conditions by rating your utility's systems and approaches and current level of achievement for each Attribute. Consider the degree to which your current management systems effectively support each of the Attributes and their component parts. Consider all components of each Attribute and gauge your rating accordingly. Use these descriptions to guide your rating.

Rating	Description
1.	Effective, systematic approach and implementation; consistently achieve goals.
2.	Workable systems in place; mostly achieve goals.
3.	Partial systems in place with moderate achievement, but could improve.
4.	Occasionally address this when specific need arises.
5.	No system for addressing this.

Step 2: Rank Importance of Attributes

Rank the importance of each Attribute to your utility, based on your utility's vision, goals, and specific needs. The ranking should reflect the interests and considerations of all stakeholders (managers, staff, customers, regulators, elected officials, community and watershed interests, shareholders, and others).

There are ten Attributes; considering long-term importance to your utility, rank the most important Attribute 1, the second most important 2, and so on. The least important Attribute would be ranked 10. Your ranking of each Attribute's importance might be influenced by current or expected challenges in that particular area, recent accomplishments in addressing these issues, or other factors. Importance ranking is likely to change over time as internal and external conditions change.

As you fill in numbers on the table below, please note that your analysis for Step 1 (rating achievement) should be separate and independent from your analysis for Step 2 (ranking importance).

Attribute	Attribute Components	**Step 1**: Rate Achievement (1-5)	**Step 2:** Rank Importance (1-10)
Product Quality (PQ)	○ Complies with regulatory and reliability requirements. ○ Consistent with customer, public health, and ecological needs.		
Customer Satisfaction (CS)	○ Provides reliable, responsive, and affordable services. ○ Receives timely customer feedback. ○ Responsive to customer needs and emergencies.		

Rating and Ranking Table, *continued*

Attribute	Attribute Components	**Step 1**: Rate Achievement (1-5)	**Step 2:** Rank Importance (1-10)
Employee and Leadership Development (ED)	○ Recruits and retains competent workforce. ○ Collaborative organization dedicated to continual learning and improvement. ○ Employee institutional knowledge retained and improved. ○ Opportunities for professional and leadership development. ○ Integrated and well-coordinated senior leadership team.		
Operational Optimization (OO)	○ Ongoing performance improvements. ○ Minimizes resource use and loss from day-to-day operations. ○ Awareness and timely adoption of operational and technology improvements.		
Financial Viability (FV)	○ Understands full life-cycle cost of utility. ○ Effective balance between long-term debt, asset values, operations and maintenance expenditures, and operating revenues. ○ Predictable and adequate rates.		
Infrastructure Stability (IS)	○ Understands the condition of and costs associated with critical infrastructure assets. ○ Maintains and enhances assets over the long-term at the lowest possible life-cycle cost and acceptable risk. ○ Repair efforts are coordinated within the community to minimize disruptions.		
Operational Resiliency (OR)	○ Staff work together to anticipate and avoid problems. ○ Proactively establishes tolerance levels and effectively manages risks (including legal, regulatory, financial, environmental, safety, security, and natural disaster-related).		

Rating and Ranking Table, *continued*

Attribute	Attribute Components	**Step 1**: Rate Achievement (1-5)	**Step 2:** Rank Importance (1-10)
Community Sustainability (SU)	○ Attentive to impacts on community and watershed health and welfare. ○ Operations enhance natural environment. ○ Efficiently use water and energy resources; promote economic vitality; and engender overall community improvement. ○ Maintain and enhance ecological and community sustainability including pollution prevention, watershed, and source water protection.		
Water Resource Adequacy (WA)	○ Ensures water availability through long-term resource supply and demand analysis, conservation, and public education. ○ Manages operations to provide for long-term aquifer and surface water sustainability and replenishment.		
Stakeholder Understanding and Support (SS)	○ Engenders understanding and support from oversight bodies, community and watershed interests, and regulatory bodies for service levels, rate structures, operating budgets, capital improvement programs, and risk management decisions. ○ Actively involves stakeholders in the decisions that will affect them.		

Step 3: Graph Results

Graph each Attribute based on your rating and ranking. For example, if you rated Product Quality (PQ) 4 for achievement and ranked it 3 for importance, you would place it on the graph as illustrated below. Similarly, if you rated Customer Satisfaction (CS) 3 for achievement and ranked it 5 for importance, you would place it on the graph as illustrated below. A blank graph is provided in Appendix B.

Rating											
	Lower Achievement	5										
		4			PQ							
		3					CS					
	Higher Achievement	2										
		1										
			1	2	3	4	5	6	7	8	9	10
			More Important						Less Important			
			Ranking									

Step 4: Choose Attributes

The goal of effective utility management is to establish high-achieving systems and approaches for each Attribute. Ultimately, utilities should strive to improve performance for all Attributes until each can be charted in the lower half of the table (high achieving). Utility managers may wish to focus on one or a few Attributes at a time, aiming to eventually ensure that all Attributes have been addressed and improved upon over time.

Examining the results of the charting exercise in Step 3 can help identify Attributes to focus on. Attributes that graph into the *blue quadrant* are both very important (ranked 1-5), and under-developed (rated 3-5). These Attributes are strong candidates for improvement efforts. Attributes that fall in the lower left-hand quadrant are both important and well-developed. Some utilities may choose to focus on these areas to continue further improving upon important and well-developed areas, due to their long-term importance (for example, water resource adequacy). Specifically examining these areas may also help a utility identify success factors which would be helpful in addressing areas need-

ing improvement. Others may choose to focus on Attributes that would lead to early successes to build confidence in effecting change, Attributes that maximize benefit relative to the utility's key goals, or Attributes that minimize risks (e.g., fines, penalties, lawsuits, poor public perception).

The choice to embark on improvements in one or more areas is up to the judgment of utility managers, and may also involve consideration of resources (staff and financial), leadership support, and other competing activities. Applying strategic business planning, measurement, and other Keys to Management Success is very important for moving each Attribute over time to the "well-developed" quadrants.

Step 5: Develop and Implement an Improvement Plan

Once you choose to improve one or more Attributes, the next step is to develop and implement a plan for making the desired improvements. Effective improvement plans commonly include the following features:

- A "gap" analysis to identify root causes of under-performance. This analysis would describe the utility's performance goals, its current position relative to its goals, and the reasons for not achieving its goals;
- Development of a utility-specific plan and/or strategy to achieve performance goals and address the root causes. The plan should consider how to incorporate customer and, as appropriate, broader stakeholder interests;
- Specific tasks, tactics, or management adjustments necessary to implement the utility's strategy;
- Utility-specific measures to track progress toward achievement of performance goals; and
- A timeframe for follow-up measurement to assess the degree of accomplishment and potential need for additional effort.

