NEW ISSUE RATINGS: See "RATINGS" herein

*In the opinion of Wyatt, Tarrant & Combs, LLP, Bond Counsel, (i) under the Internal Revenue Code as presently enacted and construed and subject to the conditions and limitations set forth herein under the caption "TAX TREATMENT," interest on the Series 2022A Bonds is excludable from gross income for Federal income tax purposes and (ii) the Series 2022A Bonds are exempt from ad valorem taxation, and the interest thereon is exempt from income taxation, by the Commonwealth of Kentucky and all of its political subdivisions and taxing authorities. See "TAX TREATMENT" herein.*

**$225,000,000**
**LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT**
**SEWER AND DRAINAGE SYSTEM REVENUE BONDS, SERIES 2022A**
**(Green Bonds – Climate Bond Certified)**

Dated: Date of Delivery Due Date: See Inside Cover

Interest on the captioned Bonds (the "Series 2022A Bonds") will be payable from the dated date, on each May 15 and November 15, commencing May 15, 2022. The Series 2022A Bonds mature on each May 15, as shown on the inside cover.

The Series 2022A Bonds are being issued pursuant to the provisions of Chapter 76 of the Kentucky Revised Statutes, as amended (the "Act"), a Revenue Bond Resolution adopted by the District on December 7, 1992, as heretofore amended and as further amended and supplemented by the Thirty-Second Supplemental Sewer and Drainage System Revenue Bond Resolution adopted by the District on November 15, 2021 (collectively, the "Resolution"). The holders of the Series 2022A Bonds shall, on a parity with the holders of all other bonds outstanding under the Resolution (collectively, the "Bonds"), have a first priority lien on and security interest in the revenues of the District derived from the operation of the District's sewer and drainage system (the "System"). The District reserves the right to issue additional bonds and refunding bonds on a parity with the outstanding Bonds, subject to satisfaction of the conditions set forth in the Resolution. See "SECURITY AND SOURCE OF PAYMENT FOR THE SERIES 2022A BONDS" herein.

The Series 2022A Bonds will be fully registered bonds in denominations of $5,000 or any integral multiple thereof. The Series 2022A Bonds will be issuable under a book entry system, registered in the name of The Depository Trust Company ("DTC") or its nominee. There will be no distribution of the Series 2022A Bonds to the ultimate purchasers. See "Book-Entry System" and APPENDIX E herein. Principal and interest on the Series 2022A Bonds is payable at the designated office of The Bank of New York Mellon Trust Company, N.A, as Bond Registrar and Paying Agent (the "Paying Agent and Bond Registrar").

The Series 2022A Bonds are subject to optional redemption and mandatory sinking fund redemption prior to maturity as described herein.

The Series 2022A Bonds will be issued as Green Bonds – Climate Bond Certified. The District engaged Kestrel Verifiers for the review and certification process and to provide an opinion regarding the conformance of the Series 2022A Bonds with the Climate Bonds Standard (Version 3.0). See "Appendix G - Climate Bonds Verifier's Report" herein.

The Series 2022A Bonds are special and limited revenue obligations of the District and do not constitute a debt, liability or general obligation of the District, the Commonwealth of Kentucky or any political subdivision or taxing authority thereof, including the Louisville/Jefferson County Metro Government or the County of Jefferson, Kentucky, within the meaning of the Constitution and laws of the Commonwealth of Kentucky. See "SECURITY AND SOURCE OF PAYMENT FOR THE SERIES 2022A BONDS" herein.

The Series 2022A Bonds are offered when, as and if issued, subject to the approving legal opinion of Wyatt, Tarrant & Combs, LLP, Bond Counsel, Louisville, Kentucky. Certain legal matters have been passed upon for the District by its General Counsel, Paula M. Purifoy, Esq. The Series 2022A Bonds are expected to be available for delivery on or about February 1, 2022.

Dated: January 11, 2022

**$225,000,000**
**LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT**
**SEWER AND DRAINAGE SYSTEM REVENUE BONDS, SERIES 2022A**
**(Green Bonds – Climate Bond Certified)**

Dated: Date of Delivery  Due: May 15, as shown below

| Due May 15 | Principal Amount | Interest Rate | Price | Yield | CUSIP 546589† |
|---|---|---|---|---|---|
| 2022 | $250,000 | 4.000% | 101.043 | 0.380% | S94 |
| 2023 | $500,000 | 5.000% | 105.907 | 0.400% | T28 |
| 2024 | $750,000 | 5.000% | 110.107 | 0.550% | T36 |
| 2025 | $1,000,000 | 5.000% | 114.060 | 0.670% | T44 |
| 2026 | $3,000,000 | 5.000% | 117.625 | 0.810% | T51 |
| 2027 | $6,000,000 | 5.000% | 120.841 | 0.950% | T69 |
| 2028 | $8,940,000 | 5.000% | 123.701 | 1.090% | T77 |
| 2029 | $9,380,000 | 5.000% | 126.443 | 1.200% | T85 |
| 2030 | $8,080,000 | 5.000% | 129.074 | 1.290% | T93 |
| 2031 | $7,920,000 | 5.000% | 131.762 | 1.350% | U26 |
| 2032 | $7,340,000 | 5.000% | 134.382 | 1.400% | U34 |
| 2033 | $7,740,000 | 5.000% | 134.155 [c] | 1.420% | U42 |
| 2034 | $8,155,000 | 4.000% | 122.788 [c] | 1.590% | U59 |
| 2035 | $4,200,000 | 4.000% | 122.046 [c] | 1.660% | U67 |
| 2036 | $4,370,000 | 4.000% | 121.624 [c] | 1.700% | U75 |
| 2037 | $4,540,000 | 3.000% | 109.450 [c] | 1.980% | U83 |
| 2038 | $4,675,000 | 3.000% | 109.158 [c] | 2.010% | U91 |
| 2039 | $2,785,000 | 3.000% | 108.867 [c] | 2.040% | V25 |
| 2040 | $2,870,000 | 3.000% | 108.576 [c] | 2.070% | V33 |
| 2041 | $2,955,000 | 3.000% | 108.287 [c] | 2.100% | V41 |
| 2042 | $3,045,000 | 3.000% | 107.998 [c] | 2.130% | V58 |
| 2043 | $3,135,000 | 3.000% | 107.710 [c] | 2.160% | V66 |
| 2044 | $23,515,000 | 3.000% | 106.947 [c] | 2.240% | V74 |
| 2045 | $24,220,000 | 2.625% | 100.042 [c] | 2.620% | V82 |
| 2046 | $24,860,000 | 2.625% | 99.730 | 2.640% | V90 |

$50,775,000, 2.700%, Term Bonds Due May 15, 2052, Price 100.000, Yield 2.700%, CUSIP 546589 W73

[c] Priced to call date of May 15, 2032.

† *CUSIP is a registered trademark of the American Bankers Association. CUSIP data herein is provided by Standard & Poor's, as manager of CUSIP Global Services, and is set forth herein for convenience of reference only and no representations are made as to the correctness of the CUSIP number. The CUSIP numbers for some or all of the Series 2022A Bonds may be changed as a result of various actions occurring after the issuance of the Series 2022A Bonds, including, but not limited to, a refunding in whole or in part of the Series 2022A Bonds or the addition of secondary market portfolio insurance or other credit enhancement applicable to some or all of the Series 2022A Bonds.*

**LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT**

*Board Members*

Marita Willis, Chair
Keith Jackson, Vice Chair
Rebecca Cox
Gerald Joiner
Ricky Mason
Carmen Moreno-Rivera
John Selent
JT Sims

*Executive Director and Secretary-Treasurer*
James A. "Tony" Parrott

*Chief Financial Officer*
Brad Good

*Chief of Operations*
Brian Bingham

*Chief Engineer*
David Johnson

*General Counsel*
Paula M. Purifoy, Esq.

**CERTIFIED PUBLIC ACCOUNTANTS**

Crowe LLP
Louisville, Kentucky

**BOND COUNSEL**

Wyatt, Tarrant & Combs, LLP
Louisville, Kentucky

**FINANCIAL ADVISOR**

Robert W. Baird & Co. Incorporated
Louisville, Kentucky

**PAYING AGENT AND BOND REGISTRAR**

The Bank of New York Mellon Trust Company, N.A
Louisville, Kentucky

**GREEN BONDS EXTERNAL REVIEWER**

Kestrel Verifiers
Hood River, Oregon

## REGARDING THIS OFFICIAL STATEMENT

The information set forth herein has been obtained from the Louisville and Jefferson County Metropolitan Sewer District (the "District") and other sources that are believed to be reliable but is not guaranteed as to accuracy or completeness, and is not to be construed as a representation, by the Underwriter. The information and expressions of opinion contained herein are subject to change without notice, and neither the delivery of this Official Statement nor any sale made hereunder shall, under any circumstances, create any implication that there has been no change in the affairs of the District or that the information or opinions or estimates contained herein are correct as of any date subsequent to the date hereof.

The Underwriter has provided the following sentence for inclusion in this Official Statement. The Underwriter has reviewed the information in this Official Statement in accordance with, and as a part of, its responsibilities to investors under the federal securities laws as applied to the facts and circumstances of this transaction, but the Underwriter does not guarantee the accuracy or completeness of such information.

This Official Statement contains statements which, to the extent they are not recitations of historical fact, constitute "forward-looking statements." In this respect, the words "estimate," "project," "anticipate," "expect," "intend," "believe" and similar expressions are intended to identify forward-looking statements.

No dealer, broker, salesman or other person has been authorized by the District or the Underwriter to give any information or to make any representations with respect to the Series 2022A Bonds offered hereby, other than those contained herein, and if given or made, such other information or representations must not be relied upon as having been authorized by any of the foregoing. This Official Statement does not constitute an offer to sell or the solicitation of an offer to buy, nor shall there be any sale of the Series 2022A Bonds by any person in any jurisdiction in which it is unlawful for such person to make such offer, solicitation or sale.

In connection with this offering, the Underwriter may over allot or effect transactions that stabilize or maintain the market price of the Series 2022A Bonds at a level above that which might otherwise prevail in the open market. Such stabilizing, if commenced, may be discontinued at any time.

In making an investment decision, investors must rely on their own examination of the district and the terms of the offering, including the merits and risks involved. The Series 2022A bonds have not been recommended by any federal or state securities commission or regulatory authority. Furthermore, the foregoing authorities have not confirmed the accuracy or determined the adequacy of this official statement.

This Official Statement contains summaries believed to be accurate of certain documents, but reference is hereby made to the actual documents, which are incorporated by reference, and all such summaries are qualified in their entirety by this reference. This Official Statement does not constitute a contract between the District or the Underwriter and any of the purchasers or owners of the Series 2022A Bonds.

References herein to provisions of Kentucky law, whether codified in the Kentucky Revised Statutes ("KRS") or uncodified, or of the Kentucky Constitution, are references to such provisions as they presently exist. Any of those provisions may from time to time be amended, repealed or supplemented.

As used in this Official Statement, "debt service" means principal of, premium, if any, and interest on the obligations referred to, and "Commonwealth" or "Kentucky" means the Commonwealth of Kentucky.

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Appendices

**$225,000,000**
**LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT SEWER AND DRAINAGE SYSTEM REVENUE BONDS, SERIES 2022A**
**(Green Bonds – Climate Bond Certified)**

## INTRODUCTION

The purpose of this Official Statement, which includes the cover pages and appendices, is to provide certain information with respect to the issuance of the $225,000,000 aggregate principal amount of Louisville and Jefferson County Metropolitan Sewer District Sewer and Drainage System Revenue Bonds, Series 2022A (Green Bonds – Climate Bond Certified) (the “Series 2022A Bonds”).

**This introduction is not a summary of this Official Statement. It is only a brief description of and guide to, and is qualified by, more complete and detailed information contained in the entire Official Statement, including the cover pages and appendices hereto, and the documents summarized or described herein. A full review should be made of the entire Official Statement. The offering of the Series 2022A Bonds to potential investors is made only by means of the entire Official Statement.**

Any capitalized terms not otherwise defined in this Official Statement shall have the meanings ascribed to them in “Appendix A - Definitions of Certain Terms and Summary of Provisions of the Resolution.”

### The District

The Series 2022A Bonds are being issued by the Louisville and Jefferson County Metropolitan Sewer District (the “District”), a public body corporate and politic and a political subdivision of the Commonwealth of Kentucky.

The District was created pursuant to the Act in 1946 to provide adequate sewer and drainage facilities and services in and around the City of Louisville, Kentucky (the “City”) and within Jefferson County, Kentucky (the “County”). In 1987, the District became the sole local authority for providing flood control and storm water drainage services in a drainage service area which included the City of Louisville, many small incorporated areas of the County, and portions of the unincorporated areas of the County (collectively hereinafter referred to as the “Drainage Service Area”). Substantially all the governmental and corporate functions of the City and the County merged effective January 6, 2003 into a single consolidated local government known as Louisville/Jefferson County Metro Government. The consolidated local government replaced and superseded the governments of the City and the County. The City no longer exists as a separate legal entity.

**Purpose of the Series 2022A Bonds**

The proceeds of the Series 2022A Bonds will be used: (i) together with other available funds of the District, to pay at maturity, redeem, and refund Program Notes issued and outstanding as Senior Subordinated Debt under the Resolution and under the District's Program Note Resolution (as hereinafter defined), the proceeds of which were used for the purpose of financing the cost of capital improvements and additions (the "Projects") to the District's sewer and drainage system (the "System") and refinancing other Program Notes previously issued under the Program Note Resolution, and (ii) to pay the costs of issuance of the Series 2022A Bonds. See "SWAPS, SUBORDINATED DEBT, AND OTHER FINANCIAL INSTRUMENTS-Commercial Paper Program" herein.

**Security and Source of Payment for the Series 2022A Bonds**

Pursuant to the provisions of Chapter 76 of the Kentucky Revised Statutes (the "Act"), a Revenue Bond Resolution adopted by the District on December 7, 1992, as amended March 4, 1993, June 30, 1993, December 14, 1994, January 25, 1996, and February 24, 2003, and a Thirty-Second Supplemental Sewer and Drainage System Revenue Bond Resolution adopted by the District on November 15, 2021 (collectively, the "Resolution"), the District has pledged to the payment of the principal of, premium, if any, and interest on the Series 2022A Bonds as and when due and payable: (i) the proceeds of the Series 2022A Bonds, (ii) all Revenues, (iii) all amounts on deposit in the Funds and Accounts established under the Resolution, (iv) such other amounts as may be pledged from time to time by the District as security for the payment of bonds issued and outstanding under the Resolution (the "Bonds") and (v) all proceeds of the foregoing. The Series 2022A Bonds rank on a parity as to security and source of payment with all other Bonds which have been or may hereafter be issued under the Resolution.

THE SERIES 2022A BONDS DO NOT CONSTITUTE AN INDEBTEDNESS OF THE DISTRICT, THE COMMONWEALTH OF KENTUCKY OR ANY POLITICAL SUBDIVISION OR TAXING AUTHORITY THEREOF, INCLUDING THE LOUISVILLE/JEFFERSON COUNTY METRO GOVERNMENT AND THE COUNTY OF JEFFERSON, KENTUCKY, WITHIN THE MEANING OF THE CONSTITUTION OF THE COMMONWEALTH OF KENTUCKY. THE SERIES 2022A BONDS ARE PAYABLE SOLELY FROM THE REVENUES OF THE SYSTEM AND THE OTHER ASSETS AND REVENUES PLEDGED THEREFOR UNDER THE RESOLUTION. NEITHER THE FAITH AND CREDIT NOR THE TAXING POWER OF THE DISTRICT, THE COMMONWEALTH OF KENTUCKY OR ANY POLITICAL SUBDIVISION OR TAXING AUTHORITY THEREOF, INCLUDING THE LOUISVILLE/JEFFERSON COUNTY METRO GOVERNMENT AND THE COUNTY OF JEFFERSON, KENTUCKY, IS PLEDGED TO THE PAYMENT OF THE PRINCIPAL OF, PREMIUM, IF ANY, AND INTEREST ON THE SERIES 2022A BONDS. THE DISTRICT HAS NO TAXING POWER.

**Description of the Series 2022A Bonds**

***Redemption.*** The Series 2022A Bonds are subject to optional redemption and mandatory sinking fund redemption prior to maturity as described herein.

***Denominations.*** The Series 2022A Bonds will be issued in principal amounts of $5,000 and integral multiples thereof.

***Book Entry.*** The Series 2022A Bonds are issuable only as fully registered bonds, without coupons. The Series 2022A Bonds, when issued, will be registered in the name of Cede & Co., as nominee of The Depository Trust Company, New York, New York, which will act as securities depository for the Series 2022A Bonds. Purchasers will not receive certificates representing their ownership interest in the Series

2022A Bonds. So long as DTC or its nominee is the registered owner of the Series 2022A Bonds, payments of the principal of, redemption premium, if any, and interest due on the Series 2022A Bonds will be made directly to DTC. Principal of, redemption premium, if any, and interest on the Series 2022A Bonds will be paid directly to DTC by The Bank of New York Mellon Trust Company, N.A, Louisville, Kentucky, as Paying Agent and Bond Registrar (the "Paying Agent" and "Registrar"). See "BOOK-ENTRY SYSTEM" and "APPENDIX E - Book-Entry Only System" herein.

***Interest.*** The Series 2022A Bonds will bear interest at the rates set forth on the inside cover page hereof, payable semiannually on May 15 and November 15, commencing May 15, 2022.

**Tax Treatment**

In the opinion of Bond Counsel, under the Internal Revenue Code (the "Code") as presently enacted and construed, interest, including original issue discount, if any, on the Series 2022A Bonds is excludible from gross income for Federal income tax purposes. In rendering this opinion, Bond Counsel has assumed continuing compliance with certain covenants designed to meet the requirements of Section 103 of the Code. Bond Counsel expresses no other opinion as to the federal tax consequences of purchasing, holding or disposing of the Series 2022A Bonds. The Series 2022A Bonds are exempt from ad valorem taxation, and the interest thereon is exempt from income taxation, by the Commonwealth of Kentucky and all of its political subdivisions and taxing authorities.

The District has not designated the Series 2022A Bonds as "qualified tax exempt obligations" under Section 265 of the Code. See Appendix D herein for the form of the opinion Bond Counsel proposes to deliver in connection with the Series 2022A Bonds.

**Parties to the Issuance of the Series 2022A Bonds**

The Paying Agent and Bond Registrar for the Series 2022A Bonds is The Bank of New York Mellon Trust Company, N.A., Louisville, Kentucky. Legal matters incidence to the issuance of the Series 2022A Bonds and with regard to the tax-exempt status of the interest thereon are subject to the approving legal opinion of Wyatt, Tarrant & Combs, LLP, Louisville, Kentucky, Bond Counsel. Certain legal matters will be passed upon for the District by its General Counsel, Paula M. Purifoy, Esq. The financial advisor to the District with regard to the issuance of the Series 2022A Bonds is Robert W. Baird & Co. Incorporated, Louisville, Kentucky. Kestrel Verifiers, Hood River, Oregon, will verify the designation of the 2022A Bonds as Green Bonds – Climate Bond Certified.

**Authority for Issuance**

Authority for the issuance of the Series 2022A Bonds is provided by Chapter 76 of the Kentucky Revised Statutes (the "Act") and the Resolution.

**Offering and Delivery of the Series 2022A Bonds**

The Series 2022A Bonds are offered when, as and if issued by the District. The Series 2022A Bonds will be delivered on or about February 1, 2022 in New York, New York through the Depository Trust Company (DTC).

**Disclosure Information**

This Official Statement speaks only as of its date, and the information contained herein is subject to completion and change. This Official Statement and the continuing disclosure documents of the District are intended to be made available through one or more repositories. Copies of the basic documentation relating to the Series 2022A Bonds, including the Resolution and the bond form, are available from the District.

The District has deemed this Official Statement to be final for the purposes of Securities and Exchange Commission Rule l5c2-l2, except for certain information herein which has been omitted in accordance with the Rule and will be provided in the final Official Statement.

**Additional Information**

Additional information concerning this Official Statement, as well as copies of the basic documentation relating to the Series 2022A Bonds, is available from Robert W. Baird & Co. Incorporated, Financial Advisor to the District, 500 West Jefferson Street, Suite 2600, Louisville, Kentucky 40202, Telephone (502) 588-1763.

Brief descriptions of the Series 2022A Bonds, the sources of payment and the security for the Series 2022A Bonds, the District, the System and the Resolution are included in this Official Statement. Certain information with respect to the District is included in the Appendices hereto. Capitalized terms not otherwise defined herein shall have the meanings assigned to them in the Resolution. All summaries herein of documents and agreements are qualified in their entirety by reference to such documents and agreements, copies of which are available at the office of the District.

This Official Statement is also available on the District's investor relations website at www.louisvillemsdbonds.com. The District intends to post from time to time on its investor relations website preliminary and final official statements and other information that may be of interest to prospective purchasers and purchasers of the District's bonds and notes, including information required or permitted to be posted on the Municipal Securities Rulemaking Board's (MSRB) Electronic Municipal Market Access (EMMA) website at https://emma.msrb.org. The District does not, however, undertake to post on its investor relations website necessarily all the information it posts on EMMA or to regularly update any information on its investor relations website or to delete from its investor relations website any information that may no longer be current.

## THE SERIES 2022A BONDS

**General**

The Series 2022A Bonds are to be issued only as fully registered Bonds without coupons in denominations of $5,000 or any integral multiple thereof. The Series 2022A Bonds will be dated their date of delivery, will bear interest from that date, payable semiannually on May 15 and November 15 of each year, commencing May 15, 2022 (each an "Interest Payment Date"), and will mature on May 15, in the years and in the principal amounts set forth on the inside cover page of this Official Statement. Interest shall be computed based on a year consisting of twelve thirty-day months.

The Series 2022A Bonds shall be payable at the designated office of the Paying Agent and Bond Registrar with respect to principal and premium, if any, in any coin or currency of the United States of America which at the time of payment is legal tender for the payment of public or private debts. Interest will be payable on May 15, 2022, and semiannually thereafter on May 15 and November 15 of each year, by check of the Paying Agent mailed to such registered owner who shall appear as of the close of business on the fifteenth day (or if such day shall not be a business day, the preceding business day) of the calendar month next preceding such interest payment date on the registration books of the District maintained by the Bond Registrar, or if the registered owner shall be the registered owner of Series 2022A Bonds in the aggregate principal amount of $1,000,000 or more, by wire transfer, if the registered owner has requested payment in such manner at such wire address as shall have been furnished by the registered owner on or prior to the fifteenth day next preceding such Interest Payment Date (or if such date shall not be a business day, the next succeeding business day). The record dates for the May 15 and November 15 Interest Payment Dates shall be the preceding April 15 and October 15, respectively.

Each registered Series 2022A Bond shall be transferable only upon the books of the Bond Registrar, at the request of the registered owner thereof or by his authorized attorney upon surrender thereof together with an assignment satisfactory to the Bond Registrar duly executed by the registered owner or his duly authorized attorney. Upon the transfer of any such Series 2022A Bond, the District shall issue in the name of the transferee a new registered Series 2022A Bond of the same aggregate principal amount and maturity as the surrendered Series 2022A Bond. If any Series 2022A Bond is mutilated, lost, stolen or destroyed, the District will execute and deliver a new Series 2022A Bond in accordance with the Resolution.

**Redemption**

***Optional Redemption.*** The Series 2022A Bonds maturing on and after May 15, 2033 are subject to optional redemption prior to their stated maturity, at the option of the District, from time to time in whole or in part on any date on or after May 15, 2032 (and, if less than all such Series 2022A Bonds of a maturity are called, the selection of the bonds to be redeemed shall be by lot in any customary manner of selection as designated by the Bond Registrar), at a redemption price equal to the principal amount being redeemed plus interest accrued thereon to the redemption date.

***Mandatory Sinking Fund Redemption.*** The Series 2022A Bonds maturing on May 15, 2052, are subject to mandatory sinking fund redemption on May 15 of the years, and at a redemption price equal to the principal amount being redeemed plus interest accrued thereon to the redemption date, as set forth below:

| Year | Principal Amount |
|---|---|
| 2047 | $13,620,000 |
| 2048 | 19,155,000 |
| 2049 | 5,000,000 |
| 2050 | 5,000,000 |
| 2051 | 5,000,000 |
| 2052* | 3,000,000 |

*Final Maturity

***Selection of Series 2022A Bonds to be Redeemed.*** In the event of redemption of less than all the outstanding Series 2022A Bonds of the same maturity, the selection of Series 2022A Bonds for redemption shall be by lot in any customary manner of selection as designated by the Bond Registrar.

In determining the amount of any sinking fund installment due on any date specified above, there shall be deducted the principal amount of any Series 2022A Bonds to which such sinking fund installment applies, where such Series 2022A Bonds have been (1) redeemed or purchased on a date more than 60 days preceding the date on which such installment is due, from amounts accumulated in the Debt Service Account with respect to such sinking fund installment or (2) purchased during the period from 40 to 60 days prior to the due date of the installment, from any amount (exclusive of amounts deposited from proceeds of Series 2022A Bonds) in the Debt Service Account. In addition, upon the redemption or purchase of the Series 2022A Bonds for which sinking fund installments have been established, unless otherwise provided by the District, each such sinking fund installment thereafter to become due (other than that next due) shall be credited with an amount which bears the same relation to the sinking fund installment to be credited as the total principal amount of the Series 2022A Bonds purchased or redeemed bears to the total amount of sinking fund installments to be credited.

***Notice of Redemption.*** The Bond Registrar will give notice of redemption, identifying the Series 2022A Bonds (or portions thereof) to be redeemed, by mailing a copy of the redemption notice by first class mail not less than 30 days prior to the date fixed for redemption to the registered owner of each Series 2022A Bond (or portion thereof) to be redeemed at the address shown on the registration books maintained by the Bond Registrar. Failure to give such notice by mail to any registered owner of the Series 2022A Bonds or any defect therein shall not affect the validity of any proceedings for the redemption of the Series 2022ABonds (or portions thereof). All Series 2022A Bonds (or portions thereof) so called for redemption will cease to bear interest from and after the specified redemption date, provided funds for their redemption are on deposit at the place of payment at that time.

**Book-Entry System**

The Series 2022A Bonds initially will be issued solely in book entry form to be held in the book-entry only system maintained by DTC. So long as such book-entry system is used, only DTC will receive or have the right to receive physical delivery of Series 2022A Bonds and Beneficial Owners will not be or be considered to be, and will not have any rights as, owners or holders of the Series 2022A Bonds under the Resolution. For additional information about DTC and the book-entry-only system see "APPENDIX E - Book-Entry Only System."

THE INFORMATION IN THIS SECTION AND IN APPENDIX E CONCERNING DTC AND DTC'S BOOK-ENTRY SYSTEM HAS BEEN OBTAINED FROM SOURCES THAT THE DISTRICT BELIEVES TO BE RELIABLE, BUT THE DISTRICT TAKES NO RESPONSIBILITY FOR THE ACCURACY THEREOF.

**Exchange and Transfer**

The registration of any Series 2022A Bond may be transferred only upon the books of the District kept by the Bond Registrar, by the owner thereof, in person or by the owner's attorney duly authorized in writing, upon surrender of such Series 2022A Bond at the designated office of the Bond Registrar accompanied by a written instrument of transfer satisfactory to the Bond Registrar and duly executed by the owner or by the owner's duly authorized attorney. Any Series 2022A Bond may be exchanged at the designated office of the Bond Registrar for a new Series 2022A Bond of any authorized denomination and of the same aggregate principal amount and maturity as the surrendered Series 2022A Bond. The Bond Registrar will not charge for any new bond issued upon any transfer or exchange, but may require the owner requesting such exchange to pay any tax, fee or other governmental charge required to be paid with respect to such exchange or transfer. Neither the District nor the Bond Registrar is required (a) to exchange or transfer any Bond during the period commencing on the fifteenth day of the month preceding an interest payment date and ending on such interest payment date, or during the period commencing fifteen days prior to the date of any selection of Series 2022A Bonds to be redeemed and ending on the day after the mailing of the notice of redemption, or (b) to transfer or exchange any Series 2022A Bond called for redemption.

**Defeasance**

If the District pays or causes to be paid, or there is otherwise paid, to the owners of all outstanding Series 2022A Bonds of a particular maturity or particular Series 2022A Bonds within a maturity, the principal or redemption price, if applicable, and interest due or to become due thereon, at the times and in the manner stipulated therein and in the Resolution, such Series 2022A Bonds will cease to be entitled to any lien, benefit or security under the Resolution, and all covenants, agreements and obligations of the District to the owners of such Series 2022A Bonds will thereupon cease, terminate and become void and be discharged and satisfied.

Subject to the provisions of the Resolution, any outstanding Series 2022A Bonds will be deemed to have been paid within the meaning and with the effect expressed in the foregoing paragraph if (a) in the case of any Series 2022A Bonds to be redeemed on any date prior to their maturity, the District has instructed the Bond Registrar to mail a notice of redemption of such Series 2022A Bonds on said date, (b) there has been deposited with an escrow agent appointed for such purpose either money in an amount which will be sufficient, or Defeasance Obligations the principal of and the interest on which when due will provide money which, together with the money, if any deposited with the escrow agent at the same time, will be sufficient, to pay when due the principal or redemption price, if applicable, and interest due and to become due on such Series 2022A Bonds on or prior to the redemption date or maturity date thereof, as the case may be, and (c) in the event such Series 2022A Bonds are not by their terms subject to redemption within the next succeeding 60 days, the District has given the Bond Registrar instructions in writing to mail a notice to the owners of such Series 2022A Bonds that the deposit required by (b) above has been made with the escrow agent and that such Series 2022A Bonds are deemed to have been paid in accordance with the Resolution, and stating the maturity or redemption date upon which money is expected to be available for the payment of the principal or redemption price, if applicable, on such Series 2022A Bonds. For a description of the types of Defeasance Obligations in which funds may be invested for purposes of clause (b) above, see "Appendix A- Definitions of Certain Terms and Summary of Provisions of the Resolution -- Defeasance."

## DESIGNATION OF THE SERIES 2022A BONDS AS GREEN BONDS - CLIMATE BOND CERTIFIED

The information set forth below concerning (i) the Climate Bonds Initiative ("CBI") and the process for obtaining certification from CBI, and (2) Kestrel Verifiers in its role as a verifier with respect to the certification of the Series 2022A Bonds as Climate Bond Certified, all as more fully described below, has been extracted from materials provided by CBI and Kestrel Verifiers. Additional information relating to CBI and the certification process can be found at www.climatebonds.net. The CBI website is included for reference only and the information contained therein is not incorporated by reference in this Official Statement.

In connection with the Series 2022A Bonds and the capital improvements and additions to the District's sewer and drainage system to be refinanced with the proceeds of the Series 2022A Bonds (the "Projects"), the District applied to the CBI for designation of the Series 2022A Bonds as "Climate Bond Certified." CBI is an independent not-for-profit organization that works solely on mobilizing the bond market for climate change solutions. CBI has established a certification program that provides criteria for eligible projects to be considered a Certified Climate Bond. Rigorous scientific criteria ensure that financed activities are consistent with the 1.5 degrees Celsius warming target declared in the 2015 Paris Agreement which exists within the United Nations Framework Convention on Climate Change, to address greenhouse-gas-emissions mitigation, adaptation, and finance. The CBI certification program is used globally by bond issuers, governments, investors and the financial markets to prioritize investments which genuinely contribute to addressing climate change.

The CBI standards use credible, science-based, widely supported guidelines about what should and should not be considered a qualifying climate-aligned investment to assist investors in making informed decisions about the environmental credentials of a bond. In order to receive the CBI certification, the District engaged Kestrel Verifiers, a third-party CBI Approved Verifier, to provide verification to the CBI Certification Board that the Series 2022A Bonds meet the CBI standards and relevant sector criteria. Kestrel

Verifiers reviewed and provided verification to CBI, and CBI certified the Series 2022A Bonds as Climate Bonds on January 3, 2022. Kestrel Verifiers will also provide a Post-Issuance Report to CBI as to whether the proceeds of the Series 2022A Bonds have been allocated properly.

The terms “Climate Bond Certified” and “Green Bonds” are solely for identification purposes and are not intended to provide or imply that the owners of the Series 2022A Bonds are entitled to any security other than that described under the heading “SECURITY AND SOURCE OF PAYMENT FOR THE SERIES 2022A BONDS.”

The certification of the Series 2022A Bonds as Climate Bonds by the Climate Bonds Initiative is based solely on the Climate Bond Standard and does not, and is not intended to, make any representation or give any assurance with respect to any other matter relating to the Series 2022A Bonds or the Projects, including but not limited to the Official Statement, the transaction documents, the District or the management of the District.

The certification of the Series 2022A Bonds as Climate Bonds by the Climate Bonds Initiative was addressed solely to the District and is not a recommendation to any person to purchase, hold or sell the Series 2022A Bonds and such certification does not address the market price or suitability of the Series 2022A Bonds for a particular investor. The certification also should not be deemed to be an expression of an opinion as to the District or any aspect of the Projects (including but not limited to the financial viability of the Projects) other than with respect to conformance with CBI’s standards for Certified Climate Bonds.

In issuing or monitoring, as applicable, the certification, CBI and Kestrel Verifiers have assumed and relied upon and will assume and rely upon the accuracy and completeness in all material respects of the information supplied or otherwise made available to CBI and Kestrel Verifiers. CBI does not assume or accept any responsibility to any person for independently verifying (and it has not verified) such information or to undertake (and it has not undertaken) any independent evaluation of the District or the Projects.

In addition, CBI does not assume any obligation to conduct (and it has not conducted) any physical inspection of the Projects. The certification may only be used with the Series 2022A Bonds and may not be used for any other purpose without CBI’s prior written consent.

The certification does not and is not in any way intended to address the likelihood of timely payment of interest when due on the Series 2022A Bonds and/or the payment of principal at maturity or any other date.

The certification may be withdrawn at any time in the Climate Bonds Initiative’s sole and absolute discretion and there can be no assurance that such certification will not be withdrawn.

**Approved Verifier for Third Party Verification of Climate Bond**

The District has engaged Kestrel Verifiers to provide a Verification on the Series 2022A Bonds’ conformance with the Climate Bond Standard V3.0. Kestrel Verifiers has determined that the Projects and related activities to be refinanced with the proceeds of the Series 2022A Bonds satisfy the Climate Bond Standard V3.0 and the Water Infrastructure Sector Criteria. Accredited as an “Approved Verifier” by the Climate Bonds Initiative, Kestrel Verifiers evaluates bonds against the Climate Bonds Initiative Standards and Criteria in all sectors worldwide. Kestrel’s Climate Bond Verifier’s Report can be found in Appendix G.

## PLAN OF FINANCE AND REDEMPTION OF PROGRAM NOTES

The Series 2022A Bonds are being issued (i) to pay at maturity, redeem, and refund Program Notes issued and outstanding as Senior Subordinated Debt under the Resolution and under the Program Note Resolution adopted on May 29, 2018 (as the same may hereafter be amended or supplemented in accordance with its terms and the terms of the Resolution, the "Program Note Resolution") (the "Program Notes"), the proceeds of which were used for the purpose of financing the cost of capital improvements and additions to the District's sewer and drainage system (the "System") and refinancing other Program Notes previously issued under the Program Note Resolution, and (ii) to pay the cost of issuance of the Series 2022A Bonds. See "SWAPS, SUBORDINATED DEBT, AND OTHER FINANCIAL INSTRUMENTS-Commercial Paper Program" herein for a further description of the Program Notes.

## SOURCES AND USES OF FUNDS

| | |
|---|---|
| Sources | |
| Principal Amount of Series 2022A Bonds | $225,000,000.00 |
| Net Original Issue Premium | 24,045,214.95 |
| Release from Reserve Fund | 1,198,140.18 |
| TOTAL | $250,243,355.13 |
| | |
| Uses | |
| Refunding of Program Notes | $215,000,000.00 |
| Deposit to Construction Fund | 33,375,398.50 |
| Deposit to Bond Fund | 1,198,140.18 |
| Underwriter's Discount | 224,091.45 |
| Costs of Issuance | 445,725.00 |
| TOTAL | $250,243,355.13 |

Upon the issuance of the Series 2022A Bonds, the Debt Service Reserve Requirement for the then Outstanding Bonds will decrease by $1,198,140.18. Pursuant to the Resolution, that amount will be transferred from the Reserve Account of the Bond Fund, deposited in the Debt Service Account of the Bond Fund, and applied to the payment of the interest coming due on the Outstanding Bonds on May 15, 2022.

The costs of issuance of the Series 2022A Bonds includes the fees and expenses of the Financial Advisor, Bond Counsel, the Paying Agent and Bond Registrar, the Green Bonds External Reviewer, and the Rating Agencies, the cost of the Climate Bonds Initiative Certification, and miscellaneous fees and expenses.

To the extent the proceeds of the Series 2022A Bonds, including net original issue premium and net of costs of issuance, exceed the amount to be applied to refund Program Notes, the excess will be deposited in the Construction Fund and used to pay costs of capital improvements to the District's sewer and drainage system, including (a) wastewater and drainage system expansion and improvements; (b) improvements to wastewater treatment facilities; (c) rehabilitation of combined sewer overflow systems; (d) improvements to flood control and drainage facilities; (e) construction of collector sewers; (f) construction and improvements of detention and retention basins; (g) construction of interceptor sewers; (h) combined sewer overflow and sanitary overflow abatement projects; (i) construction and improvements to force mains; (j) repairs and improvements to pumping stations; (k) construction of regional storage facilities; and (l) miscellaneous improvements and acquisition of equipment and mapping hardware and software.

# DEBT SERVICE REQUIREMENTS

| Fiscal Year Ending June 30 | SERIES 2022A Bond Principal | SERIES 2022A Bond Interest | SERIES 2022A Total Debt Service | Existing Senior Lien Principal (1) | Existing Senior Lien Interest (1) | New Total Senior Lien Bond Debt Service | Direct Payments (2) | Net Senior Lien Bond Debt Service | Subordinated Debt Service (3) (4) (5) | Total Net Debt Service |
|---|---|---|---|---|---|---|---|---|---|---|
| 2022 | $250,000.00 | $2,252,286.11 | $2,502,286.11 | $51,230,000.00 | $84,889,215.58 | $138,621,501.69 | ($10,359,939.45) | $128,261,562.24 | $23,884,174.90 | $152,145,737.14 |
| 2023 | 500,000.00 | 7,786,375.00 | 8,286,375.00 | 52,380,000.00 | 83,953,945.28 | 144,620,320.28 | (10,359,939.45) | 134,260,380.83 | 19,201,779.36 | 153,462,160.19 |
| 2024 | 750,000.00 | 7,761,375.00 | 8,511,375.00 | 51,625,000.00 | 81,744,993.28 | 141,881,368.28 | (10,359,939.45) | 131,521,428.83 | 22,160,556.50 | 153,681,985.33 |
| 2025 | 1,000,000.00 | 7,723,875.00 | 8,723,875.00 | 54,670,000.00 | 79,667,522.28 | 143,061,397.28 | (10,359,939.45) | 132,701,457.83 | 22,192,718.73 | 154,894,176.56 |
| 2026 | 3,000,000.00 | 7,673,875.00 | 10,673,875.00 | 53,180,000.00 | 77,432,431.78 | 141,286,306.78 | (10,359,939.45) | 130,926,367.33 | 28,598,094.95 | 159,524,462.28 |
| 2027 | 6,000,000.00 | 7,523,875.00 | 13,523,875.00 | 68,465,000.00 | 75,376,967.78 | 157,365,842.78 | (10,359,939.45) | 147,005,903.33 | 15,357,978.22 | 162,363,881.55 |
| 2028 | 8,940,000.00 | 7,223,875.00 | 16,163,875.00 | 64,285,000.00 | 72,051,607.28 | 152,500,482.28 | (9,637,955.08) | 142,862,527.21 | 21,550,005.06 | 164,412,532.26 |
| 2029 | 9,380,000.00 | 6,776,875.00 | 16,156,875.00 | 66,215,000.00 | 70,273,789.02 | 152,645,664.02 | (9,637,955.08) | 143,007,708.95 | 21,098,725.34 | 164,106,434.29 |
| 2030 | 8,080,000.00 | 6,307,875.00 | 14,387,875.00 | 48,467,900.00 | 70,068,463.67 | 132,924,238.67 | (9,637,955.08) | 123,286,283.60 | 40,654,024.58 | 163,940,308.18 |
| 2031 | 7,920,000.00 | 5,903,875.00 | 13,823,875.00 | 28,199,000.00 | 69,776,162.97 | 111,799,037.97 | (10,220,525.00) | 101,578,512.97 | 62,000,147.80 | 163,578,660.77 |
| 2032 | 7,340,000.00 | 5,507,875.00 | 12,847,875.00 | 29,731,000.00 | 68,799,031.67 | 111,377,906.67 | (10,220,525.00) | 101,157,381.67 | 62,339,852.33 | 163,497,234.00 |
| 2033 | 7,740,000.00 | 5,140,875.00 | 12,880,875.00 | 30,218,000.00 | 67,767,910.97 | 110,866,785.97 | (10,220,525.00) | 100,646,260.97 | 62,195,982.14 | 162,842,243.11 |
| 2034 | 8,155,000.00 | 4,753,875.00 | 12,908,875.00 | 91,221,000.00 | 66,861,943.87 | 170,991,818.87 | (10,220,525.00) | 160,771,293.87 | 1,872,948.77 | 162,644,242.64 |
| 2035 | 4,200,000.00 | 4,427,675.00 | 8,627,675.00 | 97,963,000.00 | 64,403,262.16 | 170,993,937.16 | (10,220,525.00) | 160,773,412.16 | 1,675,265.55 | 162,448,677.71 |
| 2036 | 4,370,000.00 | 4,259,675.00 | 8,629,675.00 | 101,601,000.00 | 60,764,131.80 | 170,994,806.80 | (10,220,525.00) | 160,774,281.80 | 1,671,042.71 | 162,445,324.51 |
| 2037 | 4,540,000.00 | 4,084,875.00 | 8,624,875.00 | 105,143,000.00 | 57,225,191.61 | 170,993,066.61 | (10,220,525.00) | 160,772,541.61 | 1,669,387.08 | 162,441,928.69 |
| 2038 | 4,675,000.00 | 3,948,675.00 | 8,623,675.00 | 109,105,000.00 | 53,261,854.50 | 170,990,529.50 | (10,220,525.00) | 160,770,004.50 | 1,634,511.40 | 162,404,515.90 |
| 2039 | 2,785,000.00 | 3,808,425.00 | 6,593,425.00 | 115,206,000.00 | 49,194,648.26 | 170,994,073.26 | (10,220,525.00) | 160,773,548.26 | 861,699.98 | 161,635,248.24 |
| 2040 | 2,870,000.00 | 3,724,875.00 | 6,594,875.00 | 119,426,000.00 | 43,145,974.54 | 169,166,849.54 | (8,393,859.25) | 160,772,990.29 | 61,972.23 | 160,834,962.52 |
| 2041 | 2,955,000.00 | 3,638,775.00 | 6,593,775.00 | 123,818,000.00 | 36,811,379.84 | 167,223,154.84 | (6,453,125.00) | 160,770,029.84 | - | 160,770,029.84 |
| 2042 | 3,045,000.00 | 3,550,125.00 | 6,595,125.00 | 128,546,000.00 | 30,013,360.26 | 165,154,485.26 | (4,383,859.38) | 160,770,625.89 | - | 160,770,625.89 |
| 2043 | 3,135,000.00 | 3,458,775.00 | 6,593,775.00 | 133,460,000.00 | 22,950,362.04 | 163,004,137.04 | (2,233,875.00) | 160,770,262.04 | - | 160,770,262.04 |
| 2044 | 23,515,000.00 | 3,364,725.00 | 26,879,725.00 | 89,780,000.00 | 15,612,691.55 | 132,272,416.55 | - | 132,272,416.55 | - | 132,272,416.55 |
| 2045 | 24,220,000.00 | 2,659,275.00 | 26,879,275.00 | 92,685,000.00 | 12,705,878.04 | 132,270,153.04 | - | 132,270,153.04 | - | 132,270,153.04 |
| 2046 | 24,860,000.00 | 2,023,500.00 | 26,883,500.00 | 95,735,000.00 | 9,655,135.29 | 132,273,635.29 | - | 132,273,635.29 | - | 132,273,635.29 |
| 2047 | 13,620,000.00 | 1,370,925.00 | 14,990,925.00 | 73,435,000.00 | 6,348,257.28 | 94,774,182.28 | - | 94,774,182.28 | - | 94,774,182.28 |
| 2048 | 19,155,000.00 | 1,003,185.00 | 20,158,185.00 | 35,640,000.00 | 3,973,607.29 | 59,771,792.29 | - | 59,771,792.29 | - | 59,771,792.29 |
| 2049 | 5,000,000.00 | 486,000.00 | 5,486,000.00 | 12,136,000.00 | 2,739,882.29 | 20,361,882.29 | - | 20,361,882.29 | - | 20,361,882.29 |
| 2050 | 5,000,000.00 | 351,000.00 | 5,351,000.00 | 12,426,000.00 | 2,451,946.59 | 20,228,946.59 | - | 20,228,946.59 | - | 20,228,946.59 |
| 2051 | 5,000,000.00 | 216,000.00 | 5,216,000.00 | 6,169,000.00 | 2,157,130.38 | 13,542,130.38 | - | 13,542,130.38 | - | 13,542,130.38 |
| 2052 | 3,000,000.00 | 81,000.00 | 3,081,000.00 | 6,315,000.00 | 2,010,925.09 | 11,406,925.09 | - | 11,406,925.09 | - | 11,406,925.09 |
| 2053 | - | - | - | 6,465,000.00 | 1,861,259.58 | 8,326,259.58 | - | 8,326,259.58 | - | 8,326,259.58 |
| 2054 | - | - | - | 6,618,000.00 | 1,708,039.09 | 8,326,039.09 | - | 8,326,039.09 | - | 8,326,039.09 |
| 2055 | - | - | - | 6,775,000.00 | 1,551,192.49 | 8,326,192.49 | - | 8,326,192.49 | - | 8,326,192.49 |
| 2056 | - | - | - | 6,935,000.00 | 1,390,624.99 | 8,325,624.99 | - | 8,325,624.99 | - | 8,325,624.99 |
| 2057 | - | - | - | 7,099,000.00 | 1,226,265.49 | 8,325,265.49 | - | 8,325,265.49 | - | 8,325,265.49 |
| 2058 | - | - | - | 7,268,000.00 | 1,058,019.19 | 8,326,019.19 | - | 8,326,019.19 | - | 8,326,019.19 |
| 2059 | - | - | - | 7,440,000.00 | 885,767.59 | 8,325,767.59 | - | 8,325,767.59 | - | 8,325,767.59 |
| 2060 | - | - | - | 7,616,000.00 | 709,439.59 | 8,325,439.59 | - | 8,325,439.59 | - | 8,325,439.59 |
| | $225,000,000.00 | $128,794,271.11 | $353,794,271.11 | $2,204,691,900.00 | $1,454,480,212.25 | $4,012,966,383.36 | ($204,522,945.55) | $3,808,443,437.81 | $410,680,867.62 | $4,219,124,305.43 |

Notes:

(1) Existing Senior Lien Principal and Interest includes WIFIA Loan. MSD anticipates the first draw on the WIFIA Loan to occur in early 2023 with the final draw occurring in November 2026. At the final draw, the outstanding balance will total $96,926,900. The WIFIA Loan is not included in the Debt Service Reserve Calculation until the first draw occurs. Refer to "Recent and Pending Transactions of the District" for additional information on the WIFIA Loan.

(2) Due to sequestration, the federal direct payments on the Louisville and Jefferson County Metropolitan Sewer District Sewer and Drainage System Revenue Bonds, Series 2009C Build America Bonds and Louisville and Jefferson County Metropolitan Sewer District Sewer and Drainage System Revenue Bonds, Series 2010A Build America Bonds were reduced by 5.7% through fiscal year 2030. For fiscal years 2031 through 2043, the federal direct payments are assumed at the original rate due on the outstanding Series 2009C BABs and 2010A BABs.

(3) Includes estimated net swap payments based on the 1-month LIBOR 5-year average as of December 15, 2021 (1.20%).

(4) Subordinated debt service for FY 2022 and FY 2023 takes into account the interest payable at maturity for the 2020 and 2021 Bond Anticipation Notes, respectively. Subordinated debt service also includes estimated debt service on outstanding General Obligation, KACO and KIA debt service.

(5) Does not include the principal of the Series 2021 Bond Anticipation Notes payable at maturity.

## SECURITY AND SOURCE OF PAYMENT FOR THE SERIES 2022A BONDS

The Series 2022A Bonds will rank on a parity as to source of payment with Bonds previously issued and any Additional Bonds and Refunding Bonds which may be issued from time to time pursuant to the Resolution (collectively, the "Bonds"). The Bonds are secured by and payable solely from pledged revenues derived from the collection of rates, rents and charges for the services rendered by the System as set forth in the Resolution. The Bonds do not constitute an indebtedness of the Commonwealth of Kentucky, the Louisville/Jefferson County Metro Government or the County of Jefferson, Kentucky.

The District has heretofore issued its Sewer and Drainage System Revenue Bonds outstanding in the amounts shown below, each Series of which will rank on a parity as to security and source of payment with the Series 2022A Bonds.

**Senior Lien**

| Series | Dated Date | Original Principal Amount | Principal Amount Outstanding[1] |
|---|---|---|---|
| Series 2009C | 24-Nov-09 | $180,000,000 | $180,000,000 |
| Series 2010A | 30-Nov-10 | 330,000,000 | 330,000,000 |
| Series 2013A | 23-May-13 | 115,790,000 | 115,790,000 |
| Series 2013B | 23-May-13 | 119,515,000 | 110,970,000 |
| Series 2013C | 27-Nov-13 | 100,000,000 | 250,000 |
| Series 2014A | 25-Nov-14 | 80,000,000 | 79,700,000 |
| Series 2015A | 21-Oct-15 | 175,000,000 | 172,175,000 |
| Series 2015B | 21-Oct-15 | 81,750,000 | 68,815,000 |
| Series 2016A | 30-Aug-16 | 150,000,000 | 148,415,000 |
| Series 2016B | 30-Aug-16 | 28,315,000 | 21,960,000 |
| Series 2016C | 30-Aug-16 | 67,685,000 | 32,305,000 |
| Series 2017A | 22-Aug-17 | 175,000,000 | 155,790,000 |
| Series 2017B | 29-Aug-17 | 35,725,000 | 32,055,000 |
| Series 2018A | 31-May-18 | 60,380,000 | 60,380,000 |
| Series 2019 | 19-Aug-19 | 30,910,000 | 17,065,000 |
| Series 2020A | 30-Jul-20 | 225,000,000 | 224,750,000 |
| Series 2020B (WIFIA Loan)[2] | 15-Mar-21 | 96,926,900 | - |
| Series 2020C | 15-Oct-20 | 112,065,000 | 110,790,000 |
| Series 2021A | 17-Aug-21 | 246,555,000 | 246,555,000 |
| | | $2,410,616,900 | $2,107,765,000 |

Additionally, the District has the following Subordinate Lien debt outstanding:

**Subordinate Lien**

| Series | Dated Date | Original Principal Amount | Principal Amount Outstanding |
|---|---|---|---|
| 2021 BAN | 12-Oct-21 | $226,340,000 | $226,340,000 |
| 2009 GO Bonds | 30-Jun-20 | 7,335,000 | 785,000 |
| 2014 GO Bonds | 30-Jun-20 | 3,750,000 | 7,445,000 |
| 2017 GO Bonds | 30-Jun-20 | 9,790,000 | 3,398,805 |
| KACO | 30-Jun-20 | 4,000,000 | 2,030,000 |
| KIA A09-41 | 1-Jan-10 | 2,395,000 | 1,468,714 |
| KIA A10-04 | 30-Jun-20 | 2,843,000 | 1,839,463 |
| KIA A10-05 | 30-Jun-20 | 1,000,000 | 669,558 |
| KIA A10-06 | 30-Jun-20 | 121,000 | 75,644 |
| KIA A10-07 | 30-Jun-20 | 2,538,000 | 1,702,587 |
| KIA A11-15 | 30-Jun-20 | 671,000 | 433,857 |
| KIA A12-29 | 30-Jun-20 | 500,000 | 5,228,352 |
| KIA A17-028 (Estimated)[3] | 30-Jun-20 | 7,400,000 | 2,083,960 |
| KIA A18-010 (Estimated)[4] | 30-Jun-20 | 1,092,460 | 1,092,460 |
| KIA A19-028 (Estimated)[5] | 20-Dec-19 | 24,200,000 | 24,200,000 |
| KIA B10-01 | 30-Nov-21 | 500,000 | 261,944 |
| KIA B10-04 | 30-Nov-21 | 500,000 | 286,949 |
| KIA B15-006 | 30-Nov-21 | 87,500 | 74,243 |
| | | $295,062,960 | $279,416,536 |

Notes:

(1) As of February 1, 2022

(2) MSD anticipates the first draw on the WIFIA Loan to occur in early 2023 with the final draw occurring in November 2026. At the final draw, the outstanding balance will total $96,926,900. Refer to "Recent and Pending Transactions of the District" for additional information on the WIFIA Loan.

(3) Loan is not fully drawn.

(4) Prinicpal amortization schedule has not been finalized as of February 1, 2022.

(5) Prinicpal amortization schedule has not been finalized as of February 1, 2022.

Table does not include KIA loans which have been approved but have not been drawn on.

## Pledged Property

The Series 2022A Bonds are special and limited obligations of the District payable solely from and secured as to the payment of the principal and redemption price thereof, and interest thereon, in accordance with the terms and the provisions of the Resolution solely by the Pledged Property, which is defined by the Resolution to be the proceeds of the sale of the Series 2022A Bonds, all Revenues, all amounts on deposit in the Funds and Accounts established under the Resolution, such other amounts as may be pledged from time to time by the District as security for the payment of bonds, notes or other evidences of indebtedness authenticated and delivered pursuant to the Resolution, and all proceeds of the foregoing. The Series 2022A Bonds rank on a parity as to security and source of payment with Bonds previously issued and outstanding under the Resolution and any Additional Bonds and Refunding Bonds (as such terms are defined in Appendix A) which may be issued from time to time pursuant to the Resolution.

**Rate Covenant**

The District has covenanted pursuant to the Resolution to fix, establish, maintain and collect rates, fees, rents and charges for services of the System, which, together with other "Available Revenues" (as hereinafter defined) are expected to produce Available Revenues which will be at least sufficient for each Fiscal Year to pay the sum of:

(i) an amount equal to 110% of the Aggregate Net Debt Service for such Fiscal Year;

(ii) the amount, if any, to be paid during such Fiscal Year into the Reserve Account in the Bond Fund (other than amounts required to be paid into such Account out of the proceeds of Bonds);

(iii) all Operating Expenses for such Fiscal Year as estimated in the Annual Budget;

(iv) to the extent not included in the foregoing, an amount equal to the debt service on the Senior Subordinated Debt, any other Subordinated Debt or other debt of the District for such Fiscal Year computed as of the beginning of such Fiscal Year; and

(v) amounts necessary to pay and discharge all charges or liens payable out of the Available Revenues when due and enforceable.

"Available Revenues," as used only for purposes of the above rate covenant, means all revenues and other amounts received by the District and pledged as security for the payment of Bonds, but excludes any interest income which is capitalized pursuant to generally accepted accounting principles. "Operating Expenses" includes all reasonable, ordinary, usual or necessary current expenses of maintenance, repair and operation determined in accordance with generally accepted accounting principles and the enterprise basis of accounting. "Operating Expenses" does not include reserves for extraordinary maintenance or repair such as extraordinary maintenance, administrative and engineering expenses of the District which are necessary or incident to capital improvements for which debt has been issued and which may be paid from the proceeds of such debt. "Aggregate Net Debt Service" means Aggregate Debt Service, excluding (i) interest expense which, in accordance with generally accepted accounting principles, is capitalized and which may be paid from the proceeds of debt and (ii) other amounts, if any, available or expected to be available in the ordinary course for payment of Debt Service. The summary definitions above are not intended to be comprehensive or definitive, and reference is made to the Resolution and Appendix A for more detail. The definitions above are qualified in their entirety by reference to the Resolution. For a table illustrating computation of historical debt service coverage, using these terms as defined in the Resolution, see "Appendix B- Annual Comprehensive Financial Report of the District, Fiscal Years Ended June 30, 2021 and 2020-- Comparative Schedule of Debt Service Coverage".

**Additional Bonds**

Additional Bonds may be issued on a parity with the Series 2022A Bonds to finance the Cost of Acquisition and Construction of Additional Facilities upon the satisfaction of certain conditions. Refunding Bonds may be issued to refund outstanding Bonds. The conditions for the issuance of Additional Bonds to finance the Acquisition and Construction of Additional Facilities include a certificate of an Authorized Officer of the District setting forth (i) for any period of 12 consecutive calendar months within the 24 calendar months preceding the date of the authentication and delivery, the Net Revenues for such period, and (ii) the Aggregate Net Debt Service during the same period for which Net Revenues are computed, with respect to all Series of Bonds which were then Outstanding (excluding from Aggregate Net Debt Service any Principal Installment or portion thereof which was paid from sources other than Net Revenues), and showing that the amount set forth in (i) is equal to or greater than 110% of the amount set forth in (ii). The conditions for the issuance of Additional Bonds to finance the Acquisition and Construction of Additional Facilities also include a certificate of an Authorized Officer of the District setting forth (i) for the last full Fiscal Year of 12 months (ending June 30) immediately preceding the date of the authentication and delivery, the Net Revenues for such period, or, at the option of the District, for the last 12 consecutive full calendar months immediately preceding the date of the authentication and delivery, the Net Revenues for such period, and (ii) the estimated maximum Aggregate Net Debt Service in the current or any future Fiscal Year with respect to (a) all Series of Bonds which are then Outstanding and the Additional Bonds then proposed to be authenticated and delivered (and for this purpose all Series of Bonds Outstanding plus such proposed Additional Bonds shall be treated as a single Series; that is, the maximum Aggregate Net Debt Service shall be computed collectively with respect to all such Bonds, and not computed cumulatively or separately for each particular Series), and showing that the amount set forth in (i) is equal to or greater than 110% of the amount set forth in (ii). For purposes of computing the amount set forth in (i), Net Revenues may be increased to reflect the following amounts: (a) any increases in the rates, fees, rents and other charges for services of the System made subsequent to the commencement of such period and prior to the date of such certificate, (b) any estimated increases in Net Revenues caused by any Project or Projects having been placed into use and operation subsequent to the commencement of such period and prior to the date of such certificate, as if such Project or Projects had actually been placed into use and operation for the entire period chosen in (i) above, and (c) 75% of any estimated increases in Net Revenues which would have been derived from the operation of any Project or Projects with respect to which the Cost of Construction and Acquisition is to be paid from proceeds of the Additional Bonds proposed to be authenticated and delivered, as if such Project or Projects had actually been placed into use and operation for the entire period chosen in (i) above. For additional information relating to the conditions for the issuance of Additional Bonds, see Appendix A - "Definitions of Certain Terms and Summary of Provisions of the Resolution -Additional Bonds".

## FUNDS AND ACCOUNTS

The Resolution establishes the following Funds and Accounts which, other than the Bond Fund which is held by the Paying Agent, will be held by the District: (i) Construction and Acquisition Fund; (ii) Revenue Fund; (iii) Bond Fund, consisting of a Debt Service Account and a Reserve Account; (iv) Senior Subordinated Debt Fund; and (v) Renewal and Replacement Account.

### Construction and Acquisition Fund

The Resolution provides that the amounts, if any, required by the Resolution will be paid into the Construction and Acquisition Fund and, at the option of the District, any moneys received by the District from any source, unless required to be otherwise applied as provided by the Resolution, may also be paid into this Fund. Amounts in the Construction and Acquisition Fund will be applied to pay the Cost of Construction and Acquisition in the manner provided in the Resolution.

To the extent other moneys are not available therefor, amounts in the Construction and Acquisition Fund will be applied to the payment of Principal Installments of and interest on Bonds when due.

An adequate record of the completion of construction of a Project financed in whole or in part by the issuance of Bonds shall be maintained by an Authorized Officer of the District. The balance in the separate account in the Construction and Acquisition Fund established therefor shall then be transferred to the Reserve Account in the Bond Fund, if and to the extent necessary to make the amount of such Fund equal to the Debt Service Reserve Requirement, and any excess amount shall be paid over or transferred to the District for deposit in the Revenue Fund. For additional information relating to the Construction and Acquisition Fund, see "Appendix A - Definitions of Certain Terms and Summary of Provisions of the Resolution - Construction and Acquisition Fund."

**Flow of Funds**

All Revenues shall be promptly deposited by the District upon receipt thereof into the Revenue Fund.

There shall be withdrawn in each month the following amounts, for deposit as set forth below and in the order of priority set forth below.