Utilities may also find it useful to appoint an overall improvement program manager to oversee individual improvement projects.

The improvement plan should be developed and implemented within the context of strategic business planning, the "Plan-Do-Check-Act" continual improvement framework, and other components of the Keys to Management Success discussed in Section III.

V. Utility Measures

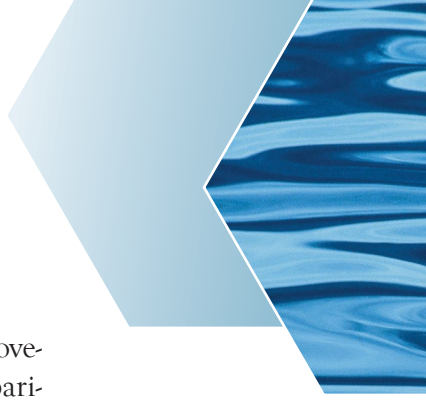
Measuring performance is one of the keys to utility management success. This section of the Primer provides ideas about how to approach measurement and then offers measures for each Attribute to help understand a utility's status and progress.

Approaching Measurement

There are two general approaches to performance measurement. Internal performance measurement, which is the focus of this Primer, involves evaluating current internal utility performance status and trends. It can also include comparison of outcomes or outputs relative to goals, objectives, baseline status, targets, and standards. Benchmarking—*which is not this Primer's focus*—is the overt comparison of similar measures or processes across organizations to identify best practices, set improvement targets, and measure progress within or sometimes across sectors. A utility may decide to engage in benchmarking for its own internal purposes or in a coordinated fashion with others.

While performance measures should be tailored to the specific needs of your utility, the following guidelines can help you identify useful measures and apply them effectively.

1. Select measures that support the organization's strategic objectives, mission, and vision, as well as the ten Attributes.
2. Select the right number, level, and type of measures for your organization. Consider how measures can be integrated as a cohesive group (e.g., start with a small set of measures across broad categories and increase number and specificity over time as needed), and consider measures that can be used by different audiences within the organization.
3. Measuring performance will not necessarily require additional staff, but will require resources. Allocate adequate resources to get the effort off to a good start, and fine tune over time to balance the level of measurement effort with the benefit to the organization.
4. Develop clear, consistent definitions for each measure. Identify who is responsible for collecting the data, and how the data will be tracked and reported.
5. Engage the organization at all levels in developing, tracking, and reporting measures, but also assign someone in the organization the role of championing and coordinating the effort.



6. Set targets rationally, based on criteria such as customer expectations, improvement over previous years, industry performance, or other appropriate comparisons. Tie targets to improving performance in the Attributes.
7. Select and use measures in a positive way to improve decision making, clarify expectations, and focus attention, not just to monitor, report, and control.
8. When selecting measures, consider how they relate to one another. Look for cause-and-effect relationships; for example, how improvements in product quality could result in increased customer satisfaction.
9. Develop an effective process to evaluate and respond to results. Identify how, when, and to whom you will communicate results.
10. Incorporate the "Plan-Do-Check-Act" cycle approach into evaluating both the specific measures and the system as a whole. Regularly review the performance measurement system for opportunities to improve.

... and remember to celebrate your measured and documented successes!

Attribute-Related Measures

The list below provides a limited list of targeted, Attribute-related measures. Taken as a whole, the measures provide a utility with a cohesive, approachable, and generally applicable starting place for gauging progress relative to the Ten Attributes. The list, for brevity, contains measure "headlines" for each Attribute; Appendix C provides further explanation and, where applicable, example calculations.

You can choose and tailor the measures to your own needs and unique, local circumstances. They are intended for your own internal use, even as certain measures (e.g., those noted as QualServe Indicators) can support benchmarking purposes. In these cases, the measures have been selected because they are relevant to the Attributes, have been tested and are in use by utilities, are supported by reference information useful for implementation, and generally can act as a good starting point for Attribute-related progress assessment.

As described in Appendix C, the measures are both quantitative and qualitative. Most are quantitative and include generally applicable example calculations. The qualitative "measures" encourage active assessment of the management area and most have a "yes/no" format.

Like the Attributes themselves, certain measures focus on core utility operations. Several measures reflect emerging utility issues, challenges, or opportunities that have

received increasing attention from a growing number of utility managers. Other measures may reflect broader interests that are worthy of consideration from a broader community perspective.

List of Attribute-Related Utility Measures

See Appendix C for measure descriptions and details.

Product Quality

1. Product quality regulatory compliance
2. Product quality service delivery

Customer Satisfaction

1. Customer complaints
2. Customer service delivery
3. Customer satisfaction

Employee and Leadership Development

1. Employee retention and satisfaction
2. Management of core competencies
3. Workforce succession preparedness

Operational Optimization

1. Resource optimization
2. Water management efficiency

Financial Viability

1. Budget management effectiveness
2. Financial procedure integrity
3. Bond ratings
4. Rate adequacy

Infrastructure Stability

1. Asset inventory
2. Asset (system) renewal/replacement
3. Water distribution/collection system integrity
4. Planned maintenance

Operational Resiliency

1. Recordable incidents of injury or illnesses
2. Insurance claims
3. Risk assessment and response preparedness
4. Ongoing operational resiliency
5. Operational resiliency under emergency conditions

Community Sustainability

1. Watershed-based infrastructure planning
2. Green infrastructure
3. Greenhouse gas emissions
4. Service affordability

Water Resource Adequacy

1. Water supply adequacy
2. Supply and demand management

Stakeholder Understanding and Support

1. Stakeholder consultation
2. Stakeholder satisfaction
3. Internal benefits from stakeholder input
4. Comparative rate rank
5. Media/press coverage

VI. Utility Management Resources

As a companion resource to this Primer, the Collaborating Organizations developed an online Resource Toolbox which offers additional information and guidance on effective utility management. The Toolbox provides a compilation of resources from the seven Collaborating Organizations designed to help the water and wastewater utility community further improve the management of its infrastructure.

The Resource Toolbox is organized according to the Ten Attributes of Effectively Managed Water Sector Utilities and five Keys to Management Success, providing a set of resources relevant to each Attribute and Key. The Toolbox also includes information on where to find these resources.

The Resource Toolbox is located at the website for the Effective Utility Management initiative, at www.watereum.org.

VII. For More Information

This Primer was developed through a collaborative partnership with the following groups. More information about this partnership can be found on their websites or by contacting specific individuals directly.

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VIII. Appendix A: Definitions

The following terms are presented in this Primer. These definitions provide a brief overview of their meaning.

- **Attribute**: A characteristic or outcome of a utility that indicates effective performance.
- **Benchmarking**: The comparison of similar processes or measures across organizations and/or sectors to identify best practices, set improvement targets, and measure progress.
- **Effective Utility Management**: Management that improves products and services, increases community support, and ensures a strong and viable utility into the future.
- **Gap analysis**: Defining the present state of an enterprise's operations, the desired or "target" state, and the gap between them.
- **Internal trend analysis**: Comparison of outcomes or outputs relative to goals, objectives, baselines, targets, and standards.
- **Life-cycle cost**: The total of all internal and external costs associated with a product, process, or activity throughout its entire life cycle – from raw materials acquisition to manufacture/construction/installation, operation and maintenance, recycling, and final disposal.
- **Performance measurement**: Evaluation of current status and trends; can also include comparison of outcomes or outputs relative to goals, objectives, baselines, targets, standards, other organizations' performance or processes (typically called benchmarking), etc.
- **Operations and maintenance expenditure**: Expenses used for day-to-day operation and maintenance of a facility.
- **Operating revenue**: Revenue realized from the day-to-day operations of a utility.
- **Performance measure**: A particular value or characteristic designated to measure input, output, outcome, efficiency, or effectiveness.
- **Source water protection**: Efforts to prevent water quality degradation in streams, rivers, lakes, or underground aquifers used as public drinking water supplies.
- **Standard operating procedure**: A prescribed procedure to be followed routinely; a set of instructions having the force of a directive, covering those features of operations that lend themselves to a definite or standardized procedure without loss of effectiveness.

- **Strategic plan**: An organization's process of defining its goals and strategy for achieving those goals. Often entails identifying an organization's vision, goals, objectives, and targets over a multi-year period of time, as well as setting priorities and making decisions on allocating resources, including capital and people, to pursue the identified strategy.
- **Stewardship**: The careful and responsible management of something entrusted to a designated person or entity's care; the responsibility to properly utilize its resources, including its people, property, and financial and natural assets.
- **Sustainability**: The use of natural, community, and utility resources in a manner that satisfies current needs without compromising future needs or options.
- **Watershed health**: The ability of ecosystems to provide the functions needed by plants, wildlife, and humans, including the quality and quantity of land and aquatic resources.

IX. Appendix B: Self Assessment

Step 1: Assess Current Conditions

On a 1-to-5 scale, assess current conditions by rating your utility's systems and approaches and current level of achievement for each Attribute. Consider the degree to which your current management systems effectively support each of the Attributes and their component parts. Consider all components of each Attribute and gauge your rating accordingly. Use these descriptions to guide your rating.

Rating	Description
1.	Effective, systematic approach and implementation; consistently achieve goals.
2.	Workable systems in place; mostly achieve goals.
3.	Partial systems in place with moderate achievement, but could improve.
4.	Occasionally address this when specific need arises.
5.	No system for addressing this.

Mark your answers in the Step 1 column of the table on the next page.

Step 2: Rank Importance of Attributes

Rank the importance of each Attribute to your utility, based on your utility's vision, goals, and specific needs. The ranking should reflect the interests and considerations of all stakeholders (managers, staff, customers, regulators, elected officials, community and watershed interests, shareholders, and others).

There are ten Attributes; considering long-term importance to your utility, rank the most important Attribute 1, the second most important 2, and so on. The least important Attribute would be ranked 10. Your ranking of each Attribute's importance might be influenced by current or foreseeable challenges in that particular area, recent accomplishments in addressing these issues, or other factors. Importance ranking is likely to change over time as internal and external conditions change.

Mark your answers in the Step 2 column of the table on the next page. As you fill in numbers, please note that your analysis for Step 1 (rating achievement) should be separate and independent from your analysis for Step 2 (ranking importance).

Attribute	**Step 1:** Rate Achievement (1-5)	**Step 2:** Rank Importance (1-10)
Product Quality (PQ)		
Customer Satisfaction (CS)		
Employee and Leadership Development (ED)		
Operational Optimization (OO)		
Financial Viability (FV)		
Infrastructure Stability (IS)		
Operational Resiliency (OR)		
Community Sustainability (SU)		
Water Resource Adequacy (WA)		
Stakeholder Understanding and Support (SS)		

Step 3: Graph Results

Graph each Attribute based on your rating and ranking.

Rating											
Lower Achievement	5										
	4			PQ							
	3					CS					
Higher Achievement	2										
	1										
		1	2	3	4	5	6	7	8	9	10
		More Important						Less Important			
		Ranking									

X. Appendix C: Attribute-Related Water Utility Measures

This Appendix provides more detailed information on the measures offered in Section V of the Primer, including descriptions and example calculations and questions.

Product Quality

1. Product quality regulatory compliance

Description: Water product quality compliance, particularly with regards to 40 CFR Part 141 (the National Primary Drinking Water Regulations), the National Pollutant Discharge Elimination System, and any other relevant federal (Clean Water Act, Safe Drinking Water Act, etc.) or state statute/regulations and permit requirements. The scope can include the quality of all related products, including drinking water, fire suppression water, treated effluent, reused water, and biosolids, as well as quality-related operating requirements such as pressure and number of sewer overflows.

Example calculations:

- *Drinking water compliance rate* (percent): 100 X (number of days in full compliance for the year ÷ 365 days). This is a QualServe Indicator.[1]
- *Wastewater treatment effectiveness rate* (percent): 100 X (365 – total number of standard noncompliance days ÷ 365 days). This is a QualServe Indicator.[2]
- *Number, type, and frequency of "near (compliance) misses"*: For example, reaching 80-95% of allowable levels of "X" during reporting period, typically per month. Tracking this type of measure could be used to improve performance in these "near miss" areas before violations occur.

2. Product quality service delivery

Description: This measure assesses delivery of product quality service based on utility-established objectives and service level targets. It focuses on non-regulatory performance targets.

[1] This is one of the 22 Performance Indicators from the Qualserve program, a voluntary quality improvement program designed for water and wastewater utilities by the American Water Works Association and the Water Environment Federation. Reference from the American Water Works Association and the Awwa Research Foundation, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities*, p. 57. 2004. Note: This material is copyrighted and any reprinting must be by permission of the American Water Works Association.

[2] Ibid., p. 71. 2004.