(i) To the Bond Fund, (a) for credit to the Debt Service Account, the amount, if any, required so that the balance in such Account shall equal the Accrued Aggregate Debt Service as of the last day of the then current month or, if interest or principal are required to be paid to Holders of Bonds during the next succeeding month on a day other than the first day of such month, Accrued Aggregate Debt Service as of the day through and including which such interest or principal is required to be paid and (b) for credit to the Reserve Account, the amount, if any, required for such Account, after giving effect to any surety bond, insurance policy, letter of credit or other similar obligation deposited in such Account pursuant to the Resolution, to equal one- twelfth (1/12) of the difference between (1) the amount then in the Reserve Account immediately preceding such deposit and (2) the actual Debt Service Reserve Requirement as of the last day of the then current month;

(ii) To the Senior Subordinated Debt Fund the amount, if any, required to pay scheduled base and additional rentals when due on the Senior Subordinated Debt and reserves therefor, in accordance with the resolution or other debt instrument authorizing the Senior Subordinated Debt;

(iii) Each month the District shall pay from the Revenue Fund such amounts as are necessary to meet Operating Expenses for such month; and

(iv) To the Renewal and Replacement Account, a sum equal to one-twelfth (1/12) of the amount, if any, provided in the Annual Budget to be deposited in the Renewal and Replacement Account during the then current Fiscal Year; provided that, if any such monthly allocation to the Renewal and Replacement Account shall be less than the required amount, the amount of the next succeeding monthly payment shall be increased by the amount of such deficiency.

The balance of moneys remaining in the Revenue Fund after the above required payments have been made may be used by the District for any lawful purpose relating to the System. The District has covenanted not to make any expenditures from Revenues prior to making the payments out of Revenues required to be made by the Resolution as provided above.

**Reserve Account**

Amounts in the Reserve Account in the Bond Fund are to be applied to make up any deficiencies in the Debt Service Account in the Bond Fund. The Debt Service Reserve Requirement is defined in the Resolution as the least of (i) ten percent (10%) of the face amount of all Bonds issued under the Resolution, (ii) one hundred percent (100%) of the maximum Aggregate Net Debt Service (as of the computation date) in the current or any future Fiscal Year, and (iii) one hundred twenty-five percent (125%) of average Aggregate Net Debt Service (as of the computation date) in the current or any future Fiscal Year. For

Variable Interest Rate Bonds, the Debt Service Reserve Requirement shall be the maximum permitted amount with interest calculated at the lesser of the 30-year Revenue Bond Index (published by The Bond Buyer no more than two weeks prior to the date of sale of such Variable Interest Rate Bonds) or the Maximum Interest Rate. If any Variable Interest Rate Bond shall be converted to a fixed rate Bond for the remainder of the term thereof, any resulting deficiency in the Reserve Account shall be satisfied by an additional deposit or deposits into the Reserve Account so that the amount on deposit therein equals the Debt Service Reserve Requirement by the end of the Fiscal Year during which such conversion occurs.

The District's obligations to maintain the Debt Service Reserve Requirement may be satisfied by depositing therein a surety bond, insurance policy or letter of credit. See "Appendix A - Definitions of Certain Terms and Summary of Provisions of the Resolution - Bond Fund - Reserve Account" for further information regarding the Reserve Account. Upon issuance of the Series 2022A Bonds, a portion of the amount on deposit in the Reserve Account will be released so that the balance then on deposit in the Reserve Account equals to the Debt Service Reserve Requirement.

**Senior Subordinated Debt Fund**

Amounts in the Senior Subordinated Debt Fund are to be applied to the payment of the amounts required to pay scheduled base and additional rentals when due on the Senior Subordinated Debt and make deposits, if any, for reserves therefor. Amounts in the Senior Subordinated Debt Fund shall also be applied to make up any deficiencies in the Debt Service Account or the Reserve Account. See "Appendix A - Definitions of Certain Terms and Summary of Provisions of the Resolution - Senior Subordinated Debt Fund" for additional information regarding the Senior Subordinated Debt Fund.

**Renewal and Replacement Account**

Moneys to the credit of the Renewal and Replacement Account may be applied to the cost of major replacements, repairs, renewals, maintenance, betterments, improvements, reconstruction or extensions of the System or any part thereof as may be determined by the Board. If at any time the moneys in the Debt Service Account, the Reserve Account and the Revenue Fund shall be insufficient to pay the interest and Principal Installments becoming due on the Bonds, then the District shall transfer from the Renewal and Replacement Account for deposit in the Debt Service Account the amount necessary (or all the moneys in said Fund if less than the amount necessary) to make up such deficiency. See "Appendix A - Definitions of Certain Terms and Summary of Provisions of the Resolution - Renewal and Replacement Account" for additional information regarding the Renewal and Replacement Account.

For additional information relating to the application of Revenues, see "Appendix A - Definitions of Certain Terms and Summary of Provisions of the Resolution."

**Investment of Funds**

Moneys held in the Bond Fund, the Revenue Fund, the Senior Subordinated Debt Fund, the Renewal and Replacement Account, and the Construction and Acquisition Fund are required to be invested and reinvested to the fullest extent practicable in Investment Securities, maturing not later than such times as will be necessary to provide moneys when needed for payments to be made from such Fund or Account. The Fiduciaries shall make investments of moneys held by them in accordance with written instructions from time to time received from an Authorized Officer of the District. See "Appendix A - Definitions of Certain Terms and Summary of Provisions of the Resolution - Investments" for additional information regarding the investment of funds.

## SWAPS, SUBORDINATED DEBT, AND OTHER FINANCIAL INSTRUMENTS

The District has entered into interest rate swap agreements with two counterparties as part of the management of its outstanding debt. Generally, each interest rate swap agreement calls for periodic net payments from or to the District depending upon whether a specified market interest rate index is above or below a specified fixed rate or another specified market interest rate index during that period. Each such swap agreement allows the District, at its option, to terminate the agreement at any time. Upon any such termination, a termination payment is to be made, calculated based on the mark-to-market value of the swap agreement plus dealer's spread. The swap agreements provide that under certain circumstances the counterparty to the swap agreement (but not the District) may be required to post collateral, depending upon the credit rating of that counterparty, with the amount of collateral required based on the mark-to-market value of the swap. The interest rate swap agreements entered into by the District provide that the counterparties to the agreements must post collateral if their respective ratings fall below A+/A1. The agreements also provide the counterparties the right to terminate the agreements if the District's unenhanced bond rating is downgraded below BBB/Baa. The District's obligations under all of its outstanding swap agreements are unsecured and subordinate to all Bonds issued and outstanding under the Resolution. Certain provisions of the District's outstanding swap agreements are summarized below.

The Resolution permits the District to issue Senior Subordinated Debt secured by Revenues of the System, subject to the prior and senior lien on such Revenues of all Bonds issued and outstanding under the Resolution. The decision of the District from time to time whether to issue Senior Subordinated Debt or Bonds depends, among other things, upon its assessment of market conditions at the time of issuance.

The District has issued Senior Subordinated Debt to provide interim financing for capital projects. Each series of Senior Subordinated Debt that has been issued has been retired from the proceeds of Bonds issued under the Resolution or from the proceeds of another series of Senior Subordinated Debt issued to refinance an earlier series of Senior Subordinated Debt.

The District has from time to time entered into agreements with various counterparties to provide for the investment of amounts in various funds established under the Resolution. Generally such agreements provide for the investment of funds at a contractually fixed rate of return to the District during their respective terms and provisions for termination, at the option of the District, based on payment of a termination fee determined based on the mark-to-market value of the contract plus dealer's spread.

The District reserves the right to enter into, amend, and terminate any existing or future interest rate swap transactions or other agreements or derivative transactions, from time to time, as part of its overall debt, investment or general management strategy. See also "APPENDIX A - Definitions of Certain Terms and Summary of Provisions of the Resolution".

### Subordinated Revenue Bond Anticipation Notes

On October 12, 2021, the District issued its Subordinated Revenue Bond Anticipation Notes, Series 2021 (the "Series 2021 Notes") for the purpose of currently refunding the District's outstanding Subordinated Revenue Bond Anticipation Notes, Series 2020. The Series 2021 Notes were issued in the original principal amount of $226,340,000 and are currently outstanding in that same principal amount. The principal of and accrued interest on the Series 2021 Notes are payable at maturity on October 14, 2022. The Series 2021 Notes were issued in accordance with, among other things, (i) applicable provisions of Kentucky Revised Statutes Chapters 65, 58 and 76 and Section 56.513 and (ii) a Subordinated Debt Resolution adopted by the District on April 26, 2010 (the "Basic Subordinated Debt Resolution"), as amended by a Subordinated Debt Sale Resolution adopted on August 23, 2021 (the "Series 2021 Subordinated Debt Resolution").

The Series 2021 Notes, shall be paid (to the extent not paid from other sources) from the proceeds of Additional Bonds issued in accordance with the terms of the Resolution to the extent other funds are not available. The Series 2021 Notes are payable upon such terms as are described in the Basic Subordinated Debt Resolution and the Series 2021 Subordinated Debt Sale Resolution. The pledge of Revenues securing the Series 2021 Notes is subject and subordinate in all respects to the priorities, liens, and rights created by and existing under the Resolution for the security and source of payment and protection of all Bonds previously issued, the Series 2022A Bonds, and any Additional Bonds and Refunding Bonds (as such terms are defined in "Appendix A - Definitions of Certain Terms and Summary of Provisions of the Resolution") which may be issued from time to time pursuant to the Resolution.

**Floating-to-Fixed Swap**

In 2001, the District entered into two forward-starting interest rate swaps (the "1999 Swaps") pursuant to which beginning in November 2009 the District would pay a fixed rate of 4.4215% and receive 67% of the One Month LIBOR index on a notional amount corresponding to the approximate amount needed to refund the District's Series 1999 Bonds. The District's original strategy in entering into the 1999 Swaps was to "lock in" a fixed rate for the variable rate debt that could be issued in 2009 to refund the Series 1999 Bonds. In August 2009, the District decided instead to refund the Series 1999 Bonds with proceeds of its fixed-rate Series 2009B Bonds and its fixed-rate Series 2009A Notes. The Series 2009A Notes have since been refunded by successive series of refunding notes, the latest in such series of refunding notes being the Series 2021 Notes.

In August 2009, the District reversed that portion of the 1999 Swaps which corresponded in amount and amortization schedule to the portion of the Series 2009B Bonds used to refund the Series 1999 Bonds. The reversed portion of the 1999 Swaps was terminated in April 2013. The only portion of the 1999 Swaps that remains in effect is the non-reversed portion of the 1999 Swaps, which has a termination date of May 15, 2033 and amortizes in amounts that correspond with the expected maturity structure of a future hypothetical bond issue the District may issue under the Resolution to permanently refinance the Series 2021 Notes. The District's expectation is that variable payments received under the non-reversed portion of the 1999 Swaps will hedge future interest rate movements for any fixed-rate Bonds hereafter issued under the Resolution (or any other fixed-rate renewal notes hereafter issued under the Subordinated Debt Resolution) to refinance the Series 2021 Notes. See "Note 7 – Long Term Debt" in "Appendix B -- Annual Comprehensive Financial Report of the District, Fiscal Years Ended June 30, 2021 and 2020. As of November 30, 2021, the estimated aggregate mark-to-market value of the non-reversed portion of the 1999 Swaps was approximately *negative* $73,343,226.

The District has not yet begun to renegotiate with the counterparties to its outstanding interest rate swaps the replacement of One Month LIBOR as the reference rate for the payments it receives under those swaps when LIBOR is expected to be discontinued after June 30, 2023. The District is unable at the present time to predict the outcome of those renegotiations.

**Commercial Paper Program**

On May 29, 2018 the District adopted a resolution (the "Program Note Resolution") authorizing the issuance of its Sewer and Drainage System Subordinated Program Notes ("Program Notes"), consisting of Commercial Paper Notes and Direct Purchase Notes, for the purpose of (i) financing the cost of improvements or additions to the System and (ii) refinancing outstanding Program Notes. Program Notes are issued as Senior Subordinated Debt of the District, secured, on a parity with any other outstanding or hereafter issued Senior Subordinated Debt of the District, by a subordinate and junior lien on the Revenues of the System, subject to the prior and senior lien on such Revenues of all Bonds issued and outstanding under the Bond Resolution, including the Series 2022A Bonds offered hereby. Program Notes (both

Commercial Paper Notes and Direct Purchase Notes) may be issued in an aggregate principal amount not to exceed $500,000,000 at any one time outstanding.

On November 16, 2020 the District amended the Program Note Resolution to extend to June 30, 2023 the latest maturity date of Commercial Paper Notes and Direct Purchase Notes issued under the Program Note Resolution.

Commercial Paper Notes may be issued and sold, at public or private sale, as taxable or tax-exempt notes, maturing in 270 days or less (but in any event not later than June 30, 2023) as determined by the District, and bearing interest at a rate or rates determined by the District (not in excess of 12% per annum for taxable notes or 10% per annum for tax-exempt notes). Commercial Paper Notes are payable only from (i) proceeds of the sale of other Commercial Paper Notes issued under the Program Note Resolution and used to refund outstanding Commercial Paper Notes, (ii) the proceeds of Direct Purchase Notes or other loans from the Banks (as defined below) used to refund outstanding Commercial Paper Notes, and (iii) the proceeds of Bonds issued to pay outstanding Commercial Paper Notes.

Liquidity support for each subseries of Commercial Paper Notes issued under the Program Note Resolution is provided by Bank of America, N.A. or JPMorgan Chase Bank, National Association (each a "Bank" and collectively the "Banks"). As an alternative to the sale of Commercial Paper Notes to investors, the Program Note Resolution authorizes the District in its discretion to issue and sell to the Banks, as Senior Subordinated Debt of the District under the Program Note Resolution, Direct Purchase Notes, evidencing loans from the Banks to the District. Direct Purchase Notes shall mature (but not later than June 30, 2023) and bear interest as provided in the respective note purchase agreement between the District and each Bank and may be issued only as tax-exempt notes.

The District expects to issue Bonds from time to time under the Bond Resolution, in addition to the Series 2022A Bonds offered hereby, to retire any Program Notes (Commercial Paper Notes or Direct Purchase Notes) outstanding at maturity and not to be refunded with other Program Notes.

As of December 31, 2021, there was issued and outstanding under the Program Note Resolution, $205,000,000 aggregate principal amount of Commercial Paper Notes with a term to maturity of not more than seventy-three days and an interest rate of not more than 0.13% per annum.

## THE DISTRICT

### General

The District was created and established pursuant to the Act, as a public body corporate, in 1946, in the interest of the public health and for the purpose of providing adequate sewer and drainage facilities. The District had complete jurisdiction, control, possession, and supervision of the then existing sewer and drainage system in the City and the power and authority to operate, maintain, reconstruct, and improve such system and construct additions, betterments, and extensions thereto within the limits of the District area as defined in the Act. The District assumed jurisdiction over and administration of the then existing sewer and drainage system in the City on November 16, 1946, pursuant to Ordinance No. 90, Series 1946, passed by the Board of Aldermen of the City and approved by the Mayor thereof in accordance with the requirements of the Act.

### Administration and Management of the District

The business, activities, and affairs of the District are managed, controlled, and conducted by a board (the "Board"), composed of eight members, not more than five of whom shall be affiliated with the same political party. The members are appointed by the Mayor subject to the approval of the Council of the Louisville/Jefferson County Metro Government ("Metro Council"). All appointments to the Board are made for three-year terms. The current members of the Board and the expiration dates of their respective terms are as follows.

| Board Members | Term Expires |
|---|---|
| Marita Willis (Chair) | June 30, 2022 |
| Keith Jackson (Vice-Chair) | August 31, 2023 |
| Rebecca Cox | August 31, 2023 |
| Gerald Joiner | February 28, 2024 |
| Ricky Mason | July 31, 2022 |
| Cameron Moreno-Rivera | June 30, 2024 |
| John Selent | July 31, 2024 |
| JT Sims | July 31, 2023 |

The Board has delegated and placed the conduct of the day-to-day business affairs of the District under the direction of an Executive Director supported by administrative, engineering, legal and business staffs. Short biographies of key members of the District's senior management team are set forth below:

James A. Parrott, Executive Director and Secretary-Treasurer

James A. "Tony" Parrott has served as the Executive Director of the District since July 2015, having been appointed to this role after 30 years in the public utility business, including 10 years in the top leadership role of the Metropolitan Sewer District of Greater Cincinnati. He holds a Communications Degree from Georgetown College and sits on the Board of Directors for the National Association of Clean Water Agencies. On February 26, 2019, the District's employment agreement with Mr. Parrott to serve as Executive Director was extended through September 13, 2023.

David Johnson, Chief Engineer

David Johnson has been employed by the District for 22 years, all within the Engineering Division. He most recently served as the Development and Storm Water Services Director before being promoted to Chief Engineer in 2020. Mr. Johnson is a Licensed Professional Engineer in the Commonwealth of Kentucky and holds a Bachelor of Science and a Master of Engineering Degree from the J.B. Speed School of Engineering at the University of Louisville. On March 23, 2020, Mr. Johnson entered into an employment agreement with the District to serve as Chief Engineer through March 23, 2021, subject to automatic renewal for up to four additional one-year renewal periods.

Brian Bingham, Chief of Operations

Brian Bingham join the District in 2004 as the Regulatory Services Director to oversee the development and implementation of the Wet Weather Consent Decree. He assumed oversight of the District's Operations Group, including Wastewater, Drainage, and Flood Protection, in 2013. His previous experience includes 20 years of engineering and program management in the private consulting engineering business. Mr. Bingham has a Bachelor of Science degree in Civil Engineering from the J. B. Speed School of Engineering at the University of Louisville.

Brad Good, Chief Financial Officer

Brad Good has been employed by the District as Controller since 2016 and was promoted to Chief Financial Officer in 2020. His previous experience includes 15 years in various accounting and finance positions in the hotel industry. Mr. Good is a certified public accountant and has a Bachelor of Science degree in Animal Science from Kansas State University and a post-baccalaureate degree in accounting from Indiana University Southeast.

Angela Akridge, Chief Strategy Officer

Angela Akridge began working for the District as an engineering cooperative education intern and upon completion of her civil engineering bachelor's and master's degrees from the University of Louisville Speed Scientific School, she joined the District as a full-time employee. Since that time she has served the community through multiple leadership, management and technical positions throughout her 27+ years at the District. She was appointed MSD's Chief Engineer in 2015 and most recently appointed to the newly created position of Chief Strategy Officer for Business Transformation and Regulatory Compliance in 2019.

Lynne Fleming, Human Resources Director

Lynne Fleming has been the District's Director of Human Resources since January 2012. She has over 18 years' experience in HR having previously served the City of Louisville and Louisville Metro Government as Assistant Director of Human Resources. Ms. Fleming is a licensed attorney. During her 8 years with the City of Louisville Law Department, Ms. Fleming focused her practice in the areas of labor and employment law and civil rights litigation. She was also a litigator in the adult trial division of the Louisville-Jefferson County Public Defender's Office for the first 8 years of her legal career. Ms. Fleming has a Bachelor of Arts degree in International Affairs with a Business Concentration from Xavier University and a Juris Doctor degree from the University of Louisville Brandeis School of Law.

Paula Purifoy, General Counsel and Legal Director

Paula Purifoy joined the District in 2002 and has served as the District's General Counsel and Legal Director since 2007. She leads the District's legal division, advising the District's executive leadership team on a wide variety of legal and business matters, and also serves as Counsel to the District's Board. Prior to joining the District, Ms. Purifoy was in private practice at law firms representing both government and private companies. Ms. Purifoy holds Bachelor of Arts in Political Science and Juris Doctor degrees from the University of Louisville.

René Patterson-Lindsay, Chief Procurement Officer

René Patterson-Lindsay has been employed by the District since 1994 and was promoted to Chief Procurement Officer in 2018. During her tenure she has worked the last 24 years in Procurement and Supplier Diversity. Ms. Lindsay is a certified public procurement officer and has a Bachelor of Science degree in Business Administration from Spalding University.

Kimberly Reed, Chief Innovation Officer

Kim Reed has been the Chief Innovation Officer of the District since March of 2019. She previously worked for the Louisville Water Company in various leadership positions. She has had a diverse career of over 20 years in the electric, gas, water, and waste water utility industries. Ms. Reed has Bachelor of Science in Chemical Engineering and Master of Business Administration (MBA) degrees, both from the University of Louisville.

Paul Bagley, Chief Information Officer

Paul Bagley has been the Chief Information Officer of the District since April of 2021. His previous experience includes information technology leadership and technical positions in the software, airline, and utility industries. Mr. Bagley has over 20 years of experience in the field of information technology. He holds a bachelor's degree in Industrial Engineering from Georgia Tech.

### The Sewer System

The District is authorized by KRS Chapter 76 to provide wastewater collection, treatment, and disposal services in Jefferson County. Through inter-local agreements, the District also provides wastewater collection, treatment, and disposal services to portions of Oldham County and Bullitt County. The District's sewer system extends throughout much of the developed portions of Jefferson County and includes approximately 600 miles of combined sewers (which carry sanitary wastewater during dry weather and a combination of stormwater and sanitary wastewater during wet periods), 2,700 miles of sanitary sewers, more than 260 pumping stations, five regional Water Quality Treatment Centers, and an estimated 1,400 miles of lateral connections to buildings.

The District's wastewater treatment capacity as of June 30, 2021 was as follows:

**WASTEWATER TREATMENT PLANT CAPACITY**

| Plant | Current Capacity MGD | Avg Daily Flow MGD | Eventual Capacity MGD | Residential | Customer Base Commercial | Industrial | Year Total | Built | Treatment Process |
|---|---|---|---|---|---|---|---|---|---|
| Morris Forman | 120.0 | 91.2 | 120.0 | 120,629 | 13,540 | 304 | 134,473 | 1958 | Secondary added in 1976. |
| Derek R. Guthrie | 60.0 | 44.3 | 60.0 | 64,238 | 3,758 | 38 | 68,034 | 1986 | Secondary |
| Hite Creek | 6.0 | 4.2 | 9.0 | 10,816 | 663 | 9 | 11,488 | 1970 | Tertiary: sand filter |
| Cedar Creek | 7.5 | 5.9 | 11.3 | 18,712 | 1,072 | 12 | 19,796 | 1995 | Tertiary: sand filter |
| Floyd's Fork | 6.5 | 3.2 | 9.8 | 9,987 | 548 | 5 | 10,540 | 2001 | Tertiary: sand filter |
| Oldham County Plants | 4.3 | 1.9 | 4.3 | 6,495 | 93 | - | 6,588 | Varies | |
| **Total Treatment System** | 204.3 | 150.7 | 215.1 | 230,877 | 19,674 | 368 | 250,919 | | |

MGD: Million Gallons per Day
Source: Louisville/Jefferson County Metropolitan Sewer District

### The Drainage System

Under an interlocal government cooperation agreement effective January 1, 1987, the District became the sole local authority for providing flood control and storm water drainage services in the Drainage Service Area. The District is responsible for the operation, maintenance, replacement, improvements and additions to existing flood control facilities and public storm water drainage facilities within the Drainage Service Area. The stormwater drainage system is comprised of various types of facilities to collect, convey, retain, and discharge stormwater runoff into the sewers, rivers, streams, and creeks eventually draining into the Ohio River. These facilities include open channels, ditches, streams, ponds, pipes, culverts, conduits, bridge structures, detention basins, retention basins, pump stations, and other facilities. By having a single authority responsible for drainage services and a dedicated source of revenue, the community benefits by having a more efficient, cost effective drainage service program.

### One Water Initiative

In January of 2012 Mayor Greg Fischer of the Louisville/Jefferson County Metro Government formed the Louisville Utilities and Public Works Advisory Group (the "Advisory Group") to examine the operations of the Louisville Water Company, a Kentucky corporation wholly owned as a public enterprise by the Louisville/Jefferson County Metro Government ("Louisville Water Company"), the District, and Metro Government's Department of Public Works & Assets ("DPW") to determine whether synergies exist between the entities that would allow for improved service or reduced costs. The Advisory Group, along with efforts of an experienced utility industry consulting corporation, and of due diligence teams of the District and Louisville Water Company, produced a final Report on Due Diligence Analysis and

Recommendation  in February 2014.  As a result of those efforts, the District and the Board of Waterworks of the Louisville/Jefferson County Metro Government, the governing body of the Louisville Water Company (the “Board of Waterworks”) entered into an Interlocal Cooperation Agreement (the "Original ILA") on March 11, 2014, as approved by the Kentucky Attorney General on March 31, 2014. The Original ILA, effective through June 30, 2033 (unless earlier terminated by either party on six months’ notice), provided for, among other items, the joint and/or cooperative development, provision, sharing and management of certain back-office, administrative and/or support services.

On August 24, 2015, the District and the Board of Waterworks entered into an Amended and Restated Interlocal Cooperation Agreement (the "Amended ILA," and together with the Original ILA, the "ILA"), as approved by the Kentucky Attorney General on September 17, 2015. The Amended ILA was entered into to establish a joint administrative board known as the One Water Board and to provide for more efficient implementation and expansion of the services provided in the Original ILA.  The One Water Board consists of two members each from the District’s Board and the Board of Waterworks and a member appointed by the Mayor.  The One Water Board is responsible for the overall administration of the One Water shared and/or consolidated services program. The Amended ILA is effective through June 30, 2035 (unless earlier termination by either party on 180 days’ notice).

The One Water Board approves annual project plans that drive One Water efforts for both Louisville Water Company and the District. These project plans are focused on five key areas: Shared Processes, Cooperative Contracts, Shared Labor, Partnerships and Knowledge Sharing.. Through the One Water Partnership, Louisville Water Company and the District strive to achieve the Partnership’s mission of improving customer experience, creating efficiencies, and driving revenue growth.

## THE SERVICE AREA

The combined area of the former City and the County ("Louisville Metro") is located in the north-central portion of the Commonwealth on the south bank of the Ohio River. Louisville Metro is the largest city in Kentucky and is the core of the Louisville Metropolitan Statistical Area (MSA) which includes, in addition to Louisville Metro, the counties of Bullitt, Oldham and Shelby, in Kentucky, and Clark, Floyd, and Harrison, in Indiana. The Louisville MSA has exhibited a nationally familiar pattern of population dispersion from its core urban area to the balance of Louisville Metro, and from Louisville Metro to the adjacent counties in Kentucky and Indiana.

| Annual Population Estimates | | |
|---|---|---|
| Rank | Louisville Metro[1] | Louisville MSA[2] |
| 1970 | 695,000 | 991,801 |
| 1980 | 684,300 | 1,054,368 |
| 1990 | 665,200 | 1,058,425 |
| 2000 | 693,604 | 1,161,975 |
| 2010 | 741,906 | 1,267,691 |
| 2011 | 746,906 | 1,310,945 |
| 2014 | 760,026 | 1,269,702 |
| 2015 | 763,623 | 1,278,413 |
| 2016 | 765,352 | 1,350,207 |
| 2017 | 771,158 | 1,293,953 |
| 2018 | 770,517 | 1,297,301 |
| 2019 | 766,757 | 1,265,108 |
| 2020 | 767,935 | 1,268,993 |

(1)Source: Population Division, U.S. Census Bureau website: www.census.gov (Jefferson County, KY)

(2)Source: Population Division, U.S. Census Bureau website: www.census.gov (Louisville/Jefferson County, KY-IN)

Louisville Metro possesses a diverse economic base which has exhibited the national pattern of a shift away from manufacturing towards services. In 2020 the average per capita personal income in Louisville-Jefferson County metropolitan area as reported by the U.S. Bureau of Economic Analysis was $52,134.

| Louisville Metro Major Employers | | |
|---|---|---|
| Rank | Company | Employment |
| 1 | United Parcel Service, Inc. | 24,110 |
| 2 | Jefferson County Public Schools | 14,484 |
| 3 | Norton Healthcare, Inc. | 14,403 |
| 4 | Ford Motor Co. | 13,020 |
| 5 | UofL Health Inc. | 12,568 |
| 6 | Humana Inc. | 12,526 |
| 7 | Baptist Healthcare System Inc. | 9,666 |
| 8 | Walmart Inc. | 7,500 |
| 9 | The Kroger Co. | 7,421 |
| 10 | GE Appliances, a Haier company | 7,100 |

Source: Louisville Business First, July 16, 2021 Edition

## RATES AND CHARGES

### Wastewater Service and Drainage Service Charges

The District derives its revenue for wastewater service and drainage service from the collection of rates, rentals and charges established in accordance with the provisions of the Act for services rendered within the Service Area to customers served by the District's facilities. Wastewater Service Rates and Drainage Service Rates, are billed and collected by Louisville Water Company on behalf of the District under terms of an agreement executed in January 2013 and ending in December 2027. These rates are billed simultaneously with the water bill on a single statement payable in total for wastewater, drainage and water service rendered. Customers are billed bimonthly except for larger industrial/commercial accounts which are billed monthly. In the event of nonpayment of any such wastewater rates, rentals, or charges for a period of more than 30 days after they become due and payable, Louisville Water Company is required by law to discontinue water service.

The District wastewater service rates include a fixed service charge based on the size of the public water meter serving the property plus a charge for each 1,000 gallons of water consumed on the premises. Each customer has the option of installing private meters to record water usage which does not enter the sewers. Industrial and commercial customers may use this option to obtain credit for water which does not enter the sewers. Drainage service rates are charged based on measured impervious areas with one equivalent service unit assigned for each 2,500 square feet of impervious area (residential unit). Of approximately 256,000 active wastewater customer accounts, fewer than 40 accounts have no public water meter because they are residential accounts served by well water. Such accounts are charged a fixed fee.

The District's wastewater and drainage service revenues for the past five fiscal years were as follows:

| | Wastewater Revenue (dollars in thousands) | | | | | Drainage Revenue (dollars in thousands) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Fiscal Year | Residential | Commercial | Industrial | Other | Total | Residential | Commercial | Industrial | Other | Total |
| **2017** | 108,809 | 61,860 | 21,218 | 3,078 | 194,965 | 22,111 | 33,421 | 3,445 | - | 58,977 |
| **2018** | 116,457 | 66,651 | 24,439 | 3,088 | 210,635 | 23,811 | 35,778 | 3,864 | 415 | 63,868 |
| **2019** | 122,830 | 71,054 | 23,172 | 2,412 | 219,468 | 25,716 | 38,775 | 4,373 | 842 | 69,706 |
| **2020** | 140,125 | 74,134 | 21,759 | 1,789 | 237,807 | 27,684 | 41,960 | 4,815 | 593 | 75,052 |
| **2021** | 148,091 | 74,460 | 23,080 | 171 | 245,802 | 29,413 | 45,220 | 5,239 | 43 | 79,915 |

Source: Louisville/Jefferson County Metropolitan Sewer District

### Rate Making Process

To amend its Schedule of Rates, Rentals and Charges in effect from time to time, the District adopts and publishes a preliminary rate resolution, receives public comment for a period of 30 days, and then adopts a final rate resolution. The Metro Government's Code of Ordinances provides that, in the event the District's net revenues are less than 1.10 times the debt service on the District's outstanding revenue bonds for any consecutive six-month period, the District's Schedule of Rates, Rentals and Charges shall be amended in order to maintain such 1.10 debt service coverage, provided that the aggregate of the adjustments for any 12-month period shall not generate additional revenue from wastewater and drainage service charges in excess of 7% and that an explanation of proposed rate increases in excess of 4% shall be delivered to the Metro Council at least 60 days prior to the approval of the District's Board. Any rate increase that would generate additional revenue from wastewater and drainage service charges in excess of 7% for a 12-month period requires Metro Council approval. "Net revenues" are defined for such purpose as gross revenue from wastewater service charges less operating expenses and debt service payments other than debt service payments on the District's outstanding revenue bonds.