Example calculations:

- *Drinking water flow and pressure* (percent): 100 X [number of customers with less than (flow of "X" gallons per minute (gpm) and pressure of "Y" pounds per square inch (psi)—levels set by utility) ÷ total number of customers] (during reporting period, typically per month).
- *Fire suppression water flow and pressure* (percent): 100 X [hours of time when (flow of "X" gpm and pressure of "Y" psi—levels set by utility) is available for fire suppression at maximum day demand ÷ total number of hours when fire suppression water should be available at maximum day demand] (during reporting period, typically per month).
- *Service interruptions* (percent): 100 X (number of active account customers experiencing a service interruption of greater than 1 hour ÷ total number of customers during reporting period) (typically per month). Note: the utility may elect to measure planned and unplanned interruptions separately.
- *Water quality goals met/not met*: Number of days in reporting period (typically one month) where utility-defined beyond-compliance targets are met/not met.
- *Sewer backups* (if not included in permit requirements) (amount and percent): Number of customers experiencing backups each year; 100 X (number of customers experiencing backups each year ÷ total number of customers).
- *Sewer overflows* (if not included in permit requirements): Number of sewer overflows per 100 miles of collection system piping.
- *Water reuse* (amount and percent):
  - Amount: Amount of water supplied that is from reused/recycled sources.
  - Percent: 100 X (amount of water supplied that is from reused/recycled water ÷ total amount of water supplied).

  Then, as desired, these amounts can be broken into recipients/applications (e.g., irrigation, agriculture, industrial processes, etc.).
- *Biosolids put to beneficial use* (percent): 100 X (amount of biosolids produced that are put to a beneficial use ÷ total amount of biosolids produced) (in wet tons per year).

Customer Satisfaction

1. Customer complaints

Description: This measure assesses the complaint rates experienced by the utility, with individual quantification of customer service and core utility service complaints.[3] As a "passive measure," it will not likely be numerically representative (i.e., a statistically valid customer sample group) and is a "starting point" measure for understanding customer service problems.

Example calculations:

- Number of complaints per 1,000 customers per reporting period, recorded as either customer service or technical quality complaints. These calculations are based on the QualServe Customer Service Complaints/Technical Quality Complaints Indicator.
  - *Customer service complaint rate*: 1,000 X (customer service associated complaints ÷ number of active customer accounts). This is a QualServe Indicator.[4]
  - *Technical quality complaint rate*: 1,000 X (technical quality associated complaints ÷ number of active customer accounts). This is a QualServe Indicator.[5]

For both calculations, utilities may wish to subcategorize complaints by type and aspect (e.g., customer service into billing, problem responsiveness, interruptions, etc., and technical quality into service deficiencies such as taste, odor, appearance, flow/pressure, etc.) and by type of customer (e.g., residential, industrial, commercial, etc.)

2. Customer service delivery

Description: This measure requires the utility, based on internal objectives and customer input, to set desirable customer service levels, then determine an appropriate (target) percentage of time to meet the performance levels. Once established, the utility can track how often it meets the service levels, helping the utility to determine how well customer needs are being satisfied (e.g., have 95 percent of service calls received a response within 60 minutes). A utility can average across individual measures to determine the overall percentage of service level commitments met.

[3] From AWWA and AwwaRF, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities*, p. 41. 2004. Note: This material is copyrighted and any reprinting must be by permission of the American Water Works Association
[4] Ibid., p. 41.
[5] Ibid., p. 42.

Example calculations:

- *Call responsiveness* (percent): 100 X (number of calls responded to within "X" minutes ÷ total number of calls during reporting period) (typically per month).
- *Error-driven billing adjustment rate* (percent): 100 X (number of error-driven billing adjustments during reporting period ÷ number of bills generated during reporting period). This is a QualServe Indicator.[6]
- *Service start/stop responsiveness* (percent): 100 X (number of stop/start service orders processed within "X" days ÷ total number of stop/start service orders during reporting period).
- *First call resolution* (percent): 100 X (number of calls for which problem was resolved/fixed/scheduled to be fixed at the time of the first call ÷ total number of calls during reporting period).

3. Customer satisfaction

Description: This is an overarching customer satisfaction measure based on requested customer feedback (surveys), not calls received or internal customer satisfaction service level commitments. A utility can measure customer satisfaction immediately after service provision or use a periodically performed, more comprehensive customer satisfaction survey. After-service surveys are simpler and easier for the utility to develop and implement without professional advice, but they tend to over represent the most satisfied (e.g., those who just received service) and the most dissatisfied (e.g., those who just called with complaints) customers. Comprehensive surveys can provide statistical validity enabling extrapolation to the population served. A utility can verify survey information through customer conversations, either as follow up to a survey, during public meetings or focus groups, or by some other method (e.g., individual telephone calls).

Example calculation:

- *Overall customer satisfaction*: Percent of positive or negative customer satisfaction survey responses based on a statistically valid survey or on an immediately after-service survey. Satisfaction responses can be divided into categories such as: highly satisfied/satisfied/moderately satisfied/unsatisfactory; exceeding expectations/meeting expectations/not meeting expectations; numerical scales (e.g., 1-5); or other divisions. Customer satisfaction information is often also gathered and assessed by topic areas such as product quality, service reliability, billing accuracy, customer service, costs/rates/value, crew courtesy, notification around street construction/service interruptions, etc.

[6] From AWWA and AwwaRF, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities*, p. 49. 2004. Note: This material is copyrighted and any reprinting must be by permission of the American Water Works Association.

Employee and Leadership Development

1. Employee retention and satisfaction

Description: This measure gauges a utility's progress toward developing and maintaining a competent and stable workforce, including utility leadership.

Example calculations:

- *Employee turnover rate* (percent): 100 X (number of employee departures ÷ total number of authorized positions per year). Can be divided into categories such as:
  - *Voluntary turnover* (percent): 100 X (number of voluntary departures ÷ total number of authorized positions per year). (Perhaps the best indicator of retention problems.)
  - *Retirement turnover* (percent): 100 X (number of retirement departures ÷ authorized positions per year). (Measures loss/retention of institutional knowledge.)
  - *Experience turnover* (percent): 100 X (number of years of experience represented by all departures ÷ total years of experience with the organization) (at the beginning of the year). (These are harder data to collect but provide a good assessment of institutional knowledge loss potential and therefore the need to retain/capture institutional knowledge.)
- *Employee job satisfaction* (percent): 100 X (number of employees with "X" job satisfaction level ÷ total number of employees) (based on implementation and monitoring over time of a comprehensive employee survey). Can be divided into work type or job classification categories, etc., and cover overall satisfaction and topics deemed relevant to longer-term employee satisfaction and retention, such as:
  - Compensation and benefits
  - Management
  - Professional development and long-term advancement opportunities
  - Work and teamwork
  - Procedures
  - Fairness and respect
  - Communication

2. Management of core competencies

Description: This measure assesses the utility's investment in and progress toward strengthening and maintaining employee core competencies.