## Rate History

The following table shows the District's combined wastewater and drainage service charge rate increases during the last five years and the resulting additional revenues. Additional revenues from the rate increases are approximate and assume constant water usage.

| Historical Service Charge Revenue (dollars in thousands) | | | | | |
|---|---|---|---|---|---|
| | 8/1/2017 | 8/1/2018 | 8/1/2019 | 8/1/2020 | 8/1/2021 |
| Rate Increase | 6.90% | 6.90% | 6.90% | 5.00% | 6.90% |
| Annual additional revenue from rate increase | 20,561 | 14,669 | 16,589 | 12,552 | * |

*Data available 6/30/22
Table excludes Oldham County service area.
Source: Louisville/Jefferson County Metropolitan Sewer District

## Customer Growth

The following tables show the growth in the total number of the District's wastewater customers and drainage service customers. Wastewater customer growth in fiscal year 2021 is primarily due to the District's acquisition of the former Oldham County Environmental Authority service area. This acquisition added approximately 6,000 wastewater customers.

| Historical Active Wastewater Customer Totals | | | | | | |
|---|---|---|---|---|---|---|
| | FY 16 | FY 17 | FY 18 | FY 19 | FY 20 | FY 21 |
| Residential | 216,593 | 217,979 | 219,186 | 220,412 | 221,796 | 230,157 |
| Commercial | 19,057 | 19,658 | 19,350 | 19,373 | 21,331 | 21,537 |
| Industrial | 407 | 340 | 348 | 360 | 385 | 390 |
| Total | 236,057 | 237,977 | 238,884 | 240,145 | 243,512 | 252,084 |
| % Growth | 0.43% | 0.81% | 0.38% | 0.53% | 1.40% | 3.40% |

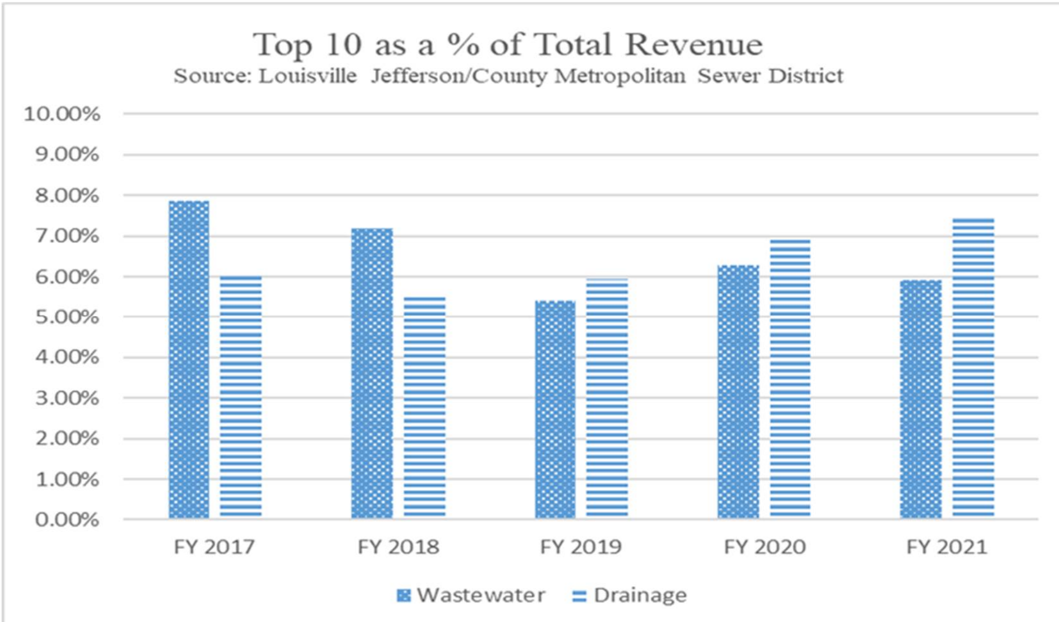
Source: Louisville/Jefferson County Metropolitan Sewer District

| Historical Active Drainage Customer Totals | | | |
|---|---|---|---|
| | FY19 | FY 20 | FY 21 |
| Residential | 206,499 | 207,317 | 208,060 |
| Commercial | 14,024 | 14,087 | 14,062 |
| Industrial | 257 | 271 | 269 |
| Total | 220,780 | 221,675 | 222,391 |
| % Growth | | 0.41% | -0.74% |

Source: Louisville/Jefferson County Metropolitan Sewer District

**Top 10 Customers**

The following table shows the District's top 10 wastewater and drainage customers as a % of total revenue for the past five fiscal years.




Source: Louisville/Jefferson County Metropolitan Sewer District

The following tables shows the District's top 10 wastewater and drainage customers in fiscal year 2021.

**Top 10 Wastewater Customers**

| Rank | Customer Name | | FY '21 Wastewater Billed | Percent Total Wastewater Revenue |
|---|---|---|---|---|
| 1 | Heaven Hill Distilleries | $ | 3,715,684 | 1.51% |
| 2 | Lubrizol Advanced Material | | 2,071,550 | 0.84% |
| 3 | Swift Pork Co. | | 2,053,342 | 0.84% |
| 4 | The Chemours Company FC LLC | | 1,388,385 | 0.56% |
| 5 | Early Times Distillery | | 1,373,275 | 0.56% |
| 6 | Ford Motor Co. | | 1,124,209 | 0.46% |
| 7 | Haier US Appliance Solutions | | 778,537 | 0.32% |
| 8 | Rohm & Haas | | 739,411 | 0.30% |
| 9 | Ford Motor Co. | | 717,704 | 0.29% |
| 10 | Clariant Corporation | | 590,926 | 0.24% |
| | Total | | 14,553,023 | 5.92% |
| | Total FY 21 Wastewater Revenue: | $ | 245,801,703 | |

Source: Louisville/Jefferson County Metropolitan Sewer District

**Top 10 Drainage Customers**

| Rank | Customer Name | | FY 21' Drainage Billed | Percent Total Drainage Revenue |
|---|---|---|---|---|
| 1 | Regional Airport Authority | $ | 1,546,213 | 1.93% |
| 2 | United Parcel Service | | 1,358,550 | 1.70% |
| 3 | Jeff Co Bd of Ed | | 855,119 | 1.07% |
| 4 | Ford Motor Co. | | 428,087 | 0.54% |
| 5 | LIT Industrial Limited Partner | | 320,852 | 0.40% |
| 6 | Regional Airport Authority | | 305,126 | 0.38% |
| 7 | Kentucky State Fair | | 300,720 | 0.38% |
| 8 | Churchill Downs Inc | | 278,017 | 0.35% |
| 9 | The University of Louisville Campus | | 275,408 | 0.34% |
| 10 | Seaboard System RR-00822 | | 260,138 | 0.33% |
| | Total | | 5,928,230 | 7.42% |
| | Total FY 21 Drainage Revenue: | $ | 79,915,505 | |

Source: Louisville/Jefferson County Metropolitan Sewer District

## FINANCIAL OPERATIONS

### Historical Financial Operations

The District derives its revenues primarily from customer payments for wastewater and stormwater services, which accounts for 99% of operating revenues. Other operating revenues include inflow and infiltration fees, capacity charges and other miscellaneous system fees and charges, which account for the remaining 1% of operating revenues. Non-operating revenues include interest income earned on investments and the federal interest subsidy on the District's Build America Bonds. The current portion of assessments payments is also included in non-operating revenue for purposes of coverage calculations per the Resolution.

The District's Finance Department provides detailed monthly reports on cash and investments, revenues, expenses, variances to budget and capital spending to management and the Board. The following table presents historical revenues, expenses and changes in net position using information contained in the audited financial statements for fiscal years 2017 through 2021. The District's audited financial statements for the fiscal year ended 2021 are found in Appendix B.

**Historical Revenues, Expenses and Changes in Net Postion**
Fiscal Year ended June 30
($ in thousands)

| | FY17 | FY18 | FY19 | FY20 | FY21 |
|---|---|---|---|---|---|
| Operating revenue: | | | | | |
| Wastewater service charges | $ 194,965 | $ 210,636 | $ 219,467 | $ 237,807 | $ 245,802 |
| Drainage service charges | 58,978 | 63,868 | 69,706 | 75,052 | 79,915 |
| Other operating income | 5,691 | 4,645 | 5,195 | 6,198 | 3,701 |
| Total operating revenue | 259,634 | 279,149 | 294,368 | 319,057 | 329,418 |
| Operating expenses: | | | | | |
| Service and administrative costs | 122,098 | 142,711 | 154,325 | 167,771 | 170,073 |
| Capitalization/recovery of cost | (31,949) | (38,147) | (38,383) | (39,643) | (41,785) |
| Capitalized overhead (over) under applied | - | 88 | - | - | - |
| Depreciation and amortization | 77,156 | 77,954 | 87,882 | 98,872 | 97,874 |
| Total operating expenses | 167,305 | 182,606 | 203,824 | 227,000 | 226,162 |
| Income (loss) from operations | 92,329 | 96,543 | 90,544 | 92,057 | 103,256 |
| Non-operating revenue (expense): | | | | | |
| Gain/Loss Disposal of Assets | - | - | 15 | (15,008) | (21) |
| Investment income | 4,047 | 6,280 | 8,338 | 5,275 | 1,777 |
| Build America bond refund | 10,226 | 10,249 | 10,339 | 10,325 | 10,398 |
| Interest expense - bonds | (90,117) | (95,041) | (94,831) | (92,274) | (93,067) |
| Interest expense - swaps | (8,926) | (7,724) | (6,468) | (8,027) | (9,793) |
| Interest expense - other | (9,317) | (9,873) | (13,497) | (13,129) | (13,104) |
| Amortization of debt discount/premium | 13,701 | 15,198 | 14,344 | 12,688 | 17,429 |
| Amoritzation of loss on refunding | (3,070) | (3,147) | (2,817) | (2,404) | (3,107) |
| Capitalized interest | 20,074 | 21,859 | 18,582 | 13,043 | 12,049 |
| Change in fair values - swaps | 26,072 | 16,317 | (13,597) | 812 | 8,796 |
| Total non-operating revenue (expenses), net | (37,310) | (45,882) | (79,592) | (88,699) | (68,643) |
| Net income / (loss) before contributions | 55,019 | 50,661 | 10,952 | 3,358 | 34,613 |
| Contributions | | | | | |
| Property owner assessments | 2,376 | - | - | - | - |
| All other | 10,513 | 12,726 | 50,926 | 9,085 | 16,422 |
| Increase (decrease) in net position | 67,908 | 63,387 | 61,878 | 12,443 | 51,035 |
| Net position, beginning of year | 600,580 | 668,488 | 708,674 | 770,552 | 796,730 |
| Net poistion, OCEA merger | - | - | - | 13,735 | - |
| Restatement for GASB 75 implementation | - | (23,201) | - | - | - |
| Net Position, beginning of year, as restated | 600,580 | 645,287 | 708,674 | 784,287 | 796,730 |
| Net position, end of year | $ 668,488 | $ 708,674 | $ 770,552 | $ 796,730 | $ 847,765 |

Source: Louisville/Jefferson County Metropolitan Sewer District

The following table presents historical senior debt service coverage for each of the last five fiscal years.

**Historical Debt Service Coverage**
Fiscal Year ended June 30
($ in thousands)

| | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| Revenues: | | | | | |
| Service charges | $ 253,943 | $ 274,504 | $ 289,173 | $ 312,859 | $ 325,717 |
| Other operating income | 5,691 | 4,645 | 5,195 | 6,198 | 3,701 |
| Assessments | 1,375 | 1,232 | 1,258 | 909 | 799 |
| Investment income | 14,273 | 16,531 | 18,692 | 15,600 | 12,175 |
| Less: capitalized investment income | - | - | - | - | - |
| Total revenues | 275,282 | 296,912 | 314,318 | 335,566 | 342,392 |
| Operating expenses: | | | | | |
| Service and administrative costs[1] | 119,586 | 131,948 | 142,082 | 149,945 | 151,527 |
| Less: capitalized overhead | (31,949) | (38,148) | (38,383) | (39,643) | (41,785) |
| Capitalization Rate | 27% | 29% | 27% | 26% | 28% |
| Total operating expenses | 87,637 | 93,800 | 103,699 | 110,302 | 109,742 |
| Net revenues | 187,645 | 203,112 | 210,619 | 225,264 | 232,650 |
| Aggregate debt service: | | | | | |
| Current maturities of long-term debt | 33,655 | 33,906 | 40,358 | 40,637 | 43,802 |
| Interest expense - senior lien | 90,117 | 95,041 | 94,831 | 92,274 | 93,067 |
| Less: capitalized interest expense | (20,074) | (21,859) | (18,582) | (13,043) | (12,050) |
| Aggregate net debt service | $ 103,698 | $ 107,088 | $ 116,607 | $ 119,868 | $ 124,819 |
| Debt service coverage ratio[2] | 181% | 190% | 181% | 188% | 186% |

[1]Excludes the actuarial portion of changes to GASB 68 pension expense and GASB 75 OPEB for the year
[2]Excludes the actuarial portion of changes to GASB 68 pension expense and GASB 75 OPEB for the year
Source: Louisville/Jefferson County Metropolitan Sewer District

## Projected Financial Operations

Both historic revenues and expenses of the District for prior fiscal years and projected revenues and expenses of the District for the current and future fiscal years are reflected in the charts below. The projected revenues reflect the increases in rates and charges adopted by the District for fiscal year 2021 and the anticipated increases in rates and charges for fiscal years 2023 through 2026. The projected financial results for fiscal years 2022 through 2026 incorporate assumptions as of the date of this Official Statement. The projected debt service requirements include estimated debt service for the Series 2022A Bonds.

The information on projected revenues and expenses constitute a "forward looking statement" under federal securities law. Actual revenues, expenses, or both could differ materially from those forecasted and there can be no assurance that such estimates of future results will be achieved. For example, there can be no assurance that the MSD Board will approve any proposed revision of the District’s Schedule of Rates, Rentals and Charges. In general, important factors that could cause actual results to differ materially from the revenues or expenses presently estimated include, but are not limited to, material changes in the size and composition of the District's service area, unanticipated changes in law or unanticipated material litigation, a material downturn in economic activity, efficiency of operations and the capital construction and expenditure plans and results of the District.

**Analysis of Actual and Projected Financial Results**
Fiscal Years Ended/Ending June 30
($ in thousands)

| | FY19 Actual | FY20 Actual | FY21 Actual | FY22 Budget | FY23 Projected | FY24 Projected | FY25 Projected | FY26 Projected |
|---|---|---|---|---|---|---|---|---|
| Rate Increase[1] | *6.90%* | *6.90%* | *5.00%* | *6.90%* | *6.90%* | *6.90%* | *6.90%* | *6.90%* |
| Operating Revenues | | | | | | | | |
| Wastewater service charges | $ 219,467 | $ 237,807 | $ 245,802 | $ 255,698 | $ 269,681 | $ 285,442 | $ 302,125 | $ 319,783 |
| Drainage service charges | 69,706 | 75,052 | 79,915 | 85,238 | 91,102 | 97,371 | 104,072 | 111,236 |
| Other operating income | 5,194 | 6,198 | 3,701 | 4,350 | 4,350 | 4,350 | 4,375 | 4,400 |
| Total Operating Revenues | 294,367 | 319,057 | 329,418 | 345,286 | 365,133 | 387,163 | 410,572 | 435,419 |
| Non-Operating Revenues | | | | | | | | |
| Assessments | 1,137 | 909 | 799 | 850 | 850 | 850 | 850 | 850 |
| BAB refund | 10,339 | 10,325 | 10,398 | 10,338 | 10,338 | 10,986 | 10,986 | 10,986 |
| Investment income | 8,339 | 5,275 | 1,777 | 1,188 | 1,188 | 1,236 | 1,285 | 1,337 |
| Total Non-Operating Revenues | 19,815 | 16,509 | 12,974 | 12,376 | 12,376 | 13,072 | 13,121 | 13,173 |
| Total Available Revenue | 314,182 | 335,566 | 342,392 | 357,662 | 377,509 | 400,235 | 423,693 | 448,592 |
| Operating Expenses | | | | | | | | |
| Total operating expenses[2] | 142,082 | 149,945 | 151,528 | 161,045 | 172,110 | 177,692 | 187,402 | 193,781 |
| Captialized cost | (38,383) | (39,643) | (41,786) | (38,651) | (38,953) | (38,469) | (38,742) | (38,155) |
| Net Operating Expense | 103,699 | 110,302 | 109,742 | 122,394 | 133,157 | 139,223 | 148,660 | 155,626 |
| Net Revenues Available for Debt Service | 210,483 | 225,264 | 232,650 | 235,268 | 244,352 | 261,012 | 275,033 | 292,966 |
| Debt Service | | | | | | | | |
| Total senior debt service[3] | 135,189 | 132,911 | 136,869 | 145,745 | 150,765 | 156,219 | 166,939 | 166,636 |
| Capitalized interest[4] | (18,582) | (13,043) | (12,049) | - | - | - | - | - |
| Total subordinated debt service | 19,966 | 20,751 | 22,782 | 27,952 | 29,361 | 34,235 | 33,592 | 37,379 |
| Total Outstanding & Projected Debt Service | 136,573 | 140,619 | 147,602 | 173,697 | 180,126 | 190,454 | 200,531 | 204,015 |
| Senior Debt Service Coverage | 181% | 188% | 186% | 161% | 162% | 167% | 165% | 176% |
| Total Debt Service Coverage | 154% | 160% | 158% | 135% | 136% | 137% | 137% | 144% |
| Aggregate Net Debt Service | 116,607 | 119,868 | 124,820 | 145,745 | 150,765 | 156,219 | 166,939 | 166,636 |
| 110% of Aggregate Net Debt Service | 128,268 | 131,855 | 137,302 | 160,320 | 165,842 | 171,841 | 183,633 | 183,300 |
| Subordinate Debt Service | 19,966 | 20,751 | 22,782 | 27,952 | 29,361 | 34,235 | 33,592 | 37,379 |
| 110% of Subordinated Debt Service | 21,963 | 22,826 | 25,060 | 30,747 | 32,297 | 37,659 | 36,951 | 41,117 |

[1] Projections include the former Oldham County Environmental Authority customers which are on a different rate schedule.
[2] Excludes the actuarial portion of changes to GASB 68 pension expense and GASB 75 OPEB for the year.
[3] Projections assume bonds issued in 2022 and 2024 are issued on a senior lien basis.
[4] GASB 89 eliminates capiatlization of interest costs incured before the end of a construction period for periods beginning after December 31, 2020.
Source: Louisville/Jefferson County Metropolitan Sewer District

## CAPITAL IMPROVEMENT PROGRAM

### Consulting Engineer's Report

Jacobs Engineering Group, Inc., Louisville, Kentucky (the "Consulting Engineers") has been retained by the District as its engineering consultant. The most recent report of the Consulting Engineers is appended to this Official Statement as Appendix F. The projections shown in "Appendix F — Consulting Engineer's Report" are based, among other things, on the District's Capital Improvement Plan in effect as of the date of such report. Except as specifically described herein, there can be no assurance that the District will not amend or revoke the Capital Improvement Program (the "CIP") described in "Appendix F - Consulting Engineer's Report" or that the District will issue or support bonds or other funding for the Capital Improvement Program in its current form or as amended or any substitute therefor.

### Consent Decree

In August 2005, the District entered into a joint Consent Decree agreement with the federal government and the Commonwealth of Kentucky. The Consent Decree created the framework for a 19-

year program to manage and mitigate combined sewer overflows (CSOs), and eliminate sanitary sewer overflows (up to a certain storm event). In 2009, the Consent Decree was amended to address recordkeeping and Water Quality Treatment Center bypasses and treatment performance.

To meet the requirements of the Amended Consent Decree, the District developed the Integrated Overflow Abatement Program (IOAP), which was later incorporated into the Critical Repair and Reinvestment Plan. Key capital projects included in the IOAP include:

- **CSO Storage Basins.** Large storage basins are under design or construction at strategic locations in the District's combined sewer system to temporarily store flows during rain events. When capacity is available, these stored flows will be released back into the collection system for treatment. These basins are a foundation of the District's CSO control strategy and must be operational by state and federally-enforced deadlines.

- **Green Infrastructure Projects.** Green infrastructure works by capturing stormwater flows in natural systems before they can enter the underground pipe network and thus creates additional capacity within the sewer system. Additionally, these systems remove pollutants through natural filtration systems so that any flows that must pass through them carry a reduced pollutant load. The District is committed to integrating green infrastructure as part of its overflow control strategy and has implemented an innovative system of cost-sharing with other public agencies and private developers to leverage the District's investment in green infrastructure to the extent it furthers the District's service offerings.

- **Capacity, Management, Operations and Maintenance (CMOM) Projects.** An essential component to the long-term success of the IOAP is an effective CMOM program that makes sure the wastewater collection system operates effectively. Elements of this program include capital investment, sewer inspection and cleaning, repair of defects found in sewers, and removal of illicit and illegal connections to the system.

- **Nine Minimum Controls (NMC) Projects**. Reporting requirements for the NMC program will be phased out after the completion of the District's obligations under the Consent Decree. The NMC principles related to optimizing operation of the combined sewer system will remain in full force and effect, with the enforcement mechanism shifted from the Consent Decree to the Morris Forman WQTC discharge permit. One critical item that will continue after the IOAP is completed is the continued implementation and optimization of the District's Real Time Control system that maximizes storage in the collection system through a series of automated dams and gates.

The District has spent approximately $1 billion designing and constructing many of the IOAP projects and completing other projects required under the Amended Consent Decree. This work has been financed or refinanced with proceeds of the District's Sewer and Drainage System Revenue Bonds, Series 2008, Series 2009C, Series 2010A, Series 2013C, Series 2014A, Series 2015A, Series 2016A, Series 2017A, Series 2020C, and Series 2021A, and to be refinanced with proceeds of the 2022A Bonds when issued.

All scheduled milestones on IOAP projects to mitigate sewer overflows across the service area have been met. Local waterways are safer and cleaner today as a result of these expenditures. Spending on the Amended Consent Decree work has consumed the majority of the District's capital expenditures since 2009. However, IOAP projects have only addressed a fraction of the wastewater, stormwater and flood protection assets under the District's purview. An unintended consequence of compliance with the Amended Consent Decree has been deferred asset management on the remaining infrastructure.

The District proactively approached federal and state regulators in 2019 to renegotiate the timing for completing the remaining LTCP and SSDP projects required by the Amended Consent Decree in order to reprioritize capital dollars for rehabilitation of the Districts' aging biosolids systems, failing sewer interceptors and flood protection system rehabilitation. The District, along with the federal government and the Commonwealth of Kentucky, have negotiated the Second Amended Consent Decree which grants a time extension for completing the remaining LTCP and SSDP projects to 2035. In exchange, the District agreed to invest a minimum of $25 million annually for asset management projects through 2035. Additionally, the District agreed to incorporate $70 million for critical sewer rehabilitation in its 5-year capital improvement plan. These financial commitments are achievable within the Board's rate increase authority of 6.9% per year. Final approval of the Second Amended Consent Decree is pending. See "PENDING LITIGATION" and "Appendix F -- 2021 Supplemental Engineer's Report", for additional information on the Second Amended Consent Decree.

**Critical Repair and Reinvestment Plan**

The District's 20-year Comprehensive Facility Plan published in June 2017 ("Facility Plan") represents the District's most ambitious planning effort in a decade. Working with the Wet Weather Team Stakeholder Group and District staff, the Facility Plan Team reviewed the challenges our community faces now and in the future and has developed a roadmap to protect the area's health, economic vitality, and environment. The recommendations in this plan are the result of well-vetted analyses from some of the most experienced engineers in Louisville Metro. The recommendations are essential to maintaining reliable and properly sized facilities that will allow the District to fulfill its responsibility for safe, clean waterways and to help preserve and promote our competitiveness as a city.

Wastewater collection and treatment is the District's largest service offering and was the original reason the District was formed by state statute in 1946. Fully implementing the Facility Plan recommendations will accomplish the following wastewater service objectives:

- Fulfill the obligation of the Consent Decree, including completing all the projects contained in the IOAP on schedule
- Provide facilities that comply with the other environmental regulations the District is governed by and provide a plan to remain in compliance with future regulations currently under development
- Renew and replace aging wastewater infrastructure to provide reliable service and the lowest overall cost using a best-practice asset management approach
- Position the District to support the community's ability to grow responsibly as economic development opportunities become available

The District assumed responsibility for stormwater management, including both drainage and interior floodplain management for most of Jefferson County in 1987. The drainage system at that time had a backlog of thousands of drainage complaints that the District was expected to correct. While the District has invested hundreds of millions of dollars in drainage infrastructure since 1987, drainage problems still are found across the entire county. In addition, the increased frequency of extreme storms that have been observed in Louisville Metro have raised customer concerns about the adequacy of our drainage and interior floodplain management systems. While current development standards require mitigation of the drainage impacts of land use changes, analysis of historical trends shows a significant reduction in natural green space and an increase in impervious services that do not allow stormwater to seep into the ground. Runoff from impervious surfaces also causes increased runoff volume and greatly increased runoff peak flows. Together, these factors exacerbate the observed deficiencies in the stormwater system that the District now has responsibility for, impacting neighborhood drainage in addition to interior floodplain inundation.

Implementing the Facility Plan recommendations will accomplish the following stormwater management objectives:

- Improve the level of protection against public health and property risks caused by inadequate stormwater drainage systems
- Continue support for the Project DRI neighborhood drainage solutions
- Expand the efforts of the MS4 program to reduce stormwater contamination of our waterways, primarily through BMPs and continued proactive support of green infrastructure solutions to both quantity and quality concerns
- Recognize and respond to the impact of changing weather patterns including the increased frequency of extreme storms

The Ohio River Flood Protection System (ORFPS) was developed in response to the flood of 1937. This system of levees, floodwalls, and flood pumping stations has protected Louisville since it became operational in the 1950s. While the system has an outstanding record of reliability, much of the system is more than 60 years old and includes antiquated equipment that cannot be repaired with standard parts available today. In addition, the same changing precipitation and land use patterns that affect drainage and inland floodplain management also impact the flood pumping stations and related appurtenances. Implementing the Facility Plan recommendations will accomplish the following ORFPS objectives:

- Maintain protection from Ohio River floods entering Louisville by proactive preventive and predictive maintenance activities related to the levee, floodwall, and all gates and other penetration closures that keep floodwaters at bay
- Modernize the flood pumping stations with current mechanical and electrical equipment that can provide continued reliability and a predictable cost because parts will be more readily available at a more reasonable cost
- Expand the capacity of those flood pumping stations to enhance community protection in response to changing precipitation and land use patterns

Implementing the recommendations for all three service areas will require a significant investment from the community. Based on the analyses of this Facility Plan, meeting the critical needs of the community is estimated to cost $4.3 billion over the next two decades. Unlike the IOAP, which is required by the Consent Decree to be completed, most stormwater management and flood protection capacity projects developed in the Facility Plan are not specifically required by regulation. Providing for infrastructure renewal and replacement, and improving the consistent level of service in stormwater management and flood protection are local decisions driven by the District's mission to provide safe, clean waterways for the community. The District will implement the Facility Plan to the extent funding is provided through the rate-setting process. If sufficient funding is not provided to complete the recommended projects in the 20-year planning period, then projects will be deferred to the future, when funding comes available.

**Climate Change Storm Risk**

As stated above, one of the objectives of the Facility Plan is to recognize and respond to the impact of changing weather patterns, including the increased frequency of extreme storms. Statistical data show an increase in the volume of rain in the District's local service area as a result of fewer but more severe and intense storms. As part of the process of developing and adopting the Facility Plan, the District has taken into account this increased frequency of extreme storms, presumably related to the effects of global climate change, with an approach aimed at providing protection to properties and buildings from surface flooding across the entire county from a 10-year storm. The Facility Plan also provides guidance on reducing (but not eliminating) the risk associated with localized, unusual weather events. The Facility Plan thus takes into account climate change as an issue affecting the resilience of the District's storm water treatment and drainage system and the effect on customer protection by focusing on the ability of the District's infrastructure to function effectively under different potential storm patterns. A discussion of District's 5-year CIP spending for the Facility Plan drainage program is contained in Section 3.3 of the Consulting Engineer's Report included as Appendix F.

## RECENT AND PENDING TRANSACTIONS OF THE DISTRICT

On March 25, 2020, the District entered into a Forward Delivery Bond Purchase Agreement with Bank of America, N.A. (the "Bank") providing for the sale to the Bank of the District's Sewer and Drainage System Revenue Bonds, Series 2021A (the "Series 2021A Bonds") in the principal amount of $246,555,000 to be issued and delivered on August 17, 2021. Pursuant to the Forward Delivery Bond Purchase Agreement, the District issued the Series 2021A Bonds under the Bond Resolution and the proceeds thereof were used to defease, redeem and refund on November 15, 2021, all of the District's Sewer and Drainage System Revenue Bonds, Series 2011A outstanding on that date. Upon the issuance of the Series 2021A Bonds, the District entered into a Continuing Covenant Agreement with the Bank providing that if an Event of Default shall have occurred and be continuing under the Continuing Covenant Agreement, the Bank or its assigns as holders of the Series 2021A Bonds may by written notice to the District declare the outstanding principal of and interest on the Series 2021A Bonds to be immediately due and payable. A redacted copy of the Continuing Covenant Agreement has been posted by the District on the Municipal Securities Rulemaking Board's Electronic Municipal Market Access (EMMA) website and is available there at the following hyperlink: https://emma.msrb.org/ES1470532.pdf.

On March 5, 2021 the Kentucky Infrastructure Authority ("KIA"), an agency of the Commonwealth of Kentucky, approved a loan of $8,270,000 to the District to rehabilitate or replace several sewer pump stations in the District.

On March 15, 2021 the District issued under the General Bond Resolution, to the United States Environmental Protection Agency (the "EPA"), the District's Sewer and Drainage System Revenue Bonds, Series 2020B (the "Series 2020B Bonds") in the principal amount of $96,126,000, evidencing a loan from the EPA to the District under the federal Water Infrastructure Finance and Innovation Act (WIFIA), for the purpose of financing the costs of certain improvements to the System. The District's loan agreement with the EPA (the "WIFIA Loan Agreement") prohibits the District from incurring additional debt without the permission of the EPA if a payment default has occurred and is continuing under the WIFIA Loan Agreement. A redacted copy of the WIFIA Loan Agreement is attached to the event notice which the District posted on March 26, 2021 on the Municipal Securities Rulemaking Board's Electronic Municipal Market Access (EMMA) website and which is available there at the following hyperlink: https://emma.msrb.org/P11479931-P11147049-P11561056.pdf.

On July 2, 2021, KIA approved loans to the District (i) in the amount of $2,944,345 to rehabilitate, renovate, and replace a sewer lift station in Oldham County and (ii) in the amount of $7,400,000 to eliminate a pump station in Oldham County and increase sewer pipe diameter to facilitate future regionalization.

On July 26, 2021, MSD's Board adopted a resolution imposing a 6.9% increase in wastewater and drainage volume and service charges and optional and quality charge rates assessed to commercial and industrial customers, effective August 1, 2021, and extending the 10% Emergency Wastewater Rate Assistance Program discount on wastewater service charges for eligible customers through July 31, 2022.

On November 30, 2021 the District acquired the wastewater system of the Bullitt County Sanitation District ("BCSD") pursuant to (i) an Interlocal Cooperation Agreement for Wastewater Collection and

Treatment Services, dated May 6, 2021, as amended by a First Amendment to Interlocal Agreement dated July 26, 2021, and a Second Amendment to Interlocal Cooperation Agreement dated September 27, 2021, by and among the District, BCSD, and the County of Bullitt, Kentucky (the "County") and (ii) an Asset Purchase Agreement dated as of October 25, 2021, by and between the District, BCSD, and the County. BCSD operated a sewer and wastewater treatment system in Bullitt County, Kentucky serving approximately 4,200 residential customers with eight small "package" wastewater treatment plants. Further details regarding this acquisition is contained in the event notice the District posted on the Municipal Securities Rulemaking Board's Electronic Municipal Market Access (EMMA) website on December 10, 2021 and which is available there at the following hyperlink: https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/P11177347.

## COVID-19 PANDEMIC

The World Health Organization has declared a pandemic following the outbreak of COVID-19, a respiratory disease caused by a new strain of coronavirus. In response to this novel coronavirus, on March 6, 2020, the Governor of Kentucky issued Executive Order 2020-215, declaring a State of Emergency under KRS Chapter 39A and activating the Kentucky Emergency Operations Plan. On March 13, 2020, President Donald Trump declared a national emergency and made federal government funds available to help states and local governments fight the pandemic. The continued spread of COVID-19 may alter the behavior of businesses and individuals in a manner that could have negative effects on economic activity and therefore may adversely affect the financial conditions of the Commonwealth and the District, either directly or indirectly.

District operations have continued, largely uninterrupted, by the pandemic. The District has taken measures to safeguard its employees while enabling them to perform their work. Many administrative personnel are teleworking, operational personnel have been supplied with personal protective equipment, and the District has made other modifications following CDC guidelines that enable it to continue to provide wastewater treatment, drainage and flood protection to the community.

As the federal, state, and local governments, including the District, continue efforts to contain and limit the spread of COVID-19, revenue collections may deviate from historical or anticipated collections and may have an adverse impact on the financial position and operations of the District to a degree that cannot currently be estimated. As of June 30, 2021, MSD has $107 million of unrestricted operating cash and investments on hand, which is expected to be adequate to fund essential services and make timely debt service payments. In addition, MSD can issue Program Notes to provide short-term funding for its capital improvement program. The District, however, is not able to predict and makes no representations as to the future economic impact of the COVID-19 pandemic on the District, the operations of the District, or the financial position of the District.

Certain statements contained in this Official Statement are "forward-looking statements." Particularly because of the evolving nature of the current public health crisis, no assurances can be given that any projected future results described herein will be achieved, and actual results may differ materially from the projected future results described herein. In this respect, the words "estimate," "forecast," "project," "anticipate," "expect," "intend," "believe," "budget" and similar expressions are intended to identify forward-looking statements. All projections, forecasts, assumptions and other forward-looking statements in this Official Statement are expressly qualified in their entirety by this cautionary statement.

## PENDING LITIGATION

There is no litigation or other legal proceeding pending or, to the knowledge of the District, threatened to restrain or enjoin the issuance, sale or delivery of the Series 2022A Bonds or the implementation of the plan of financing described herein, or in any way contesting or affecting the validity of the Series 2022A Bonds or the plan of financing described herein or any proceedings of the District taken with respect to the issuance or sale of the Series 2022A Bonds, the pledge or application of any moneys or securities provided for the payment of the Series 2022A Bonds or the existence or powers of the District insofar as they relate to the authorization, sale and issuance of the Series 2022A Bonds or such pledge or application of moneys and securities or the implementation of the plan of financing described herein.

There is no litigation or other legal proceeding pending or, to the knowledge of the District, threatened which challenges the authority of the District to operate the System or to collect revenues therefrom or which contests the creation, organization or existence of the District or the title of any of its Board members or executive staff to their respective offices.

After several months of negotiation, the District, Commonwealth of Kentucky and United States of America have reached an agreement on important modifications to the 2009 Amended Consent Decree entered by the United States District Court for the Western District of Kentucky, Louisville Division (the "Court"), in Civil Action No. 3:08-CV-00608-CRS. The parties have agreed to enter into a Second Amended Consent Decree which will supersede and replace the 2009 Amended Consent Decree and update the 2012 Integrated Overflow Abatement Plan ("IOAP") Modification approved on June 19, 2014 with the 2021 IOAP Modification.

The original IOAP, which included a Final Sanitary Sewer Discharge Plan ("SSDP") and CSO Long Term Control Plan ("LTCP"), was certified on December 19, 2008, and incorporated by reference into the 2009 Amended Consent Decree by an Order signed on February 12, 2010 and entered into the public record February 15, 2010. The IOAP was amended in 2012 and 2014 to improve compliance and adjust capital project schedules.

Since entry of the 2009 Amended Consent Decree, the District has spent approximately $1 billion developing and completing many of the IOAP projects, and completing other projects and compliance measures mandated by the Consent Decree. The District has completed the majority of the CSO LTCP projects and SSDP projects, as well as the development of Comprehensive Program Evaluations, Composite Correction Plans, Sewer Overflow Response Protocol, Interim Sanitary Sewer Discharge Plan, and Sanitary Capacity Assessment Plan.

The Second Amended Consent Decree, which was lodged in the Court on July 27, 2021, was negotiated to effectuate additional remedial measures for CSO and SSO control and regulatory compliance. Specifically, the Second Amended Consent Decree was negotiated to integrate the development of an asset management plan that provides for a long-term maintenance and funding strategy for rehabilitation and renewal of the District's aging biosolids systems and failing critical interceptors and flood protection system. To facilitate the District's ability to reprioritize projects and capital spending, the Commonwealth of Kentucky and United States of America have agreed to extend the time for completion of remaining LTCP and SSDP projects to 2035. In exchange for the time extension, the District has agreed to invest a minimum of $25 million on average each fiscal year in asset management projects for a total of $375 million by June 30, 2035. The District has also agreed to incorporate $70 million in its 5-year CIP for critical sewer rehabilitation. The Second Amended Consent Decree sets forth stipulated penalties to be assessed should the District fail to comply.

Final approval of the Second Amended Consent Decree by the Commonwealth of Kentucky and United States of America, and entry by the Court, are subject to the requirements of 28 C.F.R. §50.7, which provides for notice of the lodging of the Second Amended Consent Decree in the Federal Register, and an opportunity for public comment. The comment period has expired and entry of the Second Amended

Consent Decree as a final judgement is currently pending consideration of comments by the United States of America.

The District is a defendant from time to time in various lawsuits. Although the outcome of these lawsuits is not presently determinable, it is the opinion of the District that resolution of these matters will not result in a material adverse effect on the operations, properties or financial condition of the District.

Except as disclosed above, there is no litigation or other legal proceeding pending or, to the knowledge of the District, threatened against or affecting the District or its Board wherein an unfavorable decision, ruling or finding might have a materially adverse effect on the operations, properties or financial condition of the District.

## APPROVAL OF LEGAL PROCEEDINGS

The issuance of the Series 2022A Bonds is subject to the approval of Wyatt, Tarrant & Combs, LLP, Louisville, Kentucky, Bond Counsel, whose approving opinion will be delivered with the Series 2022A Bonds. Certain legal matters will be passed upon for the District by its General Counsel, Paula M. Purifoy, Esq.

Bond Counsel has reviewed legal matters incident to those sections of the Official Statement entitled "The Series 2022A Bonds," "Security and Sources of Payment for the Series 2022A Bonds," "Funds and Accounts," "Tax Treatment," and "Appendix A – Definitions of Certain Terms and Summary of Provisions of the Resolution," and is of the opinion that the statements contained in such sections are, as to law and legal conclusions, correct and that such sections fairly summarize the contents of documents therein described. Bond Counsel assumes no responsibility for the accuracy or completeness of other statements or financial information contained in this Official Statement.

## TAX TREATMENT

### General

In the opinion of Wyatt, Tarrant & Combs, LLP, Bond Counsel, (i) under the Internal Revenue Code (the "Code") as presently enacted and construed, interest on the Series 2022A Bonds is excludable from gross income for federal income tax purposes and (ii) the Series 2022A Bonds are exempt from ad valorem taxation, and the interest thereon is exempt from income taxation, by the Commonwealth of Kentucky and all of its political subdivisions and taxing authorities.

A copy of the form of opinion of Bond Counsel is set forth in Appendix D.

The Code imposes various restrictions, conditions, and requirements relating to the qualification of the Series 2022A Bonds as so-called "tax-exempt" bonds. The District has covenanted to comply with certain restrictions designed to ensure that interest on the Series 2022A Bonds will not be includable in gross income for federal income tax purposes. Failure to comply with these covenants could result in the Series 2022A Bonds not qualifying as "tax-exempt bonds," and thus interest on the Series 2022A Bonds being includable in the gross income of the holders thereof for federal income tax purposes. Such failure to qualify and the resulting inclusion of interest could be required retroactively to the date of issuance of the Series 2022A Bonds. The opinion of Bond Counsel assumes compliance with these covenants. However, Bond Counsel has not undertaken to determine (or to inform any person) whether any actions taken (or not taken) or events occurring (or not occurring) after the date of issuance of the Series 2022A Bonds may adversely affect either the federal or Kentucky tax status of the Series 2022A Bonds.

Certain requirements and procedures contained or referred to in the Resolution and other relevant documents may be changed and certain actions (including, without limitation, defeasance of the Series 2022A Bonds) may be taken or omitted under the circumstances and subject to the terms and conditions set forth in such documents. Bond Counsel expresses no opinion as to any Series 2022A Bonds or the interest thereon if any such change occurs or action is taken or omitted upon the advice or approval of bond counsel other than Wyatt, Tarrant & Combs, LLP.

Although Bond Counsel is of the opinion that interest on the Series 2022A Bonds will be excludable from gross income for federal income tax purposes and the Series 2022A Bonds and the interest thereon will be exempt from taxation in Kentucky, as described above, the ownership or disposition of, or the accrual or receipt of interest on, the Series 2022A Bonds may otherwise affect a Holder's federal, state or local tax liabilities. The nature and extent of these other tax consequences may depend upon the particular tax status of the Holder or the Holder's other items of income, deduction, or credit. Bond Counsel expresses no opinions regarding any tax consequences other than what is set forth in its opinion and each Holder or potential Holder is urged to consult with tax counsel with respect to the effects of purchasing, holding, or disposing of Series 2022A Bonds on the tax liabilities of the Holder.

Receipt of interest on, or ownership or disposition of, Series 2022A Bonds may result in other collateral federal, state, or local tax consequence for certain taxpayers. Such effects may include, without limitation, increasing the federal tax liability of certain foreign corporations subject to the branch profits tax imposed by Section 884 of the Code, increasing the federal tax liability of certain insurance companies under Section 832 of the Code, increasing the federal tax liability and affecting the status of certain S Corporations subject to Sections 1362 and 1375 of the Code, increasing the federal tax liability of certain individual recipients of Social Security or Railroad Retirement benefits under Section 86 of the Code, and limiting the amount of earned income credit under Section 32 of the Code that might otherwise be available. Ownership of any of the Series 2022A Bonds may also result in the limitation of interest and certain other deductions for financial institutions and other taxpayers pursuant to Section 265 of the Code. Residence of the Holder of Series 2022A Bonds in a state other than Kentucky or being subject to tax in a state other than Kentucky may result in income or other tax liabilities being imposed by such states or their political subdivisions based on the interest on or other income from the Series 2022A Bonds.

The District has *not* designated the Series 2022A Bonds as "qualified tax-exempt obligations" under Section 265 of the Code.

**Original Issue Premium**

"Acquisition Premium" is the excess of the cost of a bond over the stated redemption price of such bond at maturity or, for bonds that have one or more earlier call dates, the amount payable at the next earliest call date. The Series 2022A Bonds having a yield that is lower than their stated interest rate, as shown on the inside cover page hereto (the "Premium Bonds"), are being initially offered and sold to the public at an Acquisition Premium. For federal income tax purposes, the amount of Acquisition Premium on each bond the interest on which is excludable from gross income for federal income tax purposes ("tax-exempt bonds") must be amortized and will reduce the bondholder's adjusted basis in that bond. However, no amount of amortized Acquisition Premium on tax-exempt bonds may be deducted in determining the holder's taxable income for federal income tax purposes. The amount of any Acquisition Premium paid on the Premium Bonds that must be amortized during any period will be based on the "constant yield" method, using the original bondholder's basis in such bonds and compounding semiannually. This amount is amortized ratably over the semiannual period on a daily basis.

Holders of Premium Bonds should consult their own tax advisors as to the effect of Acquisition Premium with respect to their own tax situation and as to the treatment of Acquisition Premium for state tax purposes.

**Original Issue Discount**

Series 2022A Bonds having a yield that is higher than their stated interest rate, as shown on the inside cover page hereof (the "Discount Bonds") are being offered and sold to the public at an original issue discount ("OID") from the amounts payable thereon at maturity. OID is the excess of the stated redemption price of a bond at maturity over the "issue price" of such bond. The issue price is generally the initial offering price to the public (other than to bond houses, brokers, or similar persons acting in the capacity of underwriters or wholesalers) at which a substantial amount of bonds of the same maturity are sold pursuant to the initial offering. For federal income tax purposes, OID on each bond will accrue over the term of the bond, and for the Discount Bonds, the amount of accretion will be based on a single rate of interest, compounded semiannually (the "yield to maturity"). The amount of OID that accrues during each semiannual period will do so ratably over that period on a daily basis. With respect to an initial purchaser of a Discount Bond at its issue price, the portion of OID that accrues during the period that such purchaser owns the Discount Bond is added to such purchaser's tax basis for purposes of determining gain or loss at the maturity, redemption, sale, or other disposition of that Discount Bond and thus, in practical effect, is treated as stated interest, which is excludable from gross income for federal income tax purposes.

Holders of Discount Bonds should consult their own tax advisors as to the treatment of OID and the tax consequences of the purchase of Discount Bonds other than at the issue price during the initial public offering and as to the treatment of OID for state tax purposes.

## FINANCIAL STATEMENTS

The financial statements of the District for the fiscal years ended June 30, 2021 and 2020 included in Appendix B of this Official Statement, which is an integral part of this Official Statement, have been audited by Crowe LLP, independent auditors, as stated in their report.

The interim unaudited financial statements of the District for the for the five-month period ended November 30, 2021 are included in Appendix C, which is an integral part of this Official Statement.

## RATINGS

Moody's Investors Service, Inc. ("Moody's") and S&P Global Ratings, a division of Standard & Poor's Financial Services LLC ("S&P") have assigned the ratings of "Aa3" and "AA", respectively, to the Series 2022A Bonds. Such ratings reflects only the views of the respective rating agencies. An explanation of the significance of the rating given by Moody's may be obtained from Moody's Investors Service, Inc., 7 World Trade Center, 250 Greenwich Street, Public Finance Group - 23rd Floor, New York, New York 10007, (212) 553-0300; and an explanation of the rating given by S&P may be obtained from S&P Global Ratings, 55 Water Street, New York, New York 10041, (212) 438-2124. There is no assurance that such ratings will continue for any given period of time or that they will not be revised downward or withdrawn entirely by such organizations if, in the judgment of such organizations, circumstances so warrant. Any such downward revision or withdrawal of such ratings could have adverse effects on the market price of the Series 2022A Bonds.

## UNDERWRITING

The Series 2022A Bonds are being purchased for reoffering by J.P. Morgan Securities LLC (the "Underwriter"). The Underwriter has agreed to purchase the Series 2022A Bonds at an aggregate purchase price of $248,821,123.50 (representing the $225,000,000.00 par amount of the Series 2022A Bonds, plus net original issue premium of $24,045,214.95, and less underwriter's discount of $224,091.45). The initial public offering prices, which produce the yields set forth on the cover page of this Official Statement, may be changed by the Underwriter and the Underwriter may offer and sell the Series 2022A Bonds to certain dealers (including dealers depositing Series 2022A Bonds into investment trusts) and others at prices lower than the offering prices which produce the yields set forth on the cover page.

## FINANCIAL ADVISOR

Robert W. Baird & Co. Incorporated, has been employed as Financial Advisor to the District in connection with the issuance of the Series 2022A Bonds. The Financial Advisor's fee for services rendered with respect to the sale of the Series 2022A Bonds is contingent upon the issuance and delivery thereof. This Official Statement was prepared and distributed by the Financial Advisor. The information set forth herein was obtained from the District and other sources believed to be reliable, but is not guaranteed as to accuracy or completeness by, and is not to be construed as a representation of the Financial Advisor.

## CONTINUING DISCLOSURE

In accordance with Securities and Exchange Commission Rule 15c2-12 (the "Rule"), the District will agree, pursuant to a Continuing Disclosure Certificate to be dated and delivered as of the date of issuance and delivery of the Series 2022A Bonds (the "Disclosure Certificate"), to cause the following information to be provided:

(i) to the Municipal Securities Rulemaking Board (the "MSRB"), certain annual financial information and operating data, including audited financial statements prepared in accordance with generally accepted accounting principles as applied to governmental units, generally consistent with the information contained under the headings "THE DISTRICT - Customer History," "THE DISTRICT - Rate History," and in "Appendix B" of the Official Statement; such information shall be provided on or before the January 1 following the fiscal year ending on the preceding June 30, commencing with the fiscal year ended June 30, 2021; provided that the audited financial statements may not be available by such date, but will be made available immediately upon delivery thereof by the auditor to the obligated person;

(ii) in a timely manner not in excess of ten business days after the occurrence of the events to the MSRB, notice of the occurrence of the following events with respect to the Bonds:

(a) Principal and interest payment delinquencies;
(b) Non-payment related defaults, if material;
(c) Unscheduled draws on debt service reserves reflecting financial difficulties;
(d) Unscheduled draws on credit enhancements reflecting financial difficulties;
(e) Substitution of credit or liquidity providers, or their failure to perform;
(f) Adverse tax opinions, the issuance by the Internal Revenue Service of proposed or final determinations of taxability, Notices of Proposed Issue (IRS Form 5701- TEB) or other material notices or determinations with

respect to the tax status of the security, or other material events affecting the tax-exempt status of the security;

(g) Modifications to rights of security holders, if material;

(h) Bond calls, if material, and tender offers (except for mandatory scheduled redemptions not contingent upon the occurrence of an event);

(i) Defeasances;

(j) Release, substitution or sale of property securing repayment of the securities, if material;

(k) Rating changes;

(l) Bankruptcy, insolvency, receivership or similar event of the obligated person (Note: For the purposes of this event, the event is considered to occur when any of the following occur: The appointment of a receiver, fiscal agent or similar officer for an obligated person in a proceeding under the U.S. Bankruptcy Code or in any other proceeding under state or federal law in which a court or governmental authority has assumed jurisdiction over substantially all of the assets or business of the obligated person , or if such jurisdiction has been assumed by leaving the existing governing body and officials or officers in possession but subject to the supervision and orders of a court or governmental authority, or the entry of an order confirming a plan of reorganization, arrangement or liquidation by a court or governmental authority having supervision or jurisdiction over substantially all of the assets or business of the obligated person);

(m) The consummation of a merger , consolidation, or acquisition involving an obligated person or the sale of all or substantially all of the assets of the obligated person , other than in the ordinary course of business, the entry into a definitive agreement to undertake such an action or the termination of a definitive agreement relating to any such actions, other than pursuant to its terms, if material;

(n) Appointment of a successor or additional trustee or the change of name of a trustee, if material;

(o) Incurrence of a financial obligation of the obligated person, if material, or agreement to covenants, events of default, remedies, priority rights, or other similar terms of a financial obligation of the obligated person, any of which affect security holders, if material; and

(p) Default, event of acceleration, termination event, modification of terms, or other similar events under the terms of the financial obligation of the obligated person, any of which reflect financial difficulties.

(iii) in a timely manner, to the MSRB, notice of a failure of the obligated person to provide the required Annual Financial Information on or before the date specified in the Continuing Disclosure Certificate.

The Disclosure Certificate provides holders of the Series 2022A Bonds, including beneficial owners of the Series 2022A Bonds, with certain enforcement rights in the event of a failure by the District to comply with the terms thereof; however, a default under the Disclosure Certificate does not constitute an event of default under the Resolution. The Disclosure Certificate may also be amended or terminated under certain circumstances in accordance with the Rule as more fully described therein. Holders of the Series 2022A Bonds are advised that the Disclosure Certificate, the form of which is obtainable from the Financial Advisor, should be read in its entirety for more complete information regarding its contents.

For purposes of this transaction with respect to events as set forth in the Rule:

(i) the District is the obligated person;

(ii) there are no credit enhancements applicable to the Bonds; and

(iii) there are no liquidity providers applicable to the Bonds.

Pursuant to outstanding continuing disclosure undertakings (the "Existing Undertakings") the District is required to file certain annual financial information with the MSRB by January 1 of each year. The District has filed its annual financial information in accordance with the Existing Undertakings and, to the best of the District's knowledge, is in material compliance with the continuing disclosure undertaking requirements of the Rule in connection with its outstanding obligations that are subject to such requirements. In the past five years, the District has been made aware that there have been changes to the credit ratings on certain obligations of the District resulting from changes to the credit rating of credit enhancers providing bond insurance for those obligations, for which continuing disclosure event notices were not filed. Such changes to the credit ratings were made without any formal notice of the change to the District.

**CONCLUDING STATEMENT**

The foregoing summaries or descriptions of provisions of the Resolution and all references to other materials not quoted in full are only brief outlines of certain provisions thereof and do not purport to be complete statements of such documents and provisions. Reference is hereby made to the complete documents, copies of which will be furnished by the District upon request, for further information.

Any statements in this Official Statement involving matters of opinion, whether or not expressly so stated, are intended as such and not as representations of fact. This Official Statement is not to be construed as a contract or agreement between the District and the purchasers or holders of any of the Series 2022A Bonds.

This Official Statement has been approved by the District as of the date set forth on the cover hereof.

LOUISVILLE AND JEFFERSON COUNTY
METROPOLITAN SEWER DISTRICT

By: /s/ Marita Willis
Chair

By: /s/ Brad Good
Chief Financial Officer

# APPENDIX A

## DEFINITIONS OF CERTAIN TERMS AND SUMMARY OF PROVISIONS OF THE RESOLUTION

## SUMMARY OF PROVISIONS OF THE RESOLUTION

The descriptions and summaries set forth herein are not intended to be comprehensive or definitive, and reference is made to the Resolution for the complete details of all terms and conditions. All statements herein are qualified in their entirety by reference to the Resolution. Copies of the Resolution are available from the District.

**Definitions**

"Account" means an Account established pursuant to the Resolution.

"Accountant's Certificate" means a certificate of an independent certified public accountant or firm of accountants (who may be the accountant or firm which regularly audits the books of the District) selected by the District.

"Accreted Value" means, with respect to any Capital Appreciation Bond, an amount equal to the principal amount of such Capital Appreciation Bond (determined on the basis of the principal amount per $5,000 at maturity thereof) plus the amount assuming semi-annual compounding of earnings which would be produced on the investment of such principal amount, beginning on the dated date of such Capital Appreciation Bond and ending at the maturity date thereof, at a yield which, if produced until maturity, will produce $5,000 at maturity. As of any Valuation Date, the Accreted Value of any Capital Appreciation Bonds shall mean the amount set forth for such date in the Supplemental Resolution authorizing such Capital Appreciation Bonds and as of any date other than a Valuation Date, the sum of (a) the Accreted Value on the preceding Valuation Date and (b) the product of (1) a fraction, the numerator of which is the number of days having elapsed from the preceding Valuation Date and the denominator of which is the number of days from such preceding Valuation Date to the next succeeding Valuation Date and (2) the difference between the Accredited Values for such Valuation Dates.

"Accrued Aggregate Debt Service" for any period means, as of any date of calculation and with respect to any Series, an amount equal to the sum of the amounts of accrued Debt Service with respect to all Series, calculating the accrued Debt Service with respect to each Series at an amount equal to the sum of [i] interest on the Bonds of such Series accrued and unpaid and to accrue to the end of the then current calendar month and [ii] Principal Installments due and unpaid and that portion of the Principal Installment for such Series next due which would have accrued (if deemed to accrue in the manner set forth in the definition of Debt Service) to the end of such calendar month. The principal and interest portions of the Accreted Value and Appreciated Value of Capital Appreciation Bonds and Capital Appreciation and Income Bonds, respectively, becoming due at maturity or by virtue of a Sinking Fund Installment shall be included in the calculations of accrued and unpaid and accruing interest or Principal Installments in such manner and during such period of time as is specified in the Supplemental Resolution authorizing such Bonds.

"Act" means Kentucky Revised Statutes Chapter 76, including particularly Sections 76.055 et seq., inclusive, as the same may be from time to time amended, and successor provisions.

"Additional Bonds" means Bonds authenticated and delivered upon original issuance pursuant to the Resolution and any Bonds thereafter authenticated and delivered in lieu of or in substitution for such Bonds pursuant to the Resolution.

"Agent Member" shall mean a member of, or participant in, the Securities Depository. "Aggregate Debt Service" for any period means, as of any date of calculation and with respect to all Bonds, the sum of the amounts of Debt Service for such period.

"Aggregate Net Debt Service" for any period means, as of any date of calculation and with respect to all Bonds, the Aggregate Debt Service for such period, less any amounts available or expected to be available in the ordinary course for the payment of Debt Service during such period pursuant to the Resolution (including but not limited to interest or other income available or expected to be available for payment of Debt Service during such period from the Reserve Account).

"Annual Budget" means the budget adopted or in effect for a particular Fiscal Year as provided in the Resolution.

"Appreciated Value" means, with respect to any Capital Appreciation and Income Bond up to the Interest Commencement Date, an amount equal to the principal amount of such Capital Appreciation and Income Bond (determined on the basis of the principal amount per $5,000 at the Interest Commencement Date thereof) plus the amount, assuming semi-annual compounding of earnings which would be produced on the investment of such principal amount, beginning on the dated date of such Capital Appreciation and Income Bond and ending on the Interest Commencement Date, at a yield which, if produced until the Interest Commencement Date, will produce $5,000 at the Interest Commencement Date. As of any Valuation Date, the Appreciated Value of any Capital Appreciation and Income Bond shall mean the amount set forth for such date in the Supplemental Resolution authorizing such Capital Appreciation Bonds and as of any date other than a Valuation Date, the sum of (a) the Appreciated Value on the preceding Valuation Date and (b) the product of (1) a fraction, the numerator of which is the number of days having elapsed from the preceding Valuation Date and the denominator of which is the number of days from such preceding Valuation Date to the next succeeding Valuation Date and (2) the difference between the Appreciated Values for such Valuation Dates.

"Authorized Newspaper" means The Bond Buyer or any other financial newspaper customarily published at least once a day for five days (other than legal holidays) in each calendar week, printed in the English language and of general circulation in the Borough of Manhattan, City and State of New York.

"Authorized Officer of the District" means any person authorized by the District to perform the act or sign the document in question.

"Board" means the Board of the District, or such board, commission or agency as may succeed to the duties and responsibilities of such Board.

"Bond" or "Bonds" means any bonds, notes or other evidences of indebtedness (other than Subordinated Debt), as the case may be, authenticated and delivered pursuant to the Resolution.

"Bond Counsel" means a nationally recognized municipal bond attorney or firm of municipal bond attorneys, acceptable to the District.

"Bond Fund" means the Bond Fund established in the Resolution.

"Bondholder" or "Holder of Bonds" or "Holder" means any person who shall be the registered owner of any Bond or Bonds. Notwithstanding this definition, with respect to any Bonds which are registered in Book-Entry Form , the Paying Agent shall be entitled to rely upon written instructions from a majority of the beneficial owners of the Bonds with reference to consent, if any, required from Bondholders under the Resolution.

"Bond Register" means the form or system or document in which the ownership of Bonds is recorded by the Bond Registrar.

"Bond Registrar" means any bank or trust company organized under the laws of any state of the United States of America or national banking association appointed by the District to perform the duties of Bond Registrar enumerated in the Resolution.

"Book-Entry Form" or "Book-Entry System" means, with respect to the Bonds, a form or system, as applicable, under which (i) the ownership of beneficial interests in Bonds and bond service charges may be transferred only through a book entry and (ii) physical Bond certificates in fully registered form are registered only in the name of a Securities Depository or its nominee as Holder, with the physical Bond certificates in the custody of a Securities Depository.

"Business Day" means any day other than a Saturday, Sunday or legal holiday in the Commonwealth or a day on which either Bond Registrar, the Paying Agent or the District is legally authorized to close.

"Capital Appreciation Bonds" means any Bonds issued under the Resolution as to which interest is payable only at the maturity or prior redemption of such Bonds, as further described in the Resolution.

"Capital Appreciation and Income Bonds" means any Bonds issued under the Resolution as to which interest is deferred prior to the Interest Commencement Date, as further described in the Resolution.

"Chairperson" means the Chairperson of the District, or such Officer of the District as may succeed to the duties and responsibilities of the Chairperson.

"Commonwealth" means the Commonwealth of Kentucky.

"Construction and Acquisition Fund" means the Construction and Acquisition Fund established in the Resolution.