Example calculations and assessment areas:

- *Presence of job descriptions and performance expectations*: Does your organization have and maintain current job descriptions and related performance expectations (yes/no)?
- *Training hours per employee*: Total of qualified formal training hours for all employees ÷ total FTEs worked by employees during the reporting period. This is a QualServe Indicator.[7]
- *Certification coverage* (percent): 100 X (number of certifications achieved or maintained ÷ number of needed certifications per year) (across the utility).
- *Employee evaluation results* (assumes utility evaluates employee performance in a routine way and documents results): Results of employee evaluations (e.g., employee growth not clearly demonstrated, employee growth only demonstrated in certain areas or for certain labor categories, etc.).
- *Presence of employee-focused objectives and targets*: Do you have employee-focused organizational objectives and targets and a related professional management system in place? Are you meeting your targets (yes/no)? (Targets could be, for instance, related to quantity, quality, timeliness, or cost. A timeliness target could, for example, relate to the number of hours it takes on average to complete a routine task.)

3. Workforce succession preparedness

Description: This measure assesses utility long-term workforce succession planning efforts to ensure critical skills and knowledge are retained and enhanced over time, particularly in light of anticipated retirement volume in coming years. Focus is on preparing entire groups or cohorts for needed workforce succession, including continued training and leadership development.

Example calculations:

- *Key position vacancies*: Average time that critical-skill positions are vacant due to staff departures per vacancy per year.
- *Key position internal/external recruitment* (percent): 100 X (number of critical-skill positions that are filled internally (through promotion, transfer, etc. rather than outside recruitment) versus filled through outside recruitment ÷ total number of positions filled per year). (This will help the utility to understand if internal workforce development is covering long-term succession needs.)

[7] From AWWA and AwwaRF, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities*, p. 38. 2004. Note: This material is copyrighted and any reprinting must be by permission of the American Water Works Association.

- *Long-term succession plan coverage* (percent): 100 X (number of employees (or cohorts, work units, etc.) covered by a long-term workforce succession plan that accounts for projected retirements and other vacancies in each skill and management area ÷ total number of employees) (or cohorts, work units, etc.).

Operational Optimization

1. Resource optimization

Description: This measure examines resource use efficiency, including labor and material per unit of output or mile of collection/distribution system.

Example calculations:

- *Customer accounts per employee*: Number of accounts ÷ number of FTEs. (FTE = 2,080 hours per year of employee time equivalent.) This is a QualServe Indicator.[8]
- *MGD water delivered/processed per employee*: Average MGD delivered/processed ÷ FTEs per year. This is a QualServe Indicator.[9]
- *Chemical use per volume delivered/processed*: Amount of chemicals used ÷ MG delivered/processed during reporting period. (Alternatively can use dollar amount spent on chemicals ÷ MG delivered/processed; in this case a rolling average for amount spent would account for periodic bulk purchases.)
- *Energy use per volume delivered/processed*: KWH ÷ MG delivered/processed during reporting period. (Alternatively can use dollar amount spent on energy ÷ MG delivered/processed.)
- *O&M cost per volume delivered/processed*: Total O&M cost ÷ MG delivered/processed during reporting period.

A utility can also apply the above resource use per volume delivered/processed calculations to resource use per mile (or 100 miles) of collection/distribution system, (i.e., chemical use per mile, energy use per mile, or O&M cost per mile).

2. Water management efficiency

Description: This measure assesses drinking water production and delivery efficiency by considering resources as they enter and exit the utility system.

[8] Part of the same Indicator (set) as MGD water delivered/MGD waste water processed per FTE. From AWWA and AwwaRF, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities*, p. 40. 2004. Note: This material is copyrighted and any reprinting must be by permission of the American Water Works Association.
[9] Ibid., p. 40.

Example calculations:

- *Production efficiency*: Ratio of raw water volume taken into the treatment system to treated water produced.
- *Distribution system water loss* (a.k.a. non-revenue water) (percent): 100 X [volume of water distributed – (volume of water billed + volume of unbilled authorized water) ÷ total volume of water distributed]. (Quantifies the percentage of produced water that fails to reach customers and cannot otherwise be accounted for through authorized usage.) This is a QualServe Indicator.[10]
- *Meter function* (percent): 100 X (total number of active billable meters minus stopped or malfunctioning meters ÷ total number of active billable meters).

Financial Viability

1. Budget management effectiveness

Description: This measure has short-term and long-term aspects. The short-term calculations are commonly used financial performance indicators, and the long-term consideration is a more comprehensive analytical approach to assessing budget health over the course of several decades.

Example calculations:

Short-term (typically per year):

- *Revenue to expenditure ratio*: Total revenue ÷ total expenditures.
- *O&M expenditures* (percent): 100 X (O&M expenditures ÷ total operating budget).
- *Capital expenditures* (percent): 100 X (capital expenditures ÷ total capital budget).
- *Debt ratio*: Total liabilities ÷ total assets. Total liabilities are the entire obligations of the utility under law or equity. Total assets are the entire resource of the utility, both tangible and intangible. Utilities often have different debt-risk acceptability levels, thus the ratio itself should be considered within each utility's unique circumstances. This is a QualServe Indicator.[11]

[10] From AWWA and AwwaRF, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities*, p. 59. 2004. Note: This material is copyrighted and any reprinting must be by permission of the American Water Works Association.
[11] Ibid., p. 51. 2004.

Long-term:

- *Life-cycle cost accounting*: Has the utility conducted a life-cycle cost accounting analysis[12] that explicitly incorporates accepted service level risks, asset condition, budget needs based on the values (net present values) of utility current and future assets, etc., and made financial and budget management decisions accordingly (yes/no)?

2. Financial procedure integrity

Description: Questions that gauge presence of internal utility processes to ensure a high level of financial management integrity.

Example calculations:

- Does the utility have financial accounting policies and procedures (yes/no)?
- Are financial results and internal controls audited annually (yes/no)?
- Have the number of control deficiencies and material weaknesses been reduced from previous audits (yes/no)?

3. Bond ratings

Description: Bond ratings are a general indicator of financial viability; however, they are not always within a utility's control and are less important if a utility is not participating in capital markets. Smaller utilities often struggle to obtain high ratings. Even though a higher bond rating is desirable and this provides a general indicator of financial health, the bond rating should not be considered alone. It should be considered in light of other factors such as the other measures suggested for this Attribute.

Example question:

- Has your bond rating changed recently? If so, why? Does the change reflect the utility's financial management in a way that can and should be acknowledged and, if need be, addressed?

[12] Section 707 of Executive Order 13123 defines life-cycle costs as, "...the sum of present values of investment costs, capital costs, installation costs, energy costs, operating costs, maintenance costs, and disposal costs over the life-time of the project, product, or measure." Life-cycle cost analysis (LCCA) is an economic method of project evaluation in which all costs arising from owning, operating, maintaining, and disposing of a [facility/asset] are considered important to the decision. LCCA is particularly suited to the evaluation of design alternatives that satisfy a required performance level, but that may have differing investment, operating, maintenance, or repair costs; and possibly different life spans. LCCA can be applied to any capital investment decision, and is particularly relevant when high initial costs are traded for reduced future cost obligations. See also: http://www.epa.gov/EMS/position/eo13148.htm, http://www.wbdg.org/resources/lcca.php.

4. Rate adequacy

Description: This measure helps the utility to consider its rates relative to factors such as external economic trends, short-term financial management, and long-term financial health. It recognizes that a "one size fits all" calculation would not be realistic due to each utility's unique situation and the number of variables that could reasonably be considered. The following three questions prompt assessment of key components of rate adequacy.

Example questions:

- How do your rate changes compare currently and over time with the inflation rate and the Consumer Price Index (CPI) or Consumer Price Index for All Urban Consumers (CPI-U)? (Rate increases below CPI for very long may suggest rates are not keeping up with utility costs.) (Using a rolling rate average over time will adjust for short-term rate hikes due to capital or O&M spending needs.)
- Have you established rates that fully consider the full life-cycle cost of service and capital funding options? (See the life-cycle cost accounting discussion, above.)
- Does your utility maintain a rate stabilization reserve to sustain operations during cycles of revenue fluctuation, in addition to 60- (or 90-) day operating reserves?

Infrastructure Stability

1. Asset inventory

Description: This measure gauges a utility's efforts to assess assets and asset conditions, as the first steps towards building a comprehensive asset management program.

Example calculations:

- *Inventory coverage* (percent): 100 X (total number of critical assets inventoried within a reasonable period of time (e.g., 5-10 years) ÷ total number of critical assets). A utility will need to first define what it considers to be a critical asset and a complete inventory will involve understanding the following for each:
  - Age and location;
  - Asset size and/or capacity;
  - Valuation data (e.g., original and replacement cost);
  - Installation date and expected service life;

- Maintenance and performance history; and
- Construction materials and recommended maintenance practices.[13]

- *Condition assessment coverage* (percent): 100 X (total number of critical assets with condition assessed and categorized into condition categories within a reasonable period of time (e.g., 5-10 years) ÷ total number of critical assets). Condition categories could include: unacceptable, improvement needed, adequate, good, and excellent to reflect expected service levels and accepted risks.

2. Asset (system) renewal/replacement

Description: This measure assesses asset renewal/replacement rates over time. The measure should reflect utility targets, which will vary depending on each utility's determinations of acceptable risks for different asset classes. Decisions on asset replacement typically factor in internally agreed-upon risks and objectives, which may differ by asset class and other considerations. For instance, a utility may decide to run certain assets to failure based on benefit-cost analysis.

Example calculations:

- *Asset renewal/replacement rate* (percent): 100 X (total number of assets replaced per year for each asset class ÷ total number of assets in each asset class). For example, a two percent per year replacement target (50-year renewal) for a particular asset class could be identified as the basis for performance monitoring.

  — *or* —

- *Asset (system) renewal/replacement rate*: 100 X (total actual expenditures or total amount of funds reserved for renewal and replacement for each asset group ÷ total present worth for renewal and replacement needs for each asset group). This is a QualServe Indicator.[14]

3. Water distribution/collection system integrity

Description: For drinking water utilities, this measure quantifies the number of pipeline leaks and breaks. Distribution system integrity has importance for health, customer service, operational, and asset management reasons. For wastewater utilities, this measure examines the frequency of collection system failures. When tracked over time, a utility can evaluate whether its failure rate is decreasing, stable, or increasing. When data are maintained to characterize failures by pipe type and age, type

[13] From the U.S. General Accounting Office, *Water Infrastructure: Comprehensive Asset Management Has Potential to Help Utilities Better Identify Needs and Plan Future Investments*. GAO-04-461. March 2004. Available: http://www.gao.gov/new.items/d04461.pdf.

[14] From AWWA and AwwaRF, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities*, p. 53. 2004. Note: This material is copyrighted and any reprinting must be by permission of the American Water Works Association.

of failure, and cost of repairs, decisions regarding routine maintenance and replacement/renewals can be better made.[15]

Example calculation (drinking water utilities):

- *Leakage and breakage frequency rate* (percent): 100 X ((total number of leaks + total number of breaks) ÷ total miles of distribution piping per year). (Note: leaks and breaks are distinctly different events.) This is a QualServe Indicator.[16]

Example calculation (wastewater utilities):

- *Collection system failure rate* (percent): 100 X (total number of collection system failures ÷ total miles of collection system piping per year). This is a QualServe Indicator.[17]

4. Planned maintenance

Description: Planned maintenance includes both preventive and predictive maintenance. Preventive maintenance is performed according to a predetermined schedule rather than in response to failure. Predictive maintenance is initiated when signals indicate that maintenance is due. All other maintenance is categorized as corrective or reactive.[18]

Example calculations:

This measure can be measured in different ways. Calculating costs may be preferable to encourage business decisions based on total cost; however, the reliability of costs is uncertain. Hours are likely to be less variable than costs, but not all utilities track hours. Thus, cost and hours ratios are desirable, where possible.

- *Planned maintenance ratio by hours* (percent): 100 X (hours of planned maintenance ÷ (hours of planned + corrective maintenance)). This is a QualServe Indicator.[19]
- *Planned maintenance ratio by cost* (percent): 100 X (cost of planned maintenance ÷ (cost of planned + corrective maintenance)). This is a QualServe Indicator.[20]

[15] From AWWA and AwwaRF, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities*, p. 70. 2004. Note: This material is copyrighted and any reprinting must be by permission of the American Water Works Association.
[16] Ibid., p. 61.
[17] Ibid., p. 70.
[18] Ibid., p. 65.
[19] Ibid., p. 66.
[20] Ibid., p. 66.

Operational Resiliency

1. Recordable incidents of injury or illnesses

Description: Incidence rates can be used to show the relative level of injuries and illnesses and help determine problem areas and progress in preventing work-related injuries and illnesses.

Example calculations:

The U.S. Bureau of Labor Statistics has developed instructions for employers to evaluate their firm's injury and illness record. The calculation below is based on these instructions, which can be accessed at: http://www.bls.gov/iif/osheval.htm.

- *Total recordable incident rate*: (Number of work-related injuries and illnesses X 200,000[21]) ÷ employee hours worked.

2. Insurance claims

Description: This measure examines the number, type, and severity of insurance claims to understand insurance coverage strength/vulnerability.

Example calculations:

- *Number of insurance claims*: Number of general liability and auto insurance claims per 200,000[22] employee hours worked.
- *Severity of insurance claims*: Total dollar amount of general liability and auto insurance claims per 200,000[23] employee hours worked.