"Cost of Construction and Acquisition" means, with respect to a Project, the District's costs, expenses and liabilities paid or incurred or to be paid or incurred by the District in connection with the planning, engineering, designing, acquiring, constructing, installing and financing, of a Project and the obtaining of all governmental approvals, certificates, permits and licenses with respect thereto, including, but not limited to, all costs relating to the acquisition, construction and installation of a Project and the cost of any demolitions or relocations necessary in connection therewith, any good faith or other similar payment or deposits required in connection with the purchase of a Project, the cost of acquisition by or for the District of real and personal property or any interests therein, and costs of the District incidental to such construction, acquisition or installation all costs relating to injury and damage claims relating to a Project, the cost of any indemnity or surety bonds and premiums on insurance, preliminary investigation and development costs, engineering fees and expenses, contractors' fees and expenses, the costs of labor, materials, equipment and utility services and supplies, legal and financial advisory fees and expenses, interest and financing costs, including, without limitation, bank commitment, line of credit, and letter of credit fees, bond insurance and indemnity premiums, and any other means of providing credit enhancement or credit support, costs incurred in connection with interest rate exchanges, futures contracts or other similar financing arrangements, fees and expenses of the Fiduciaries, including reasonable fees and expenses of counsel to the Fiduciaries, administration and general overhead expense and costs of keeping accounts and making reports required by the Resolution prior to or in connection with the completion of construction of a Project, amounts, if any, required by the Resolution to be paid into the Bond Fund to provide, among other things, for interest accruing on Bonds and to provide for the Debt Service Reserve Requirement or to be paid into the Renewal and Replacement Account for any of the respective purposes thereof, payment when due (whether at the maturity of principal or the due date of interest or upon redemption or purchase) on any indebtedness of the District, including Bonds, notes and Subordinate Debt, incurred in respect of any of the foregoing, and working capital and reserves therefor, and all federal, state and local taxes and payments in lieu of taxes legally required to be paid in connection with a Project and shall include reimbursements to the District for any of the above items theretofore paid by or on behalf of the District. It is intended that this definition of Cost of Construction and Acquisition be broadly construed to encompass all costs, expenses and liabilities of the District related to a Project which on the date of adoption of the Resolution or in the future shall be permitted to be funded with the proceeds of Bonds pursuant to the provisions of the laws of the Commonwealth.

"Credit Facility" means, a letter of credit, surety bond, loan agreement, standby purchase agreement or other credit agreement, facility or insurance or guaranty arrangement which has been rated not lower than "A" by Moody's or S&P's, or which is issued by an entity whose unsecured long term debt or claims paying ability is rated not lower than "A" by Moody's or S&P's, in either case, pursuant to which the District or another person is entitled to obtain funds to pay Bonds and interest thereon tendered to the District or a third party for payment, purchase or redemption in accordance with the Resolution.

"Debt Service" for any period means, as of any date of calculation and with respect to any Series, an amount equal to [i] the interest accruing during such period on Bonds of such Series plus [ii] the portion of each Principal Installment for such Series which would accrue during such period if such Principal Installment were deemed to accrue periodically in equal amounts from the next preceding Principal Installment due date for such Series (or, if there shall be no such preceding Principal Installment due date, from a date one year preceding the due date of such Principal Installment or from the date of issuance of the Bonds of such Series, whichever date is later). For Variable Interest Rate Bonds, the annual interest rate thereon and the resulting Debt Service shall be calculated by an Authorized Officer and evidenced by a certificate from such Authorized Officer of the District in accordance with the following procedure: for any Variable Interest Rate Bonds Outstanding on the date such certificate is delivered, an Authorized Officer of the District shall estimate the Debt Service on such Bonds upon reliance upon a written estimate of such Debt Service by the District's financial advisor which estimate shall include assumptions with respect to the interest rate or rates to be borne by such Bonds and the amounts and due dates of the Principal Installments for such Bonds; provided, however, that the interest rate or rates assumed to be borne by any Variable Interest Rate Bonds shall not be less than the interest rate borne by such Variable Interest Rate Bonds at the time that an Authorized Officer of the District delivers such certificate. The principal and interest portions of the Accreted Value and Appreciated Value of Capital Appreciation Bonds and Capital Appreciation and Income Bonds, respectively, becoming due at maturity or by virtue of a Sinking Fund Installment shall be included in the calculations of accrued and unpaid and accruing interest or Principal Installments in such manner and during such period of time as is specified in the Supplemental Resolution authorizing such Bonds.

"Debt Service Account" means the Debt Service Account of the Bond Fund.

"Debt Service Reserve Requirement" as of a particular date of computation means an amount, computed separately for each Series of Bonds, equal to the least of [i] ten percent (10%) of the face amount of such Series, [ii] one hundred percent (100%) of the maximum Aggregate Net Debt Service (as of the computation date) in the current or any future Fiscal Year and [iii] one hundred twenty-five percent (125%) of average Aggregate Net Debt Service (as of the computation date) in the current or any future Fiscal Year. For Variable Interest Rate Bonds, the Debt Service Reserve Requirement shall be the maximum permitted amount with interest calculated at the lesser of the 30-year Revenue Bond Index (published by The Bond Buyer no more than two weeks prior to the date of sale of such Variable Interest Rate Bonds) or the Maximum Interest Rate. If any Variable Interest Rate Bond shall be converted to a fixed rate Bond for the remainder of the term thereof, and as a result thereof a nominal deficiency shall be created in the Bond Fund, the Debt Service Reserve Requirement shall be adjusted so as to exclude the amount of such deficiency, but the Debt Service Reserve Requirement shall be increased in each Fiscal Year or portion thereof after the date of such conversion by an amount equal to one hundred percent (100%) of the nominal deficiency, until there is no longer a nominal deficiency.

"Defeasance Obligations" means (i) cash, (ii) U.S. Treasury Certificates, Notes and Bonds (including State and Local Government Series - "SLGS"), (iii) direct obligations of the United States Treasury which have been stripped by the Treasury itself (CATS, TIGRS and similar securities), (iv) interest components of obligations of the Resolution Funding Corporation in book-entry form if such obligations have been stripped by request to the Federal Reserve Bank of New York, (v) pre-refunded municipal bonds rated "Aaa" by Moody's and "AAA" by S&P; however, if the issue is only rated by S&P, then the pre-refunded bonds must have been pre-refunded with cash, direct U.S. or U.S. guaranteed obligations, or AAA rated pre-refunded municipals, (vi) obligations issued by the following agencies which are backed by the full faith and credit of the United States: (a) direct obligations or fully guaranteed certificates of beneficial ownership of the U.S. Export-Import Bank (Eximbank), (b) certificates of beneficial ownership of the Farmers Home Administration, (c) obligations of the Federal Financing Bank, (d) participation certificates of the General Services Administration, (e) guaranteed Title XI financings of the U.S. Maritime Administration, (f) United States guaranteed New Community Debentures, (g) United States guaranteed public housing notes and bonds, and (h) project notes and local authority bonds of the U.S. Department of Housing and Urban Development, and (vii) any other investments approved in writing by the Insurer.

"District" means the Louisville and Jefferson County Metropolitan Sewer District, a public body corporate and political subdivision, created and established pursuant to the Act.

"Event of Default" shall have the meaning given to such term herein under the caption "Events of Default."

"Federal Reserve Bank" means any one of the central banks constituting the Federal Reserve System, created by the Federal Reserve Act of 1913, as amended, in order to regulate and aid the member banks in its respective Federal Reserve district.

"Fiduciary" or "Fiduciaries" means the Bond Registrar, the Paying Agents, or any or all of them, as may be appropriate or any bank, trust company, national banking association, savings and loan association, savings bank or other banking association selected by the District as a depositary of monies and securities held under the provisions of the Resolution, and may include the Bond Registrar.

"Fiscal Year" means each twelve (12) month period commencing on July 1 and ending on the succeeding June 30.

"Fund" or "Funds" means, as the case may be, each or all of the Funds established in the Resolution.

"Government Obligations" means (i) any direct obligations of the United States of America (including obligations issued or held in book-entry form on the books of the Department of the Treasury) or obligations the principal and interest on which are unconditionally guaranteed by the United States of America, and (ii) bonds, debentures, notes or other evidences of indebtedness issued or guaranteed by any of the following federal agencies (including stripped obligations thereof if such obligations have been stripped by the issuing agency itself) provided such obligations are backed by the full faith and credit of the United States of America: [1] Farmer's Home Administration; [2] General Services Administration; [3] United States Maritime Administration - Guaranteed Title XI Financing; [4] Federal Financing Bank; [5] United States Department of Housing and Urban Development; [6] U.S. Export - Import Bank; [7] Federal Housing Administration Debentures, and [8] Government National Mortgage Association guaranteed mortgage-backed bonds and guaranteed pass-through obligations.

“Insurer” means any nationally recognized company engaged in the business of insuring bonds which may from time to time insure the payment of the principal of and interest on all or a portion of the Bonds of any Series.

“Interest Commencement Date” means, with respect to any particular Capital Appreciation and Income Bond, the date specified in the Supplemental Resolution authorizing such Bonds, (which date must be prior to the maturity date for such Bonds) after which interest ceases to be deferred and compounds and the interest becomes currently payable.

“Investment Securities” means any of the following securities, to the extent legal for investment of the District’s funds: [a] Government Obligations and, to the extent from time to time permitted by law, [b] obligations of [i] Federal Home Loan Banks, senior debt obligations, [ii] Federal Home Loan Mortgage Corporation, participation certificates and senior debt obligations, [iii] Student Loan Marketing Association, senior debt obligations, [iv] Resolution Funding Corporation and [v] Federal National Mortgage Association mortgage-backed securities and senior debt obligations; [c] money market funds registered under the Federal Investment Company Act of 1940, whose shares are registered under the Federal Securities Act of 1933, and having a rating by Standard and Poor’s of AAAm-G, AAAm or AAm; [d] certificates of deposit or time deposits of any bank, any branch of any bank, trust company or national banking association or any savings and loan association; provided, however, that such certificates of deposit or time deposits shall be fully secured, to the extent not insured by the Federal Deposit Insurance Corporation or the Federal Savings and Loan Insurance Corporation, by Government Obligations in which the Bond Registrar has a perfected first security interest, [e] investment agreements (for investment of moneys held in the Construction and Acquisition Fund) or other investments approved in writing by the Insurer, [f] commercial paper rated at the time of purchase, “Prime-1” by Moody’s and “A-1” or better by S&P, [g] bonds or notes issued by any state or municipality which are rated by Moody’s and S&P in one of the two highest rating categories assigned by such agencies, [h] federal funds or banker acceptances with a maximum term of 1 year with a rating of “Prime-1” or “A-3” or better by Moody’s and “A-1” or “A” or better by S&P, and [i] any repurchase agreement approved in writing by the Insurer or any repurchase agreement with a term not in excess of 30 days that is a legal investment for public funds under state law (as determined by a written legal opinion delivered to the District) and is with a primary dealer on the Federal Reserve reporting dealer list rated A or better by Moody’s and S&P or any bank or trust company (including the Bond Registrar) rated “A” or better by Moody’s and S & P for Government Obligations or obligations described in [b] above in which the Bond Registrar shall be given a first security interest and on which no third party shall have a lien. The underlying repurchase obligations must be valued weekly and marked to market at a current market price plus accrued interest of at least 104% (105% if the underlying securities are Federal National Mortgage Association Mortgage-backed securities and senior debt obligations) of the amount of the repurchase obligations of the bank or trust company. All obligations purchased must be transferred to the Bond Registrar or a third party agent by physical delivery or by an entry made on the records of the issuer of such obligations. Any investment in a repurchase agreement shall be considered to mature on the date the obligor providing the repurchase agreement is obligated to repurchase the obligations. Any investment in obligations described in [a] and [b] above may be made in the form of an entry made on the records of the issuer of the particular obligation.

The Bond Registrar, any Paying Agent, other Fiduciaries, or other custodian of funds of the District, respectively, may trade with itself in the purchase and sale of securities for such investment and may charge its ordinary and customary fees for such trades, including cash sweep account fees. In the absence of any direction from the District, the Bond Registrar, any Paying Agent, other Fiduciaries, or other custodian of funds of the District, respectively, shall invest all funds in sweep accounts, money market funds and similar short-term investments, provided that all such investments shall constitute Investment Securities.

“Maximum Interest Rate” means, with respect to any particular Variable Interest Rate Bond, an annual rate of interest, which shall be set forth in the Supplemental Resolution authorizing such Bond, that shall be the maximum rate of interest such Bond may at any time bear.

“Minimum Interest Rate” means, with respect to any particular Variable Interest Rate Bond, an annual rate of interest which may (but need not) be set forth in the Supplemental Resolution authorizing such Bond, that shall be the minimum rate of interest such Bond may at any time bear.

“Moody’s” means Moody’s Investors Service, Inc., a corporation organized and existing under the laws of the State of Delaware, its successors and their assigns, if any.

“Month” means a calendar month.

“Net Revenues” for any period shall mean Revenues, less Operating Expenses for such period. “Operating Expenses” means the District’s reasonable, ordinary, usual or necessary current expenses of maintenance, repair and operation of the System, determined in accordance with generally accepted accounting principles and the enterprise basis of accounting. Operating Expenses shall include, without limiting the generality of the foregoing, [i] expenses not annually recurring, [ii] administrative and engineering expenses (to the extent not paid or reimbursed as a Cost of Construction and Acquisition), payments to pension or retirement funds properly chargeable to the System, insurance premiums, fees and expenses of Paying Agents and legal expenses, [iii] interest on, redemption premium on, or principal of, Subordinated Debt, [iv] any other expenses required to be paid by the District under the provisions of the Resolution or by law and [v] amounts reasonably required to be set aside in reserves for operating items or expenses the payment of which is not then immediately required.

However, Operating Expenses do not include [i] reserves for extraordinary maintenance or repair, or any allowance for depreciation, or any deposits or transfers to the credit of the Bond Fund or the Renewal and Replacement Account, nor any amounts paid or required to be paid to the United States of America pursuant to the Resolution (except to the extent such rebate amounts must be paid from Revenues other than the investment income that generated the liability to the United States), [ii] non- capital Costs of Acquisition and Construction or other costs, to the extent composed of non-capital expenses, salaries, wages and fees that are necessary or incidental to capital improvements for which debt has been issued and which may be paid from proceeds of such debt or [iii] losses from the sale, abandonment, reclassification, revaluation or other disposition of properties of the System nor such property items, including taxes and fuel, which are capitalized pursuant to the then existing accounting practice of the District.

“Opinion of Counsel” means an opinion signed by an attorney or firm of attorneys of nationally recognized standing in the field of law relating to municipal bonds (who may be counsel to the District) selected by the District.

“Option Bonds” means Bonds which by their terms may be tendered by and at the option of the Holder thereof for payment or purchase by the District or a third party prior to the stated maturity thereof, or the maturities of which may be extended by and at the option of the Holder thereof.

“Outstanding” when used with reference to Bonds, means, as of any date, Bonds theretofore or thereupon being authenticated and delivered under the Resolution except:

(i) Bonds cancelled pursuant to the Resolution at or prior to such date;

(ii) Bonds (or portion of Bonds) for the payment or redemption of which monies, equal to the principal amount or Redemption Price thereof, as the case may be, with interest to the date of maturity or redemption date shall be held in trust under the Resolution and set aside for such payment or redemption (whether at or prior to the maturity or redemption date), provided that if such bonds (or portion of Bonds) are to be redeemed, notice of such redemption shall have been given or provision satisfactory to the District shall have been made for the giving of such notice as provided in the Resolution;

(iii) Bonds in lieu of or in substitution for which other Bonds shall have been authenticated and delivered pursuant to the Resolution;

(iv) Bonds deemed to have been paid as provided in the Resolution; and

(v) Option Bonds deemed tendered in accordance with the provisions of the Supplemental Resolution authorizing such Bonds on the applicable adjustment or conversion date if interest thereon shall have been paid through such applicable date and the purchase price thereof shall have been paid or amounts are available for such payment as provided in the Resolution.

"Paying Agent" means any bank or trust company organized under the laws of any state of the United States of America or any national banking association designated as paying agent for the Bonds of any Series, and its successor or successors hereafter appointed in the manner provided in the Resolution.

"Pledged Property" means and includes the following property, as and when received by or for the account of the District, in each case pending the application or expenditure thereof in accordance with the Resolution: [i] the proceeds of sale of Bonds, [ii] all Revenues, [iii] all amounts on deposit in the Funds or Accounts established under the Resolution, [iv] such other amounts as may be pledged from time to time by the District as security for the payment of Bonds and [v] all proceeds of the foregoing.

"Principal Installment" means, as of the date of calculation and with respect to any Series, so long as any Bonds thereof are Outstanding, [i] the principal amount of Bonds of such Series due on a certain future date for which no Sinking Fund Installments have been established (including the principal amount of Option Bonds tendered for payment and not purchased), [ii] the Sinking Fund Installment due on a certain future date for Bonds of such Series and [iii] if such future dates coincide, the sum of such principal amount and such Sinking Fund Installment.

"Project" means any project directly or indirectly related to the facilities provided or to be provided by the District which is to be included as part of the System and is permitted by the Act, and any modification or substitution of such facilities by the District.

"Record Date" means a Regular Record Date or a Special Record Date.

"Redemption Price" means, with respect to any Bond, the principal amount thereof plus the applicable premium, if any, payable upon redemption thereof pursuant to such Bond.

"Refunding Bonds" means all Bonds, whether issued in one or more Series or as part of a Series, authenticated and delivered on original issuance pursuant to the Resolution.

"Renewal and Replacement Account" means the account of that name which is maintained pursuant to the Resolution.

"Reserve Account" means the Reserve Account of the Bond Fund.

"Resolution" means the Sewer and Drainage System Revenue Bond Resolution of the District originally adopted on December 9, 1992 and amended and restated in its entirety on June 30, 1993, as from time to time amended or supplemented.

"Revenue Fund" means the Revenue Fund which is maintained pursuant to the Resolution.

"Revenues" means all revenues, rates, fees, rents, charges and other operating income and receipts, as derived by or for the account of the District from or for the operation, use or services of the System, determined in accordance with generally accepted accounting principles and the enterprise basis of accounting. Revenues shall include, without limiting the generality of the foregoing, [i] revenue from capital charges recovered or reimbursed to the District, capacity charges and service connection fees, [ii] acquisition surcharges and assessments levied by the District (regardless of whether any of the same are allocated or designated by the District for capital expenditures) and [iii] interest or other income received or to be received from any source, including but not limited to interest or other income received or to be received on any monies or securities held pursuant to the Resolution. Revenues shall not include customer deposits and contributions in aid of construction, except to the extent the same would constitute revenues or income in accordance with generally accepted accounting principles.

"S&P's" means Standard & Poor's Corporation, a corporation organized and existing under the laws of the State of New York, and its successors and their assigns, if any.

"Secretary-Treasurer" means the Secretary-Treasurer of the District, or such officer of the District as may succeed to the duties and responsibilities of the Secretary-Treasurer.

"Securities Exchange Act" means the Securities Exchange Act of 1934, as amended.

"Securities Depository" means any securities depository that is a "clearing corporation" within the meaning of the New York Uniform Commercial Code and a "clearing agency" registered pursuant to the provisions of Section 17A of the Securities Exchange Act, operating and maintaining, with its participants or otherwise, a Book-Entry System to record ownership of beneficial interests in bonds and bond service charges, and to effect transfers of bonds in Book-Entry Form, and means, initially, The Depository Trust Company (a limited purpose trust company) , New York, New York.

"Securities Depository Nominee" means any nominee of a Securities Depository and shall initially mean Cede & Co., New York, New York, as nominee of The Depository Trust Company.

"Senior Subordinated Debt" means any debt of the District subordinated to the Bonds and payable from the Senior Subordinated Debt Fund, including without limitation, such Notes of the District as may be issued pursuant to the Subordinate Debt Resolution of the District adopted on June 30, 1993, as the same may be amended from time to time.

"Senior Subordinated Debt Fund" means the Senior Subordinated Debt Fund which is maintained pursuant to the Resolution.

"Series" means all of the Bonds authenticated and delivered on original issuance and identified pursuant to the Resolution or any Supplemental Resolution authorizing such Bonds as a separate Series of Bond, and any Bonds thereafter authenticated and delivered in lieu of or in substitution for such Bonds pursuant to the Resolution, regardless of variations in maturity, interest rate, Sinking Fund Installments, or other provisions.

“Sinking Fund Installment” means an amount so designated which is established pursuant to the Resolution.

“Subordinated Debt” means indebtedness of the System which is subordinate to the Bonds issued under the Resolution including the Senior Subordinated Debt.

“Supplemental Resolution” means any resolution supplemental to or mandatory of this Resolution adopted by the District in accordance with the Resolution.

“System” means [i] the sewer facilities, drainage facilities and all appurtenant facilities or any other facilities owned, operated or controlled by the District from time to time, [ii] any Project and [iii] all improvements, additions, extensions and betterments to the foregoing which may be hereafter acquired by the District by any means whatsoever.

“Valuation Date” means with respect to any Capital Appreciation Bonds and Capital Appreciation and Income Bonds, the date or dates set forth in the Supplemental Resolution authorizing such Bonds on which specific Accreted Values or Appreciated Values are assigned to the Capital Appreciation Bonds and Capital Appreciation and Income Bonds, as the case may be.

“Variable Interest Rate” means a variable interest rate to be borne by a Series of Bonds or any one or more maturities within a Series of Bonds.

“Variable Interest Rate Bonds” for any period means bonds which during such period bear a Variable Interest Rate, provided that Bonds the interest rate on which shall have been fixed for the remainder of the term thereof shall no longer be Variable Interest Rate Bonds.

“Vice-Chairperson” means the Vice-Chairperson of the District, or such officer of the District as may succeed to the duties and responsibilities of the Vice-Chairperson.

**The Pledge Effected by the Resolution**

The Bonds are special and limited obligations of the District payable, solely from and secured as to the payment of the principal and Redemption Price thereof, and interest thereon, in accordance with their terms and the provisions of the Resolution, solely from the Pledged Property. There are by the Resolution pledged and assigned as security for the payment of the principal and Redemption Price of, and interest on, the Bonds in accordance with their terms and the provisions of the Resolution, subject only to the provisions of the Resolution permitting the application thereof for the purposes and on the terms and conditions set forth in the Resolution, the Pledged Property.

**Establishment of Funds and Accounts; Application of Revenues**

The Resolution establishes the following Funds and Accounts:

(a) Construction and Acquisition Fund to be held by the District,

(b) Revenue Fund to be held by the District,

(c) Bond Fund to be held by the Paying Agent which shall consist of a Debt Service Account and a Reserve Account,

(d) Renewal and Replacement Account to be held by the District, and

(e) Senior Subordinated Debt Fund to be held by the District.

The District may, for accounting or allocation purposes, [i] establish one or more additional accounts or subaccounts within the Construction and Acquisition Account, the Revenue Fund, the Bond Fund or the Renewal and Replacement Account, or [ii] to the extent not expressly prohibited by other provisions hereof, commingle amounts between or among any or all of such Funds or Accounts, except the Senior Subordinated Debt Fund.

***Construction and Acquisition Fund.*** There shall be paid into the Construction and Acquisition Fund the amounts required to be so paid by the provisions of the Resolution, and there may be paid into the Construction and Acquisition Fund, at the option of the District, any monies received by the District from any source, unless required to be otherwise applied as provided by the Resolution. Amounts in the Construction and Acquisition Fund shall be applied to pay the Cost of Construction and Acquisition in the manner provided in the Resolution and the Supplemental Resolution authorizing a Series of Bonds to finance the Cost and Acquisition of a Project.

There shall be established within the Construction and Acquisition Fund a separate account for a Project.

The proceeds of insurance, if any, maintained pursuant to the Resolution against physical loss of or damage to the System, or of contractors' performance bonds or other assurances of completion with respect thereof, or pertaining to the period of construction thereof, shall be paid into the appropriate separate account in the Construction and Acquisition Fund.

The Secretary-Treasurer of the District shall make payments from the Construction and Acquisition Fund, except payments and withdrawals pursuant to the Resolution as described in the next paragraph, in the amounts, at the times, in the manner, and on the other terms and conditions set forth in the Resolution. The Secretary-Treasurer or other Authorized Officer of the District shall maintain adequate records in respect of all payments made, including [a] the particular account established within the Construction and Acquisition Fund from which such payment is to be made, [b] the name and address of the person, firm or corporation to whom payment is due, [c] the amount to be paid and [d] the particular item of the Cost of Construction and Acquisition to be paid and that the cost or the obligation in the stated amount is a proper charge against the Construction and Acquisition Fund which has not been previously paid. The Secretary-Treasurer shall issue a check for each payment required by such requisition or shall by interbank transfer or other method arrange to make the payment required by such requisition.

Notwithstanding any of the provisions of the Resolution as described under this caption, except as provided below, to the extent that other monies are not available therefor, amounts in the Construction and Acquisition Fund shall be applied to the payment of Principal Installments of and interest on Bonds when due; provided, however, that proceeds (and investment earnings thereon) from the issuance by the District of Senior Subordinated Debt shall not be subject to the priority in favor of the Bonds created by the Resolution, but may instead be pledged by the District as security and a source of payment first for the Senior Subordinated Debt pursuant to the resolution or resolutions of the District authorizing such Senior Subordinated Debt, in which event such amounts shall be applied to the payment of debt service on the Senior Subordinated Debt when due to the extent that other monies are not available therefor, and shall not be used to pay debt service on any Bonds if there is any Senior Subordinated Debt which remains outstanding and unpaid.

An adequate record of the completion of construction of a Project financed in whole or in part by the issuance of Bonds shall be maintained by an Authorized Officer of the District. The balance in the separate account in the Construction and Acquisition Fund established therefor shall be transferred to the Reserve Account in the Bond Fund, if and to the extent necessary to make the amount of such Account equal to the Debt Service Reserve Requirement, and any excess amount shall be paid over or transferred to the District for deposit in the Revenue Fund.

***Application of Revenues***.

All Revenues shall be promptly deposited by the District upon receipt thereof into the Revenue Fund.

There shall be withdrawn in each month the following amounts, for deposit as set forth below and in the order of priority set forth below.

(i) To the Bond Fund, [i] for credit to the Debt Service Account, the amount, if any, required so that the balance in such Account shall equal the Accrued Aggregate Debt Service as of the last day of the then current month or, if interest or principal are required to be paid to Holders of Bonds during the next succeeding month on a day other than the first day of such month, Accrued Aggregate Debt Service as of the day through and including which such interest or principal is required to be paid and [ii] for credit to the Reserve Account, the amount, if any, required for such Account, after giving effect to any surety bond, insurance policy, letter of credit or other similar obligation deposited in such Account pursuant to the Resolution, to equal one-twelfth (1/12) of the difference between [a] the amount then in the Reserve Account immediately preceding such deposit and [b] the actual Debt Service Reserve Requirement as of the last day of the then current month ; and

(ii) To the Senior Subordinated Debt Fund the amount, if any, required to pay the scheduled base and additional rental payments when due on the Senior Subordinated Debt and make deposits, if any, for reserves therefor, in accordance with the provisions of, and subject to the priorities and limitations and restrictions provided in, the Senior Subordinated Debt; and

(iii) Each month the District shall pay from the Revenue Fund such amounts as are necessary to meet Operating Expenses for such month; and

(iv) To the Renewal and Replacement Account, a sum equal to 1/12 of the amount, if any, provided in the Annual Budget to be deposited in the Renewal and Replacement Account during the then current Fiscal Year; provided that, if any such monthly allocation to the Renewal and Replacement Account shall be less than the required amount, the amount of the next succeeding monthly payment shall be increased by the amount of such deficiency.

The balance of monies remaining in the Revenue Fund after the above required payments have been made may be used by the District for any lawful purpose relating to the System; provided, however, that none of the remaining monies shall be used for any purpose other than those hereinabove specified unless all current payments and including all deficiencies in prior payments, if any, have been made in full and unless the District shall have complied fully with all the covenants and provisions of the Resolution.

So long as there shall be held in the Debt Service Account and the Reserve Account an amount sufficient to pay in full all Outstanding Bonds in accordance with their terms (including principal or applicable sinking fund Redemption Price and interest thereon), no transfers shall be required to be made to the Bond Fund; and provided further, that any deficiency in the Reserve Account, after giving effect to any surety bond, insurance policy or letter of credit deposited in such Account pursuant to the Resolution as described in the fourth paragraph under the caption "Bond Fund - Reserve Account" herein, other than a deficiency attributable to a withdrawal of amounts therefrom pursuant to the Resolution as described in the first paragraph under the caption "Bond Fund - Reserve Account" herein, shall be cured by depositing into the Reserve Account each month during the period commencing with the month following the month in which the determination of the deficiency was made an amount equal to one- twelfth (1/12th) of the deficiency, except that, if a new valuation of Investment Securities held in the Reserve Account is made pursuant to the Resolution during the period that such deposits are required, then the obligation of the District to make deposits during the balance of such period on the basis of the preceding valuation shall be discharged and the deposits, if any, required to be made for the balance of such period shall be determined under this proviso on the basis of the new valuation.

***Bond Fund - Debt Service Account***.

The Paying Agent, from amounts deposited therein, shall pay out of the Debt Service Account, [i] on or before each interest payment date for any of the Bonds, the amount required for the interest payable on such date, [ii] no later than each Principal Installment due date, the amount required for the Principal Installment payable on such due date and [iii] no later than any redemption date for the Bonds, the amount required for the payment of interest on the Bonds then to be redeemed. In the case of Variable Interest Rate Bonds, the District shall furnish the Paying Agent with a certificate setting forth the amount to be paid on such Bonds on each interest payment date, such certificate shall be furnished on or prior to the appropriate Record Date with respect to any interest payment date. Such amounts shall be applied by the Paying Agents on or after the due dates thereof. The Paying Agent shall also pay out of the Debt Service Account, from amounts deposited therein, the accrued interest included in the purchase price of Bonds purchased for retirement.

Amounts accumulated in the Debt Service Account with respect to any Sinking Fund Installment may be applied on or prior to the 40th day next preceding the due date of such Sinking Fund Installment, to [i] the purchase of Bonds of the Series and maturity for which such Sinking Fund Installment was established or [ii] the redemption at the applicable sinking fund Redemption Price of such Bonds, if then redeemable by their terms. All purchases of any Bonds pursuant to the Resolution as described in this paragraph shall be made at prices not exceeding the applicable sinking fund Redemption Price of such Bonds plus accrued interest. The applicable sinking fund Redemption Price (or principal amount of maturing Bonds) of any Bonds so purchased or redeemed shall be deemed to constitute part of the Debt Service Account until such Sinking Fund Installment date, for the purpose of calculating the amount of such Account. As soon as practicable after the 40th day preceding the due date of any such Sinking Fund Installment, the District shall proceed to call for redemption, by giving notice as provided in the Resolution, on such due date Bonds of the Series and maturity for which such Sinking Fund Installment was established (except in the case of Bonds maturing on a Sinking Fund Installment date) in such amount as shall be necessary to complete the retirement of the unsatisfied balance of such Sinking Fund Installment. The District shall pay out of the Debt Service Account to the appropriate Paying Agents, on or before such redemption date (or maturity date), the amount required for the redemption of the Bonds so called for redemption (or for the payment of such Bonds then maturing), and such amount shall be applied by such Paying Agents to such redemption (or payment).