3. Risk assessment and response preparedness

Description: This measure asks whether utilities have assessed their all-hazards (natural and human-caused) vulnerabilities and risks and made corresponding plans for critical needs. Risk assessment in this context includes a vulnerability assessment regarding, for example, power outages, lack of access to chemicals, curtailed staff availability, etc.

[21] 200,000 hours is a standard number used by OSHA to normalize data. It represents the equivalent of 100 employees working 40 hours per week, 50 weeks per year, and provides the standard base for the incidence rates.
[22] See the explanation in the footnote above regarding the 200,000 hours standard.
[23] See the explanation in the footnote above regarding the 200,000 hours standard.

Example calculations:

- Emergency Response Plan (ERP) coverage and preparedness:
  - Does the utility have an ERP in place (yes/no)?
  - Number and frequency of ERP trainings per year: 100 X (number of employees who participate in ERP trainings ÷ total number of employees).
  - Number and frequency of ERP exercises per year: 100 X (number of employees who participate in ERP exercises ÷ total number of employees).
  - Frequency with which the ERP is reviewed and updated.
- *Vulnerability management*: Is there a process in place for identifying and addressing system deficiencies (e.g., deficiency reporting with an immediate remedy process) (yes/no)?

4. Ongoing operational resiliency

Description: This measure assesses a utility's operational reliability during ongoing/routine operations.

Example calculations:

- *Uptime for critical utility components on an ongoing basis* (percent): 100 X (hours of critical component uptime ÷ hours critical components have the physical potential to be operational). Note: a utility can apply this measure on an individual component basis or summed across all identified critical components. Also, a utility can make this measure more precise by adjusting for planned maintenance periods.

5. Operational resiliency under emergency conditions

Description: This measure assesses the operational preparedness and expected responsiveness in critical areas under emergency conditions.

Example calculations (all apply to emergency conditions and, where relevant, factor in anticipated downtimes relative to required/high demand times):

- *Power resiliency*: Period of time (e.g., hours or days) for which backup power is available for critical operations (i.e., those required to meet 100 percent of minimum daily demand). (Note: "minimum daily demand" is the average daily demand for the lowest production month of the year.)
- *Treatment chemical resiliency*: Period of time (e.g., hours or days) minimum daily demand can be met with water treated to meet SDWA standards for acute contaminants (i.e., *E.coli*, fecal coliform, nitrate, nitrite, total nitrate and nitrite, chlorine dioxide, turbidity as referenced in the list of situations requiring a Tier 1 Public Notification under 40 CFR 141.202), without additional treatment

chemical deliveries. (Note: "minimum daily demand" is the average daily demand for the lowest production month of the year.)

- *Critical parts and equipment resiliency*: Current longest lead time (e.g., hours or days) for repair or replacement of operationally critical parts or equipment (calculated by examining repair and replacement lead times for all identified critical parts and equipment and taking the longest single identified time).
- *Critical staff resiliency*: Average number of response-capable backup staff for critical operation and maintenance positions (calculated as the sum of all response-capable backup staff ÷ total number of critical operation and maintenance positions).
- *Treatment operations resiliency* (percent): Percent of minimum daily demand met with the primary production or treatment plant offline for 24, 48, and 72 hours. (Note: "minimum daily demand" is the average daily demand for the lowest production month of the year.)
- *Sourcewater resiliency*: Period of time (e.g., hours or days) minimum daily demand can be met with the primary raw water source unavailable. (Note: "minimum daily demand" is the average daily demand for the lowest production month of the year.)

Community Sustainability

1. Watershed-based infrastructure planning

Description: This measure addresses utility efforts to consider watershed-based approaches when making management decisions affecting infrastructure planning and investment options. Watershed protection strategies can sometimes, for example, protect sourcewater quality limiting the need for additional or enhanced water treatment capacity.

Example question:

- Does the utility employ alternative, watershed-based approaches to align infrastructure decisions with overall watershed goals and potentially reduce future infrastructure costs? Watershed-based approaches include, for example: centralized management of decentralized systems; stormwater management; sourcewater protection programs; and conjunctive use of groundwater, sourcewater, and recycled water to optimize resource use at a basin scale. (See also "green infrastructure" below.)

2. Green infrastructure

Description: "Green infrastructure" includes both the built and natural/unbuilt environment. Utilities may promote source water protection and conservation "green infrastructure" approaches in support of water conservation (e.g., per capita demand reduction) and water quality protection objectives. Green infrastructure approaches can include: low-impact development techniques (e.g., minimization of impervious surfaces, green roofs); protection of green spaces and wildlife habitat; incentives for water-efficient domestic appliance use and landscaping; green building standards such as those promoted through the Leadership in Energy and Environmental Design (LEED) program; management of energy, chemical, and material use; etc.[24] Utilities often coordinate these efforts with community planning offices.

Example question:

- Has the utility explored green infrastructure approaches and opportunities that are aligned with the utility's mandate, goals, and objectives and community interests (yes/no)?
- Does the utility have procedures that incorporate green infrastructure approaches and performance into new infrastructure investments (yes/no)?

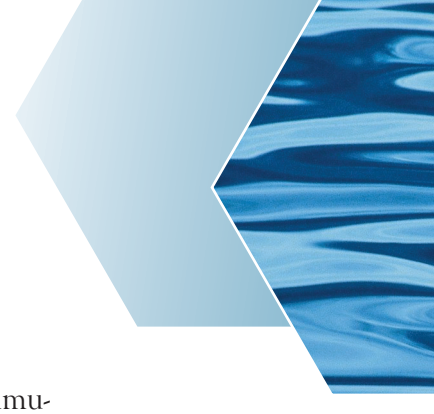
3. Greenhouse gas emissions

Description: This measure will help drinking and wastewater utilities to understand and reduce their individual contributions to area greenhouse gas emissions. Trends indicate that water utility emissions of these gases will likely be of interest to stakeholders. Monitoring of these emissions is becoming more common among water sector utilities, and some utilities are beginning voluntary efforts to reduce their emissions (e.g., through production of reusable methane energy by wastewater utilities).

Example calculation:

- Net (gross minus offsets) greenhouse gas emissions in tons of carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4), and, as applicable, hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). Start by establishing an emissions baseline and then track emission trends in conjunction with minimizing/reducing emissions over time, where possible.[25] Emissions inventories often incorporate indirect emissions such as those generated during the production and transport of materials and chemicals.

[24] For more information about green infrastructure, visit www.epa.gov/npdes/greeninfrastructure.
[25] EPA's industry-government "Climate Leaders" partnership involves completing a corporate-wide inventory of their greenhouse gas emissions. Information and related guidance is available at http://www.epa.gov/stateply/index.html.



4. Service affordability

Description: Drinking water and wastewater service affordability centers on community members' ability to pay for water services. The true cost of water/wastewater services may be higher than some low-income households can afford, particularly when rates reflect the full life-cycle cost of water services. Each utility will want to consider and balance keeping water services affordable while ensuring the rates needed for long-term infrastructure and financial integrity.

Example calculations and considerations:

- *Bill affordability* (households for which rates may represent an unaffordable level) (percent): 100 X (number of households served for which average water bill is > "X" percent (often 2-2.5%) of median household income[26] ÷ total number of households served).

Coupled with:

- *Low-income billing assistance program coverage* (percent): 100 X (number of customers enrolled in low-income billing assistance program ÷ number of customers who are eligible for enrollment in low-income billing assistance program). (The utility can try to increase participation in the program for eligible households that are not participating.)

Water Resource Adequacy

1. Water supply adequacy

Description: This measure assesses short-term and long-term water supply adequacy and explores related long-term supply considerations.

Example calculations and questions:

- *Short-term water supply adequacy*: Period of time for which existing supply sources are adequate. This can be measured as a ratio of projected short-term (e.g., 12-month rolling average) monthly supply to projected short-term monthly demand. Often an index or scale is used, for example, short-term supply relative to severe drought (assigned a "1") to abundant supply conditions (assigned a "5").

[26] This calculation focuses on identifying low-income households based median household incomes (MHI); however, MHI is not strongly correlated with the incidence of poverty or other measures of economic need. Further, populations served by small utilities in rural settings tend to have lower MHI and higher poverty rates, but fewer options for diversifying water/wastewater service rates based on need compared to larger municipal systems.

- *Long-term water supply adequacy*: Projected future annual supply relative to projected future annual demand for at least the next 50 years (some utilities project out as far as 70-80 years). Statistical forecasting and simulation modeling and forecasting techniques are typically used for such long-term projections. Analysis variables in addition to historical record (e.g., historical and year-to-date reservoir elevation data), forecasted precipitation, and flows can include:
  - Future normal, wet, dry, and very dry scenarios (including anticipated climate change-related scenarios);
  - Anticipated population changes;
  - Future service areas;
  - Availability of new water supplies, including recycled water (plus availability of water rights for new supplies, where applicable); and
  - Levels of uncertainty around the above.

2. Supply and demand management

Description: This metric explores whether the utility has a strategy for proactive supply and demand management in the short and long terms. Strategy needs will depend on community circumstances and priorities, anticipated population growth, future water supply in relation to anticipated demand, demand management and other conservation options, and other local considerations.

Example questions:

- Has the utility developed a sourcewater protection plan (yes/no) and is the plan current (yes/no)?
- Does the utility have a demand management/demand reduction plan (yes/no)? Does this plan track per capita water consumption and, where analytical tools are available to do so, accurately attribute per capita consumption reductions to demand reduction strategies (such as public education and rebates for water-efficient appliances) (yes/no)?
- Do demand scenarios account for changes in rates (which can change for many reasons) and conservation-oriented, demand management pricing structures (yes/no)?
- Does the utility have policies in place that address, prior to committing to new service areas, availability of adequate dry year supply (yes/no)? Alternatively, does the utility have a commitment to denying service commitments unless a reliable drought-year supply, with reasonable drought use restrictions, is available to meet the commitment (yes/no)?

Stakeholder Understanding and Support

1. Stakeholder consultation

Description: This measure addresses utility actions to reach out to and consult with stakeholders about utility matters, including utility goals, objectives, and management decisions.

Example questions:

- Does the utility identify stakeholders, conduct outreach, and actively consult with stakeholders about utility matters (yes/no)? Elements of this plan can include:
  - Number of active contacts with stakeholders in key areas (e.g., from local government, business, education, non-governmental groups)?
  - Does the utility actively seek input from stakeholders (yes/no)?
  - Frequency with which the utility actively consults with stakeholders. This measure should go beyond counting the number of calls or times information is sent out or posted on websites to items such as number of stakeholder outreach and education activities, number of opportunities for stakeholders to provide input, participation of stakeholders on utility committees, etc.
- Does the utility actively consider and act upon stakeholder input (yes/no)?

2. Stakeholder satisfaction

Description: This measure addresses stakeholder perceptions of the utility. Stakeholder satisfaction can be measured through surveys sent to stakeholders, formal feedback surveys distributed to stakeholders at events, etc.

Example calculations:

- *Overall satisfaction* (percent): 100 X (number of stakeholders who annually rate the overall job of the utility as positive ÷ total number of stakeholders surveyed).
- *Responsiveness* (percent): 100 X (number of stakeholders who annually rate utility responsiveness to stakeholder needs as positive ÷ total number of stakeholders surveyed).
- *Message recollection for outreach programs targeted to specific stakeholder groups* (percent): (a) 100 X (number of stakeholders who recall key messages ÷ total number of stakeholders surveyed); and (b) 100 X (number of stakeholders who recall the message source (TV, utility mailers, newsletters, etc.) ÷ total number of stakeholders surveyed).

3. Internal benefits from stakeholder input

Description: This measure addresses the value utility employees believe stakeholder engagement has provided to utility projects and activities. Measurement by the utility can focus on surveying utility employees running projects that have stakeholder involvement.

Example calculations:

- 100 X (number of utility projects or activities where stakeholders participated and/or provided input for which utility employees believe there was value added as a result of stakeholder participation and input ÷ total number of projects where stakeholders participated and/or provided input).
- *Overall value added* (percent): 100 X (number of utility employees who rated their overall sense of value added from stakeholder participation and input as (high value added, some value added, little value added, no value added) ÷ total number of utility employees surveyed).

4. Comparative rate rank

Description: This measure depicts how utility rates compare to similar utilities (e.g., utilities of the same type (drinking water, wastewater) that are similar in terms of geographic region, size of population served, etc.). A utility can use the measure internally or to educate stakeholders. It should be noted that the lowest rate is not necessarily best (see Financial Viability).

Example calculations:

- Typical monthly bill for the average household as a percentage of typical monthly bills for similar area utilities.

5. Media/press coverage

Description: This measure captures media portrayal of the utility (newspaper, TV, radio, etc.) in terms of awareness, accuracy, and tone.

Example calculations:

- *Amount of coverage*: Total number of media stories (newspaper, TV, radio, etc.) concerning the utility per year.
- *Media coverage tone* (percent): 100 X (number of media stories concerning the utility that portray the utility in a positive way ÷ total number of media stories concerning the utility) per year.
- *Media coverage accuracy* (percent): 100 X (number of media stories that accurately describe the utility ÷ total number of media stories concerning the utility) per year.

Effective Utility Management: A Primer for Water and Wastewater Utilities