Unless otherwise provided by the District, upon any purchase or redemption pursuant to the Resolution of Bonds of any Series and maturity for which Sinking Fund Installments shall have been established, there shall be credited, in increments of $5,000 to the extent practicable, toward each succeeding Sinking Fund Installment thereafter to become due on Bonds, of the same series and maturity (other than the Sinking Fund Installment next coming due) an amount bearing the same ratio, to the Sinking Fund Installment, as the total principal amount of Bonds purchased or redeemed bears to the total principal amount of all the Sinking Fund Installments to be credited. The portion of any principal Sinking Fund Installment remaining after the deduction of any such amounts are credited toward the same shall constitute the unsatisfied balance of such Sinking Fund Installment for the purpose of calculation of Sinking Fund Installments due on a future date.

The amount, if any, deposited in the Debt Service Account from the proceeds of each Series of Bonds shall be set aside in such Account and applied to the payment of interest on Bonds as provided in the Resolution or in accordance with certificates of the District delivered pursuant to the Resolution or, if the District shall modify or amend any such certificate by a subsequent certificate signed by an Authorized Officer of the District, then in accordance with the most recent amended certificate.

In the event of the refunding of any Bonds, the District may withdraw from the Debt Service Account in the Bond Fund all, or any portion of, the amounts accumulated therein with respect to Debt Service on the Bonds being refunded and deposit such amounts with itself to be held for the payment of the principal or Redemption Price, if applicable, and interest on the Bonds being refunded; provided that such withdrawal shall not be made unless (a) immediately thereafter Bonds being refunded shall be deemed to have been paid pursuant to the Resolution as described herein under the caption "Defeasance," and (b) the amount remaining in the Debt Service Account in the Bond Fund, after giving effect to the issuance of Refunding Bonds and the disposition of the proceeds thereof, shall not be less than the requirement of such Account pursuant to the Resolution in the second paragraph under this caption. In the event of such refunding, the District may also withdraw from the Debt Service Account in the Bond Fund all, or any portion of, the amounts accumulated therein with respect to Debt Service on the Bonds being refunded and deposit such amounts in any fund or Account under the Resolution; provided, however, that such withdrawal shall not be made unless items (a) and (b) referred to hereinabove have been satisfied and provided, further, that, at the time of such withdrawal, there shall exist no deficiency in any Fund or Account held under the Resolution, as confirmed in writing to the Bond Registrar by the Secretary- Treasurer.

***Bond Fund - Reserve Account.***

If five days prior to any interest or Principal Installment due date with respect to any Series of Bonds payment for such interest or Principal Installment in full has not been made or provided for, the District shall forthwith withdraw from the Reserve Account an amount not exceeding the amount required to provide or such payment in full and deposit such amount in the Debt Service Account for application to such payment.

Whenever the amount in the Reserve Account shall exceed the Debt Service Reserve Requirement, after giving effect to any surety bond, insurance policy or letter of credit deposited in such Account pursuant to the Resolution as described in the fourth paragraph under this caption, such excess shall be deposited in the Debt Service Account.

Whenever the amount in the Reserve Account (exclusive of any surety bond, letter of credit or insurance policy therein), together with the amount in the Debt Service Account is sufficient to pay in full all Outstanding Bonds in accordance with their terms (including principal or applicable sinking fund Redemption Price and interest thereon), the funds on deposit in the Reserve Account shall be transferred to the Debt Service Account. Prior to said transfer, all investments held in the Reserve Account shall be liquidated to the extent necessary in order to provide for the timely payment of principal and interest (or Redemption Price) on the Bonds.

In lieu of the required transfers or deposits to the Reserve Account, the District may cause to be deposited into the Reserve Account a surety bond or an insurance policy for the benefit of the holders of the Bonds or a letter of credit in an amount equal to the difference between the Debt Service Reserve Requirement and the sums then on deposit in the Reserve Account, if any, after the deposit of such surety bond, insurance policy or letter or credit. Such difference may be withdrawn by the District and be deposited in the Revenue Fund. The surety bond, insurance policy or letter of credit shall be payable (upon the giving of notice as required thereunder) on any due date on which monies will be required to be withdrawn from the Reserve Account and applied to the payment of a Principal Installment of or interest on any Bonds and such withdrawal cannot be met by amounts on deposit in the Reserve Account. If a disbursement is made pursuant to a surety bond, an insurance policy or a letter of credit provided pursuant to this subsection, the District shall be obligated either (i) to reinstate the maximum limits of such surety bond, insurance policy or letter of credit or (ii) to deposit into the Reserve Account, funds in the amount of the disbursement made under such surety bond, insurance policy or letter of credit, or a combination of such alternatives, as shall provide that the amount in the Reserve Account equals the Debt Service Reserve Requirement. Any other provision under this caption to the contrary notwithstanding, for each particular Series of Bonds or portion thereof which is insured by an Insurer, the right of the District under the Resolution to cause a surety bond or an insurance policy to be deposited into the Reserve Account in lieu of the required transfers or deposits thereto shall be subject to the condition that the District obtain the prior written consent of the Insurer as to the structure and the issuer of such surety bond or insurance policy.

In the event of the refunding of any Bonds, the District may withdraw from the Reserve Account in the Bond Fund all, or any portion of, the amounts accumulated therein with respect to the Bonds being refunded and deposit such amounts with itself to be held for the payment of the principal or Redemption Price, if applicable, and interest on the Bonds being refunded; provided that such withdrawal shall not be made unless (a) immediately thereafter the Bonds being refunded shall be deemed to have been paid pursuant to the Resolution as described in the second paragraph under the caption "Defeasance" herein, and (b) the amount remaining in the Reserve Account in the Bond Fund, after giving effect to the issuance of the Refunding Bonds and the disposition of the proceeds thereof, shall not be less than the Debt Service Reserve Requirement.

If any withdrawals are made from the Reserve Account pursuant to the Resolution, the resulting deficiency, if any, shall be remedied by the application of monthly payments into the Reserve Account as set forth in the Resolution, or by transfers from the Renewal and Replacement Account or both, until the amount on deposit in the Reserve Account is equal to the Debt Service Reserve Requirement, whereupon such deposits shall be discontinued until such time, if any, that there is again a deficiency.

***Renewal and Replacement Account.***

Monies to the credit of the Renewal and Replacement Account may be applied to the cost of major replacements, repairs, renewals, maintenance, betterments, improvements, reconstruction or extensions of the System or any part thereof as may be determined by the Board.

If at any time the monies in the Debt Service Account, the Reserve Account and the Revenue Fund shall be insufficient to pay the interest and Principal Installments becoming due on the Bonds, then the District shall transfer from the Renewal and Replacement Account for deposit in the Debt Service Account the amount necessary (or all the monies in said Fund if less than the amount necessary) to make up such deficiency.

Any balance of monies and securities in the Renewal and Replacement Account not required to meet a deficiency as set forth above or for any of the purposes for which the Renewal and Replacement Account was established, may, on direction of the District, be transferred from the Renewal and Replacement Account to the Reserve Account, if and to the extent necessary to make the amount in such Account equal to the Debt Service Reserve Requirement, and any balance may be deposited in the Debt Service Account or the Revenue Fund.

***Senior Subordinated Debt Fund.***

Subject to the provisions of the Resolution described in the next paragraph, the District shall apply amounts in the Senior Subordinated Debt Fund to the payment of debt service or the scheduled base and additional rental payments when due on the Senior Subordinated Debt and make deposits, if any, for reserves therefor in accordance with the provisions of, and subject to the priorities and limitations and restrictions provided in, the Senior Subordinated Debt.

Notwithstanding any of the other provisions of the Resolution described under this caption, if at any time the amount on deposit in the Reserve Account shall be less than the Debt Service Reserve Requirement, the District shall forthwith transfer from the Senior Subordinated Debt Fund for deposit in the Reserve Account the amount necessary (or all moneys in said Senior Subordinated Debt Fund, if necessary) to make up such deficiency.

Amounts in the Senior Subordinated Debt Fund which the District at any time determines to be in excess of the requirements of such fund may, at the discretion of the District, be transferred to the Debt Service Account or the Renewal and Replacement Account.

**Investments**

In making any investment in any Investment Securities with monies in any Fund or Account established under the Resolution, the District may combine, to the extent permitted by law, or instruct such Fiduciary to combine, such monies with monies in any other Fund or Account, but solely for purposes of making such investment in such Investment Securities.

Monies held in the Bond Fund, the Revenue Fund, the Renewal and Replacement Account, the Senior Subordinated Debt Fund and the Construction and Acquisition Fund shall be invested and reinvested to the fullest extent practicable in Investment Securities, maturing not later than such times as shall be necessary to provide monies when needed for payments to be made from such Fund or Account. The Fiduciary, shall make all such investments of monies held by it in accordance with written instructions from time to time received from an Authorized Officer of the District.

Interest (net of that which represents a return of accrued interest) or gain realized on investments in such Funds and Accounts other than the Reserve Account of the Bond Fund, shall be paid into the Revenue Fund, provided that gain realized from the liquidation of an investment shall be governed by the provisions described below. Interest earned or gain realized on investments in the Reserve Account shall be transferred to the Debt Service Account, provided that gain realized from the liquidation of an investment shall be governed by the provisions of the Resolution as described in the first paragraph under the caption "Valuation and Sale of Investments" herein.

Nothing in the Resolution shall prevent any Investment Securities acquired as investments of or security for funds held under the Resolution from being issued or held in book-entry form on the books of the Department of the Treasury of the United States.

Nothing in the Resolution shall preclude any Fiduciary from investing or reinvesting monies through its respective trust department; provided, however, that the District may, in its discretion, direct that such monies be invested or reinvested in a manner other than through such respective trust department.

**Valuation and Sale of Investments**

Obligations purchased as an investment of monies in any Fund or Account created under the provisions of the Resolution shall be deemed at all times to be a part of such Fund or Account. Any profit realized from the liquidation of such investment shall be credited to such Fund or Account, and any loss resulting from the liquidation of such investment shall be charged to the respective Fund or Account.

In computing the amount in any Fund or Account created under the provisions of the Resolution for any purpose provided in the Resolution, investments shall be valued at the then market price (as of the time of valuation) thereof. The accrued interest paid in connection with the purchase of an investment shall be included in the value thereof until interest on such investment is paid. Such computation shall be determined on June 30 and December 31 in each Fiscal Year and at such other times as the District shall determine.

**Additional Bonds**

One or more Series of Additional Bonds may be authenticated and delivered upon original issuance at any time or from time to time for the purpose of paying all or a portion of the Cost of Construction and Acquisition of a Project. The proceeds, including accrued interest, of the Additional Bonds of each Series shall be applied simultaneously with the delivery of such Bonds as provided in the Supplemental Resolution authorizing such Series. The conditions for the issuance of Additional Bonds to finance the Acquisition and Construction of Additional Facilities include a certificate of an Authorized Officer of the District setting forth (A) for any period of 12 consecutive calendar months within the 24 calendar months preceding the date of the authentication and delivery, the Net Revenues for such period, and (B) the Aggregate Net Debt Service during the same period for which Net Revenues are computed, with respect to all Series of Bonds which were then Outstanding (excluding from Aggregate Net Debt Service any Principal Installment or portion thereof which was paid from sources other than Net Revenues), and showing that the amount set forth in (A) is equal to or greater than 110% of the amount set forth in (B). The conditions for the issuance of Additional Bonds to finance the Acquisition and Construction of Additional Facilities include a certificate of an Authorized Officer of the District setting forth (A) for the last full Fiscal Year of 12 months (ending June 30) immediately preceding the date of the authentication and delivery, the Net Revenues for such period, or, at the option of the District, for the last 12 consecutive full calendar months immediately preceding the date of the authentication and delivery, the Net Revenues for such period, and (B) the estimated maximum Aggregate Net Debt Service in the current or any future Fiscal Year with respect to [i] all Series of Bonds which are then Outstanding and [ii] the Additional Bonds then proposed to be authenticated and delivered (and for this purpose all Series of Bonds Outstanding plus such proposed Additional Bonds shall be treated as a single Series; that is, the maximum Aggregate Net Debt Service shall be computed collectively with respect to all such Bonds, and not computed cumulatively or separately for each particular Series), and showing that the amount set forth in (A) is equal to or greater than 110% of the amount set forth in (B). For purposes of computing the amount set forth in (A), Net Revenues may be increased to reflect the following amounts: [i] any increases in the rates, fees, rents and other charges for services of the System made subsequent to the commencement of such period and prior to the date of such certificate, [ii] any estimated increases in Net Revenues caused by any Project or Projects having been placed into use and operation subsequent to the commencement of such period and prior to the date of such certificate, as if such Project or Projects had actually been placed into use and operation for the entire period chosen in (A) above and [iii] 75% of any estimated increases in Net Revenues which would have been derived from the operation of any Project or Projects with respect to which the Cost of Construction and Acquisition is to be paid from proceeds of the Additional Bonds proposed to be authenticated and delivered, as if such Project or Projects had actually been placed into use and operation for the entire period chosen in (A) above.

**Refunding Bonds**

One or more Series of Refunding Bonds may be issued at any time to refund [i] Outstanding Bonds of one or more Series or [ii] one or more maturities within a Series of any Bonds. Refunding Bonds shall be issued in a principal amount sufficient, together with other monies available therefor, to accomplish such refunding and to make the deposits in the Funds and Accounts under the Resolution required by the provisions of the Supplemental Resolution authorizing such Bonds.

Refunding Bonds of each Series shall be authenticated and delivered by the Bond Registrar only upon satisfaction of the following conditions (in addition to the other documents required by the Resolution) of: [i] Instructions to the Bond Registrar, satisfactory to it, to give due notice of redemption, if applicable, of all the Bonds to be refunded on a redemption date or dates specified in such instructions, subject to the provisions of the Resolution described hereinafter under the caption “Defeasance”; [ii] if the Bonds to be refunded are not by their terms subject to redemption or will not be redeemed within the next succeeding 60 days, instructions to the escrow agent described in the Resolution, satisfactory to it, to mail the notice provided for in the Resolution described hereinafter under the caption “Defeasance” to the Holders of the Bonds being refunded; [iii] either (a) cash (including cash withdrawn and deposited pursuant to the Resolution as described herein under the captions “Bond Fund - Debt Service Account” and “Bond Fund - Reserve Account,” respectively) in an amount sufficient to effect payment at the applicable Redemption Price of the Bonds to be refunded, together with accrued interest on such Bonds to the redemption date, which monies shall be held by the escrow agent described in the Resolution or any one or more of the Paying Agents in a separate account irrevocably in trust for and assigned to the respective Holders of the Bonds to be refunded or (b) Investment Securities in such principal amounts, of such maturities, bearing such interest, and otherwise having such terms and qualifications and any monies, as shall be necessary to comply with the provisions of the Resolution as described herein under the caption “Defeasance”, which Investment Securities and monies shall be held in trust and used only as provided in the Resolution described hereinafter under the caption “Defeasance”; and [iv] such further documents and monies as are required by the provisions of the Resolution or any Supplemental Resolution adopted pursuant to the Resolution.

The proceeds, including accrued interest, of the Refunding Bonds of each Series shall be applied simultaneously with the delivery of such Bonds for the purposes of making deposits in such Funds and Accounts under the Resolution as shall be provided by the Supplemental Resolution authorizing such Series of Refunding Bonds and shall be applied to the refunding purposes thereof in the manner provided in such Supplemental Resolution.

**Subordinated Debt**

The District may, at any time, or from time to time, issue debt or enter into a contract, lease, installment sale agreement or other instrument or lend credit to or guarantee debts, claims or other obligations of any person for any of its corporate purposes payable out of, and which may be secured by a pledge of, such amounts as may from time to time be available for the purpose of payment thereof; provided, however, that such pledge shall be, and shall be expressed to be, subordinate and junior in all respects to the pledge and lien created by the Resolution as security for the Bonds.

**Creation of Liens; Sale and Lease of Property**

The District shall not issue any bonds, notes, debentures or other evidences of indebtedness of similar nature, other than the Bonds, payable out of or secured by a pledge or assignment of the Pledged Property and shall not create or cause to be created any lien or charge on the Pledged Property; provided, however, that nothing contained in the Resolution shall prevent the District from issuing, if and to the extent permitted by law [i] evidences of indebtedness (a) payable out of monies in the Construction and Acquisition Fund as part of the Cost of Construction and Acquisition of the System or (b) payable out of, or secured by a pledge or assignment of, Revenues to be received on and after such date as the pledge of the Pledged Property provided in the Resolution shall be discharged and satisfied as provided in the Resolution or [ii] Subordinated Debt.

Facilities of the System shall not be sold, leased, mortgaged or otherwise disposed of, except as follows: A. The District may sell or exchange at any time and from time to time any property or facilities constituting part of the System, at such consideration as the District in its sole discretion deems reasonable or appropriate under all the circumstances, but only if it shall determine that ownership by the District of such property or facilities is not necessary or is not material for the purposes of the District in the operation of the System as a whole; or B. The District may lease or make contracts or grant licenses for the operation of, or make arrangements for the use of, or grant easements or other rights with respect to, any part of the System, provided that any such lease, contract, license, arrangement, easement or right [i] does not materially impede the operation by the District or its agents of the System and [ii] does not materially impair or adversely affect the rights or security of the Bondholders under the Resolution.

**Operation and Maintenance of System**

The District shall at all times use its best efforts to operate or cause to be operated the System properly and in an efficient and economical manner, and shall use its best efforts to maintain, preserve and keep the same or cause the same to be so maintained, preserved and kept, with the appurtenances and every part and parcel thereof, in good repair, working order and condition, and shall from time to time make or cause to be made, all necessary and proper repairs, replacements and renewals so that at all times the operation of the System may be properly and advantageously conducted. In rendering any report, certificate or opinion requested pursuant to the Resolution, an Authorized Officer of the District may rely upon information, certificates, opinions or reports required to be provided by others pursuant to the Resolution, and upon other sources which an Authorized Officer of the District considers reliable, and other considerations and assumptions as deemed appropriate by an Authorized Officer of the District.

**Annual Budget**

On or before the first day of each Fiscal Year commencing with the Fiscal Year beginning July 1, 1993, the District shall prepare and adopt an Annual Budget for operating purposes for the ensuing Fiscal Year and will furnish copies thereof to any holder of any Bond. Said Annual Budget shall set forth in reasonable detail the estimated Revenues and Operating Expenses and other anticipated expenditures relating to the System for such Fiscal Year. Following the end of each fiscal quarter and at such other times as the District shall determine, the District shall review its estimates set forth in the Annual Budget for such Fiscal Year, and if a material change has occurred in such estimates, the District also may at any time adopt an amended Annual Budget for the remainder of the then current Fiscal Year.

**Rents, Rates, Fees and Charges**

The District shall fix, establish, maintain and collect rates, fees, rents and charges for services of the System, which, together with other "Available Revenues" (as hereinafter defined) are expected to produce Available Revenues which will be at least sufficient for each Fiscal Year to pay the sum of: [a] an amount equal to 110% of the Aggregate Net Debt Service for such Fiscal Year; and [b] the amount, if any, to be paid during such Fiscal Year into the Reserve Account in the Bond Fund (other than amounts required to be paid into such Account out of the proceeds of Bonds); and [c] all Operating Expenses for such Fiscal Year as estimated in the Annual Budget; and [d] to the extent not included in the foregoing, an amount equal to the debt service on the Senior Subordinated Debt, any other Subordinated Debt or other debt of the District for such Fiscal Year computed as of the beginning of such Fiscal Year; and [e] amounts necessary to pay and discharge all charges or liens payable out of the Available Revenues when due and enforceable.

For purposes of the preceding paragraph, "Available Revenues" means (i) revenues from all rates, rents and charges and other operating income derived or to be derived by the District from or for the operation, use or services of the System, (ii) any other amounts received from any other source by the District and pledged by the District as security for the payment of Bonds and (iii) interest received or to be received on any moneys or securities held pursuant to the Resolution and paid or required to be paid into the Revenue Fund or required to be retained in the Debt Service Account in the Bond Fund or transferred to the Debt Service Account in the Bond Fund. "Available Revenues" will exclude, however, any interest income which is capitalized pursuant to generally accepted accounting principles and the enterprise basis of accounting for governmental enterprises, as promulgated by the Governmental Accounting Standards Board, and governmental grants, in-kind contributions of assets and any assessments levied by the District to the extent that such grants, in-kind contributions and assessments are not recognized as operating revenues, other revenues or extraordinary gains pursuant to generally accepted accounting principles for governmental enterprises, as promulgated by the Governmental Accounting Standards Board. Nothing herein under this caption or in the definition of "Available Revenues" for purposes of the covenant described in the preceding paragraph, shall be construed so as to prohibit the District from taking into account interest earned on moneys or securities held under the Resolution, and other income available or expected to be available in the ordinary course for the payment of Debt Service pursuant to the Resolution, in calculating Aggregate Net Debt Service on the Bonds for any calculation period for purposes hereof or otherwise, nor prohibit the District from taking into account interest earned on moneys or securities held under any Resolution or indenture or similar document adopted or entered into in connection with an issuance of Subordinated Debt, and other income available or expected to be available in the ordinary course for the payment of debt service on Subordinated Debt, in calculating debt service payable on Subordinated Debt for any calculation period for purposes hereof or otherwise.

Promptly upon [i] any material decrease in the Revenues anticipated to be produced by any rates, fees, rents or charges or any later review thereof, [ii] any material increase in expenses of operation of the System not contemplated at the time of adoption of the rates, fees, rents and charges then in effect or any later review thereof or [iii] any other material change in the circumstances which were contemplated at the time such rates, fees, rents and charges were most recently reviewed, but not less frequently than once every 12 months, the District shall review the rates, fees, rents and charges so established and shall promptly establish or revise such rates, fees, rents and charges as necessary to comply with the foregoing requirements, provided that such rates, fees, rents and charges shall in any event produce Revenues sufficient, together with other Revenues, if any, available therefor, to enable the District to comply with all its covenants under the Resolution.

In estimating Aggregate Debt Service or Aggregate Net Debt Service on any Variable Interest Rate Bonds for purposes of the first paragraph under this caption, the District shall be entitled to assume that such Variable Interest Rate Bonds will bear such interest rate or rates as the District shall determine; provided, however, that the interest rate or rates assumed shall not be less than the interest rate borne by such Variable Interest Rate Bonds at the time such estimate is made.

**Insurance**

***Maintenance of Insurance.***

The District shall provide protection for the System to the extent necessary to properly conduct the business of the System. Said protection may consist of insurance, self-insurance and indemnities. Any insurance shall be in the form of policies or contracts for insurance with insurers of good standing, shall be payable to the District and may provide for such deductibles, exclusions, limitations, restrictions and restrictive endorsements customary in policies for similar coverage issued to entities operating properties similar to the properties of the System.

***Application of Insurance Proceeds.***

In the event of any loss or damage to the System covered by insurance, the District will, with respect to each such loss, promptly repair, reconstruct or replace the parts of the System affected by such loss or damage to the extent necessary to the proper conduct of the operation of the business of the System, shall cause the proceeds of such insurance to be applied for that purpose to the extent required therefor, and pending such application shall hold the proceeds of any insurance policy covering such damage or loss in trust to be applied for that purpose to the extent required therefor. Any excess insurance proceeds received by the District shall be transferred to the Revenue Fund.

**Accounts and Reports**

The District shall keep or cause to be kept proper books of record and account (separate from all other records and accounts) in which complete and correct entries shall be made of its transactions relating to the System and each Fund and Account established under the Resolution and which, together with all other books and papers of the District, including insurance policies, relating to the System, shall at all times be subject to the inspection of the Bondholders and the Holders of an aggregate of not less than ten percent (10%) in principal amount of the Bonds then Outstanding or their representatives duly authorized in writing.

The District shall annually, within 180 days after the close of each Fiscal Year commencing with the Fiscal Year ending June 30, 1993, prepare an audit for such Fiscal Year, accompanied by a certificate of an Accountant relating to the System which shall include the following statements in reasonable detail: a statement of assets and liabilities as of the end of such Fiscal Year; and a statement of Revenues and Operating Expenses for such Fiscal Year. Such Certificate shall state whether or not, to the knowledge of the signer, the District is in default with respect to any of the covenants, agreements or conditions on its part contained in the Resolution, and if so, the nature of such default.

The reports, statements and other documents required pursuant to any provisions of the Resolution shall be available for the inspection of Bondholders and shall be mailed to each Bondholder who shall file a written request therefor with the District. The District may charge for such reports, statements and other documents, a reasonable fee to cover reproduction, handling and postage.

**Tax Covenants Relating to the Internal Revenue Code**

The District shall do the following with respect to Bonds which, when initially issued, are the subject of an Opinion of Counsel to the effect that interest thereon is excluded from gross income for Federal income tax purposes pursuant to the Internal Revenue Code of 1986 or any successor thereto (the “Code”): [a] in order to maintain the exclusion of interest on the Bonds from gross income for Federal income tax purposes, and for no other purpose, the District shall comply with the Code; [b] in furtherance of the covenant contained in the preceding paragraph, the District shall make any and all payments required to be made to the United States Department of the Treasury in connection with the Bonds pursuant to Section 148(f) of the Internal Revenue Code; and [c] Notwithstanding any other provision of the Resolution to the contrary, so long as necessary in order to maintain the exclusion from gross income of interest on the Bonds for Federal income tax purposes, the covenants contained in this Section thereon, including any payment or defeasance thereof pursuant to the Resolution as described under the caption “Defeasance” herein.

**Events of Default**

Each of the following events (being those provided by Section 76.160 of the Kentucky Revised Statutes) is hereby declared an “event of default”; that is, if: [a] payment of the principal of any of the Bonds is not made on the date therein specified for payment thereof, nor within thirty (30) days thereafter, or payment of any installment of interest is not made on the date specified for such payment, nor within thirty (30) days thereafter, or [b] default shall be made in the due and punctual observance or performance of any of the covenants, conditions and agreements on the part of the District, in the Bonds or in the Resolution, or in any pertinent law contained, and such default shall continue for a period of thirty (30) days.

**Rights Arising Upon Occurrence of Event of Default**

That upon the happening of any event of default specified in the Resolution as described immediately above, the provisions of said Section 76.160 of Kentucky Revised Statutes shall become operative, and the holder or holders of twenty percent (20%) in principal amount or more of the Bonds then Outstanding pursuant to the Resolution may, by an instrument or instruments filed in the office of the County Clerk of Jefferson County, Kentucky, and approved or acknowledged in the same manner as a deed to be recorded, apply to a Judge in the Circuit Court of such County to appoint a trustee to represent all of the Bondholders. Upon such application, such Judge shall appoint a trustee and such trustee may, and upon the written request of the holder or holders of twenty percent (20%) in principal amount or more of the Bonds Outstanding under the Resolution, shall, in his or its name, (a) by mandamus or other suit, action or proceeding at law, or in equity, including mandatory injunction, enforce all rights of the District to collect rates, rentals and other charges adequate to carry out any agreement as to, or pledge of, the revenues and income of the District, and to require the District and its officers to carry out any other agreement with the Bondholders and to perform its and their duties imposed by law; (b) bring suit upon the Bonds; (c) by action or suit in equity require the District to account as if it were the trustee of an express trust for the Bondholders; (d) by action or suit in equity enjoin any acts or things which may be unlawful or in violation of the rights of Bondholders; (e) declare all Bonds due and payable; and (f) pursue any other rights or remedies available at law or in equity. For any Bonds registered in Book-Entry Form, notwithstanding the above definition of "Bondholder," the Paying Agent shall be entitled to rely upon written instructions from a majority of the beneficial owners of the Bonds with reference to consent, if any, required from Holders pursuant to the terms of the Resolution.

Any such trustee, whether or not all Bonds have been declared due and payable, shall be entitled as of right upon application to such Court to the appointment of a receiver, who may enter upon and take possession of the System, or any part or parts thereof, and operate and maintain the same, and collect and receive all rentals, rates, and other charges, and other revenues and income, of the District, thereafter arising therefrom, in the same manner as the District and its officers might do, and shall deposit all such monies in a separate account and apply the same in such manner as such Court shall direct. In any suit, action or proceeding, by the trustee, the fees, counsel fees and expenses of the trustee and of the receiver, if any, shall constitute disbursements taxable as costs. All costs and disbursements allowed by the Court shall be a first charge on any revenue and income derived from the System. Such trustee shall, in addition to the foregoing, have and possess all of the powers necessary or appropriate for the exercise of any functions specifically set forth herein or incident to the general representation of the Bondholders in the enforcement and protection of their rights.

**Rights of Insurer**

Any other provision of the Resolution to the contrary notwithstanding, and to the extent permitted by law (including the Act), for each particular Series of Bonds or portion thereof that is insured by an Insurer, the exercise by the court appointed trustee or the Bondholders of any rights, powers or privileges granted thereto in the Resolution shall require the written consent of the Insurer, if the Insurer is not then in breach or default of its obligations under its insurance policy.

**Bond Registrar; Paying Agents**

The Resolution permits the appointment by the District of a Bond Registrar and one or more Paying Agents. Any Paying Agent or Bond Registrar may at any time resign and be discharged of the duties and obligations created by the Resolution by giving at least 60 days written notice to the District and the other Paying Agents or Bond Registrars. Any Paying Agent or Bond Registrar may be removed at any time by an instrument filed with such Paying Agent or Bond Registrar and signed by an Authorized Officer of the

District. Any successor Paying Agent or Bond Registrar shall be appointed by the District and shall be a bank or trust company organized under the laws of any state of the United States or a national banking association, having capital stock, surplus and undivided earnings aggregating at least $10,000,000, and willing and able to accept the office on reasonable and customary terms and authorized by law to perform all the duties imposed upon it by the Resolution.

**Amendments and Supplemental Resolutions**

Any modification or amendment of the Resolution and of the rights and obligations of the District and of the Holders of the Bonds thereunder, in any particular, may be made by a Supplemental Resolution, with the written consent given as provided in the Resolution of [i] the Holders of at least a majority in principal amount of the Bonds Outstanding at the time such consent is given and [ii] if less than all of the Series of Bonds then Outstanding are affected by the modification or amendment, the Holders of at least a majority in principal amount of the Bonds of each Series so affected and Outstanding at the time such consent is given; provided that if such modification or amendment will, by its terms, not take effect so long as any Bonds of any specified like Series and maturity remain Outstanding, the consent of the Holders of such Bonds shall not be required and such Bonds shall not be deemed to be Outstanding for the purpose of any calculation of Outstanding Bonds under this Section. No such modification or amendment shall permit a change in the terms of redemption (including Sinking Fund Installments) or maturity of the principal of any Outstanding Bond or of any installment of interest thereon or a reduction in the principal amount or the Redemption Price thereof or in the rate of interest thereof without the consent of the Holder of such Bond, or shall reduce the percentages or otherwise affect the classes of Bonds the consent of the Holders of which is required to effect any such modification or amendment, or shall change or modify any of the rights or obligations of any Fiduciary without its written assent thereto. For the purpose of this caption, a Series shall be deemed to be affected by a modification or amendment of the Resolution if the same adversely affects or diminishes the rights of the Holders of Bonds of such Series. The District may in its sole discretion determine whether or not, in accordance with the foregoing powers of amendment, Bonds of any particular Series or maturity would be affected by any modification or amendment of the Resolution and any such determination shall be binding and conclusive on the District and all Holders of Bonds.

For any one or more of the following purposes and at any time or from time to time, a Supplemental Resolution of the District may be adopted, which, when adopted, shall be fully effective in accordance with its terms: [l] to close the Resolution against, or provide limitations and restrictions in addition to the limitations and restrictions contained in the Resolution on, the authentication and delivery of Bonds or the issuance of other evidences of indebtedness; or [2] to add to the covenants and agreements of the District in the Resolution, other covenants and agreements to be observed by the District which are not contrary to or inconsistent with the resolutions as theretofore in effect; or [3] to add to the limitations and restrictions in the Resolution, other limitations and restrictions to be observed by the District which are not contrary to or inconsistent with the Resolution as theretofore in effect; or [4] to authorize Bonds of a Series; or [5] to authorize one or more series of Subordinated Debt; or [6] to authorize, in compliance with all applicable law, Bonds of each Series to be issued in the form of coupon Bonds; or [7] to authorize, in compliance with all applicable law, Bonds of each Series to be issued in the form of Bonds issued and held in book-entry form on the books of the District or any Fiduciary appointed for that purpose by the District; or [8] notwithstanding any other provisions of the Resolution, to authorize Bonds of a Series having terms and provisions different than the terms and provisions theretofore provided in the Resolution; or [9] to confirm, as further assurance, any pledge or assignment under, and the subjection to any security interest, pledge or assignment created or to be created by, the Resolution of the Pledged Property and Credit Facilities or other agreements; or [10] to comply with the provisions of any federal or state securities law, including, without limitation, the Trust Indenture Act of 1939, as amended or comply with Section 103 of the Internal Revenue Code of 1986 or 1954, as applicable, as amended, or successor provisions; or [11] to modify any of the provisions of the Resolution in any other respect whatever, provided that [i] such modification shall be, and be expressed to be, effective only after all Bonds of each Series Outstanding at the date of the adoption of such Supplemental Resolution shall cease to be Outstanding and [ii] such Supplemental Resolution shall be specifically referred to in the text of all Bonds of any Series authenticated and delivered after the date of the adoption of such Supplemental Resolution and of Bonds issued in exchange therefore or in place thereof; or [12] to cure any ambiguity, defect or inconsistency provided that there is no material adverse impact on Bondholders.

**Consent of the Insurer When Consent of Bondholder Required; Notice**

The Insurer, and not the registered Holders thereof, shall be deemed to be the Holder of Bonds of any Series as to which it is the Insurer at all times for the purpose of giving any approval or consent to the execution and delivery of any Supplemental Resolution or any amendment, change or modification of the Resolution which, as specified in the Resolution, requires the written approval or consent of the Holders of at least a majority in aggregate principal amount of Bonds of such Series at the time Outstanding. In such cases where the consent of the Insurer shall be necessary pursuant to the Resolution for the execution of a particular amendment, the District shall be required to send a copy of such amendment to S&P's. In addition, in such cases where the consent of the Insurer shall not be necessary pursuant to the Resolution for the execution of a particular amendment, the District shall provide the Insurer with written notice of such amendment prior to or within a reasonable time after the execution thereof.

**Defeasance**

If the District shall pay or cause to be paid, or there shall otherwise be paid, to the Holders of all Bonds the principal or Redemption Price, if applicable, and interest due or to become due thereon, at the times and in the manner stipulated in the Bonds and in the Resolution, then the pledge of the Pledged Property and all covenants, agreements and other obligations of the District to the Bondholders, shall thereupon cease, terminate and become void and be discharged and satisfied.

Bonds or interest installments, or portions thereof, for the payment or redemption of which monies shall have been set aside and shall be held in trust by the Paying Agents (through deposit by the District of funds for such payment or redemption or otherwise) at the maturity or redemption date thereof shall be deemed to have been paid within the meaning and with the effect expressed in the Resolution. Subject to the provisions of the Resolution, any Outstanding Bonds shall prior to the maturity or redemption date thereof be deemed to have been paid within the meaning and with the effect expressed in the Resolution if the following conditions are met: (a) if any of such Bonds are to be redeemed on any date prior to their maturity, the District shall have instructed the Bond Registrar to mail as provided in the Resolution notice of redemption of such Bonds (other than Bonds which have been purchased or otherwise acquired by the District and delivered to the Bond Registrar as hereinafter provided prior to the mailing of notice of redemption), (b) there shall have been deposited with an escrow agent either cash (including amounts, if any, withdrawn and deposited pursuant to the Resolution as described herein under the captions "Bond Fund--Debt Service Account" and "Bond Fund--Reserve Account") in an amount which shall be sufficient, or Defeasance Obligations (including any Defeasance Obligations issued or held in book-entry form on the books of the Department of the Treasury of the United States) the principal of and the interest on which when due will provide cash which, together with any other cash on deposit with the escrow agent, shall be sufficient, to pay when due the principal or Redemption Price, if applicable, and interest due and to become due on the Bonds on or prior to the redemption date or maturity date thereof, as the case may be and (c) if the Bonds are not by their terms subject to redemption within the next succeeding 60 days, the District shall have instructed the Bond Registrar to mail a notice to the Holders of such Bonds to be paid or redeemed, that the deposit required by (b) above has been made and that the Bonds are deemed to have been paid in accordance with this Section and stating the maturity or redemption date upon which monies are expected to be available for the payment.

Such escrow agent shall, as and to the extent necessary, apply amounts held by it pursuant to this Section to the retirement of Bonds in amounts equal to the unsatisfied balances (determined as provided in the Resolution as described herein under the caption "Bond Fund--Debt Service Account") of any Sinking Fund Installments with respect to such Bonds, all in the manner provided in the Resolution. The escrow agent shall, if so directed by the District prior to the maturity or redemption date, as applicable, of Bonds deemed to have been paid in accordance with the provisions of the Resolution described under this caption, apply cash, redeem or sell Defeasance Obligations so deposited with such escrow agent and apply the proceeds thereof, together with any cash on deposit with the escrow agent, to the purchase of such Bonds (and the Bond Registrar shall immediately thereafter cancel all such Bonds so purchased and delivered to it); provided, however, that the cash and Defeasance Obligations remaining on deposit with such escrow agent after the purchase and cancellation shall be sufficient to pay when due the principal or Redemption Price, as applicable, and interest due or to become due on all remaining Bonds in respect of which such cash and Defeasance Obligations are being held by such escrow agent on or prior to the redemption date or maturity date thereof, as the case may be. Except as otherwise provided in the Resolution, neither Defeasance Obligations nor cash deposited with such escrow agent pursuant to the Resolution nor principal or interest payments on any such Defeasance Obligations shall be withdrawn or used for any purpose other than, and shall be held in trust for, the payment of the principal or Redemption Price, as applicable, and interest on the Bonds with respect to which such cash and Defeasance Obligations have been deposited. Any excess cash received from such principal or interest payments on such Defeasance Obligations shall be paid over to the District as received by such escrow agent, free and clear of any trust, lien or pledge.

Notwithstanding any of the provisions of the Resolution regarding Defeasance, no forward supply contract shall constitute a "Defeasance Obligation" or otherwise be used to refund all or any portion of Bonds which are insured as to the payment of principal and interest by an Insurer, without first obtaining the prior written consent of such Insurer.

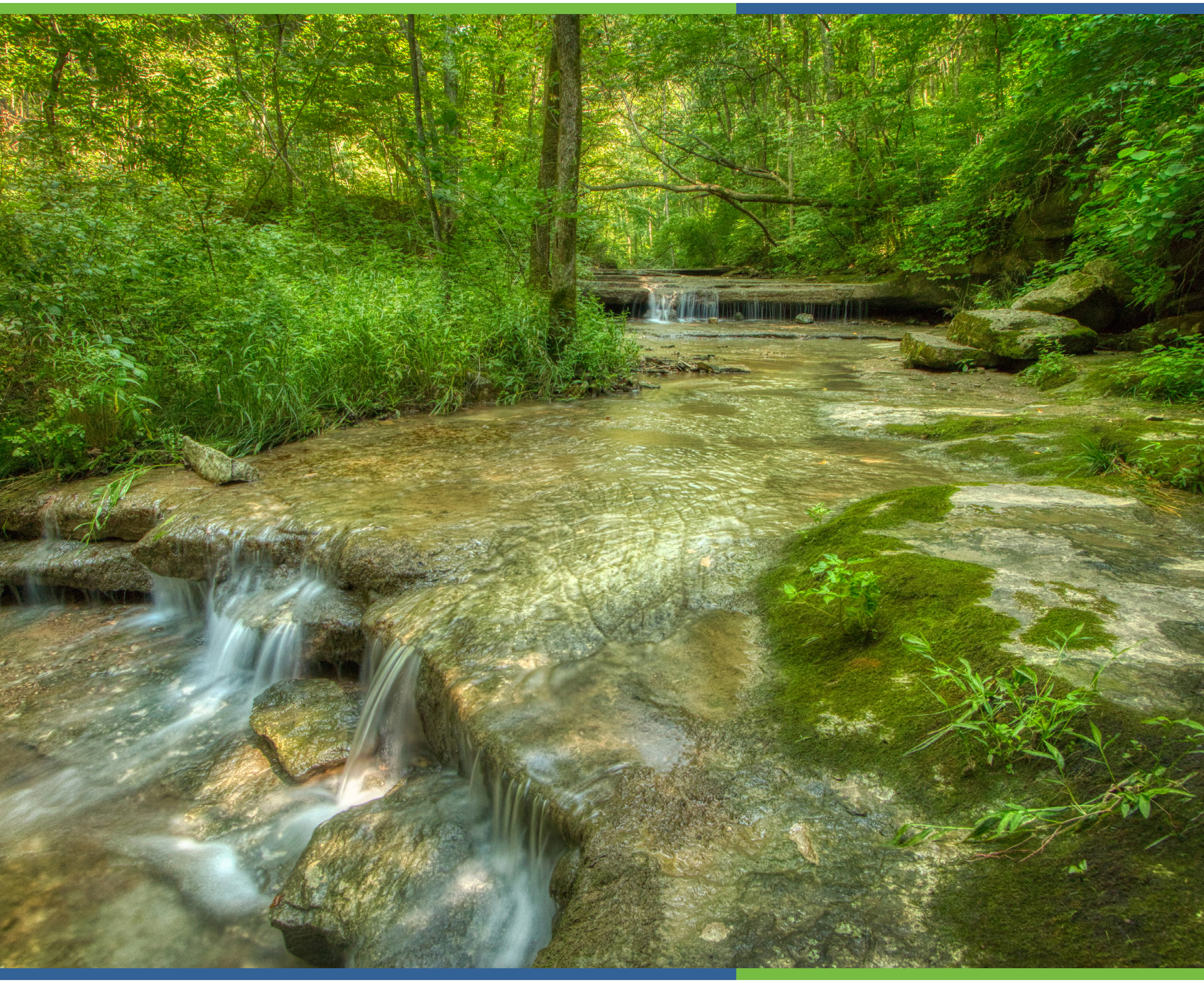
# APPENDIX B

## ANNUAL COMPREHENSIVE FINANCIAL REPORT OF THE DISTRICT, FISCAL YEARS ENDED JUNE 30, 2021 AND 2020

Louisville and Jefferson County
Metropolitan Sewer District

# ANNUAL COMPREHENSIVE FINANCIAL REPORT

Fiscal Years Ended June 30, 2021 and 2020



msd
Safe, clean waterways

A Component Unit of Louisville
Jefferson County Metro Government
Commonwealth of Kentucky

# ANNUAL COMPREHENSIVE FINANCIAL REPORT

**Louisville/Jefferson County Metropolitan Sewer District**
**Louisville, Kentucky**

**A Component Unit of Louisville/Jefferson County Metro Government**
**Commonwealth of Kentucky**

**Fiscal Years Ended June 30, 2021 and 2020**

**Prepared by the Department of Finance, Louisville MSD**
**Brad Good, Chief Financial Officer**

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## Financial Section



## Statistical Section

# INTRODUCTORY SECTION

700 West Liberty Street | Louisville, KY 40203-1911
Phone: 502.540.6000 | LouisvilleMSD.org

October 28, 2021

Letter of Transmittal

To the customers and investors of Louisville and Jefferson County Metropolitan Sewer District,

As the Chief Financial Officer of Louisville and Jefferson County Metropolitan Sewer District (MSD) it is my pleasure to present the Annual Comprehensive Financial Report for the fiscal year ended June 30, 2021.

Responsibility for the accuracy, completeness and fairness of the data presented herein, including all disclosures, rests with MSD. To provide a reasonable basis for making these representations, the management of MSD has established a comprehensive internal control framework that is designed to both protect its assets from loss, theft, or misuse and to compile sufficient reliable information for the preparation of MSD's financial statements in conformity with Generally Accepted Accounting Principles (GAAP). MSD's internal control framework has been designed to provide reasonable rather than absolute assurance that the financial statements as of June 30, 2021 and 2020 are free from material misstatement. To the best of my knowledge and belief, the accompanying data is accurate in all material respects and is reported in a manner designed to present fairly the financial position and results of the operations of MSD. All disclosures necessary to enable the reader to understand MSD's financial activities have been included. GAAP requires that management provide a narrative to accompany the basic financial statements in the form of Management's Discussion and Analysis which is found beginning on page 3. This letter of transmittal is intended to be read in conjunction with that analysis.

MSD is required by law and by its Revenue Bond Resolution to undergo an annual independent audit of its financial statements. The goal of the independent audit is to provide reasonable assurance that the financial statements of MSD for the fiscal years ended June 30, 2021 and 2020 are free of material misstatement. The independent audit involved examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements; assessing the accounting principles used and significant estimates made by management; and evaluating the overall financial statement presentation.

Crowe, LLP has been retained by MSD to serve as its independent auditors and has issued an unmodified opinion on MSD's financial statements for the years ended June 30, 2021 and 2020. The independent auditor's report can be found at the beginning of the financial section of this report.

As a recipient of federal funding, MSD is required to undergo a Single Audit in conformity with the Single Audit Act of 1984 and the Single Audit Act Amendments of 1996 and U.S. Office of Management and Budget Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards 2CFR200 (Uniform Guidance). Information related to the Single Audit, including the Schedule of Expenditures of Federal Awards, findings and recommendations and the auditor's reports on internal controls is provided in a separate report.

**Profile:**

MSD was created in 1946 as a public body corporate and subdivision of the Commonwealth of Kentucky. MSD has complete control, possession and supervision of the sewer and drainage systems within the majority of Louisville Metro, which comprises all of Jefferson County, Kentucky. In addition, MSD has control, possession and supervision of the sewer system in portions of Oldham and Shelby County, Kentucky. Chapter 76 of the Kentucky Revised Statutes authorizes MSD to construct additions, betterments, and extensions within its service area and to recover the cost of its services in accordance with rate schedules adopted by its Board.

MSD is a component unit of the Louisville/Jefferson County Metro Government. The Louisville Metro Mayor appoints, with the approval of the Louisville Metro Council, the members to MSD's governing Board, its Executive Director, Chief Engineer and Secretary/Treasurer. The Board, which has statutory authority to enter into contracts and agreements for the management, regulation and financing of MSD, manages its business and activities. The Board has full statutory responsibility for approving and revising MSD's annual budgets, for financing deficits and for disposition of surplus funds. MSD has no special financial relationship with the Louisville Metro Government;

however, effective July 1, 2006, MSD began providing free wastewater and drainage services to Louisville Metro Government. The value of these services in fiscal year 2021 was $4,950,415.

**Customer Base:**

MSD's revenue is derived from wastewater and drainage service charges collected from residential, commercial, and industrial customers. Wastewater service charges are distributed to respective customer classes on the basis of actual costs incurred to collect and treat wastewater. For fiscal 2021, 60% of MSD's wastewater service charge revenue came from residential customers, 30% came from commercial customers and 10% from industrial customers. MSD's top 10 wastewater customers remained stable from fiscal year 2020 to fiscal year 2021. The top 10 customers provided $14,553,023, or 5.9%, of MSD's total wastewater revenue in fiscal year 2021. Drainage service charges are assessed based on the equivalent service units (ESU) for each parcel of property. An ESU is defined by MSD as 2,500 square feet of impervious area. For fiscal 2021, 37% of MSD's drainage service charge revenue came from residential customers, 56% came from commercial customers and 7% from industrial customers. MSD's top 10 drainage customers remained stable from fiscal year 2020 to fiscal year 2021. The top 10 customers provided $5,928,230, or 7.4%, of MSD's total drainage revenue in fiscal year 2021.

**Local Economy:**

The fiscal year ended June 30, 2021 was marked locally by the twin impacts of the COVID-19 pandemic and protests seeking justice for Breonna Taylor. These events resulted in measurable impacts to the economy of the Louisville Metropolitan Statistical Area (Louisville MSA). The United States Department of Labor's Bureau of Labor Statistics listed the unemployment rate for Jefferson County, Kentucky, as 5.4% in June 2021. Although this is an improvement from the 7% unemployment rate at June 30, 2020, we are still not back to the pre-pandemic unemployment rate of 3.6% recorded in February 2020. The Louisville MSA ended June 2021 with 627,101 jobs compared to 603,198 jobs in June 2020, an increase of 3.9%. MSD's employment base has remained stable over the last fiscal year with 648 full time employees at June 30, 2021 compared to 653 full time employees at June 30, 2020. MSD's delinquent customer accounts remain elevated due to economic impacts associated with the pandemic. In response, MSD has worked collaboratively with our billing partner, Louisville Water Company, to connect customers with available assistance programs and provide payment plans to enable customers to bring their accounts current over time. Additional information on demographic and economic conditions for Louisville can be found in the Statistical Section of this report.

**Major Initiatives:**

- *Blueprint 2025:* MSD remains committed to our Integrated Strategic Business Plan, Blueprint 2025 adopted in fiscal year 2019. Blueprint 2025 is our action plan to transform MSD into the Utility of the Future by the year 2025. The strategic purpose behind Blueprint 2025 is to deliver MSD's three core business functions in a collaborative, efficient, innovative manner to meet regulatory requirements and community level of service through a sustainable, purpose driven and skilled workforce. Blueprint 2025 establishes the following Vision, Mission and Critical Success Factors:

  Vision: The innovative, regional utility for safe, clean waterways.

  Mission: Provide quality wastewater, drainage and flood protection services to protect public health and safety through sustainable solutions, fiscal stewardship and strategic partnerships.

  Critical Success Factors:
    - Sustain quality and compliant wastewater, drainage and flood protection services.
    - Earn the community's trust daily as the leading provider of quality wastewater, drainage and flood protection services.
    - Transform into an employer of purpose where employees are provided the opportunity to thrive.
    - Ensure fiscal stewardship and sustainability of community resources.
    - Realize operation efficiencies and revenue generation through strategic partnerships and innovations.

- *Rate Increase:* On July 27, 2020 the MSD Board approved a rate increase of 5.0% for wastewater and drainage service charges on all bills effective August 1, 2020. The average monthly residential wastewater bill (based on 4,000 gallons of water consumed per month) increased by $2.45 from $49.00 to $51.45. The monthly residential drainage service charge increased by $0.53 from $10.58 to $11.11.

- *Customer Assistance Programs:* On July 27, 2020 the MSD Board authorized a 10% Emergency Wastewater Rate Assistance Program (EWRAP) discount which provides financial assistance to qualifying residential customers in Jefferson County. The discount is available through July 31, 2022. Qualified MSD customers received $6,584 worth of EWRAP discounts in fiscal 2021. The EWRAP discount is offered in addition to MSD's long-standing Senior Citizen Discount which provided $1,067,908 in discounts in fiscal 2021. Both programs award discounts as line item reductions to the customer's bimonthly MSD wastewater bill.

- *Consent Decree Update:* MSD entered into the 2009 Amended Consent Decree (ACD) with the federal government and the Commonwealth of Kentucky by an order signed on February 12, 2010. The ACD contains an Integrated Overflow Abatement Plan (IOAP) which is comprised of Sanitary Sewer Discharge Plan (SSDP) projects and Long Term Control Plan (LTCP) projects both of which are focused on managing and mitigating sewer overflows. The IOAP was amended in 2012 and 2014 to improve compliance and adjust capital project schedules.

  Since entry of the 2009 ACD, MSD has spent approximately $1 billion designing and constructing many of the IOAP projects. To date, all schedule milestones on IOAP projects to mitigate sewer overflows across the service area have been met. Local waterways are safer and cleaner today as a result of these expenditures. Spending on the ACD work has consumed the majority of MSD's capital expenditures since 2009. However, the IOAP projects have only addressed a fraction of the wastewater, stormwater and flood protection assets under MSD's purview. An unintended consequence of compliance with the ACD has been deferred asset management on the remaining infrastructure.

  MSD proactively approached federal and state Regulators in 2019 to renegotiate the timing for completing the remaining LTCP and SSDP projects required by the ACD in order to reprioritize capital dollars for rehabilitation of MSD's aging biosolids systems, failing sewer interceptors and flood protection system rehabilitation. MSD, along with the federal government and the Commonwealth of Kentucky, have negotiated the Second ACD which grants a time extension for completing the remaining LTCP and SSDP projects to 2035. In exchange, MSD has agreed to invest a minimum of $25 million annually for asset management projects through 2035. Additionally, MSD agreed to incorporate $70 million for critical sewer rehabilitation in its 5-year capital improvement plan. These financial commitments are achievable within the MSD Board's rate increase authority of 6.9% per year. Final approval of the Second Amended Consent Decree is pending.

- *Credit Rating:* On July 30, 2020, MSD issued $225,000,000 of revenue bonds, Series 2020A. The bond proceeds were used to redeem at maturity commercial paper notes outstanding as senior subordinate debt. MSD leveraged its Aa3 stable Moody's rating and AA stable S&P Global rating to sell these long-term bonds with a true interest cost of 2.4%. Strong credit ratings enable MSD to issue debt at a lower interest rate which helps control service charge rates over the long term.

- *Commercial Paper Program Renewal:* On December 22, 2020, MSD amended the Revolving Credit Agreements and Note Purchase Agreements with Bank of America, N.A., and JPMorgan Chase Bank to change the expiration date from July 1, 2021 to June 30, 2023.

**Financial Planning:**

MSD is focused on continuously strengthening its financial position through planning and analysis in order to meet its short-term and long-term operational and infrastructure plans.

MSD's short-term plan looks forward five years at a time. Formalized budgets are developed and approved annually by the Board for operating and capital spending. Budgets are developed with an eye toward maintaining operational efficiency and achieving incremental improvement of MSD's critical debt service coverage and debt to operating ratios.

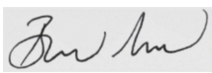
MSD's long-term financial planning window is twenty years and is supported by the Critical Repair and Reinvestment Program and a twenty year comprehensive financial model. The financial model enables MSD to analyze alternative scenarios in order to optimize resources in the face of competing priorities. Rate adjustments are carefully considered in conjunction with bond issues and other debt with an eye toward maintaining affordability for the ratepayer. Key long-term considerations are debt service coverage, maintaining level debt service payments, and maintaining adequate cash reserves.

**Awards**
The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to MSD for its Annual Comprehensive Financial Report for the fiscal year ended June 30, 2020. This was the 31st consecutive year that MSD has achieved this prestigious award. In order to be awarded a Certificate of Achievement, MSD must publish an easily readable and efficiently organized annual financial report. This report must satisfy both generally accepted accounting principles and applicable legal requirements.

A Certificate of Achievement is valid for a period of one year only. We believe that our 2021 Annual Comprehensive Financial Report continues to meet the Certificate of Achievement Program's requirements and we will submit it to GFOA to determine its eligibility for another certificate.

**Acknowledgements**
The Finance division of MSD has worked hard to make possible timely publication of the fiscal year 2021 Annual Comprehensive Financial Report and I would like to thank them for their individual contributions. I would also like to take this opportunity to thank the MSD Board of Directors and the Executive Leadership Team for their continued support.

Respectfully Submitted,



Brad Good
Chief Financial Officer

Government Finance Officers Association

# Certificate of Achievement for Excellence in Financial Reporting

Presented to

**Louisville and Jefferson County Metropolitan Sewer District, Kentucky**

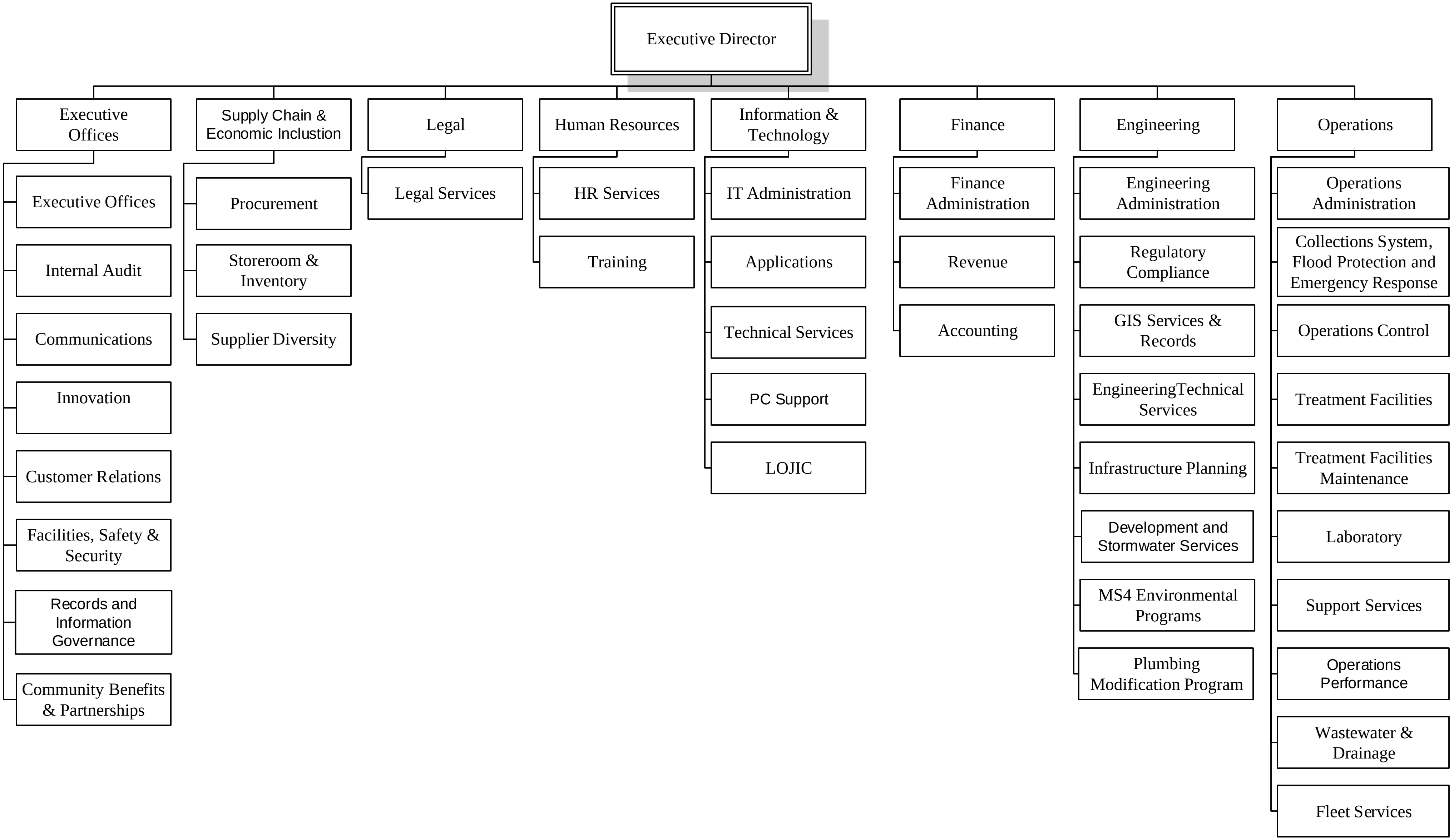
For its Comprehensive Annual Financial Report For the Fiscal Year Ended

June 30, 2020

Christopher P. Morrill

Executive Director/CEO

Louisville and Jefferson County
Metropolitan Sewer District
Organization Chart



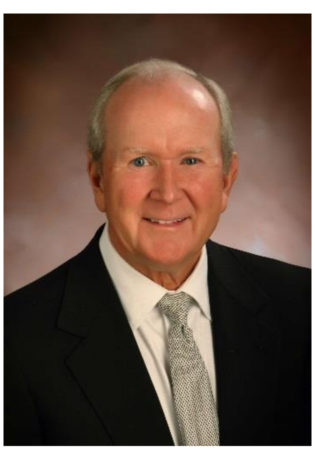
Marita Willis
Chair

Dan Arbough
Vice Chair

Andrew Bailey

Keith Jackson

Ricky Mason



JT Sims

Rebecca Cox

**James A. Parrott**
Executive Director
Secretary/Treasurer

**Angela Akridge**
Chief Strategy Officer

**David Johnson**
Chief Engineer

**Brad Good**
Chief Financial Officer

**Brian Bingham**
Chief of Operations

**Lynne Fleming**
Human Resources Director

**Paula Middleton Purifoy**
General Counsel and
Legal Director

## PRINCIPAL OFFICERS

**Paul Bagley**

Chief Information Officer

**Kimberly Reed**
One Water
Chief Innovation Officer

**Rene' Lindsay**
One Water
Chief Procurement Officer

# FINANCIAL SECTION

Crowe LLP
Independent Member Crowe Global

INDEPENDENT AUDITOR'S REPORT

Board of Directors
Louisville and Jefferson County Metropolitan Sewer District
Louisville, Kentucky

**Report on Financial Statements**

We have audited the accompanying financial statements of the Louisville and Jefferson County Metropolitan Sewer District, a component unit of the Louisville-Jefferson County Metro Government, as of and for the years ended June 30, 2021 and 2020, and the related notes to the financial statements, which collectively comprise the Louisville and Jefferson County Metropolitan Sewer District's basic financial statements as listed in the table of contents.

***Management's Responsibility for the Financial Statements***

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

***Auditor's Responsibility***

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in Government Auditing Standards, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

***Opinion***

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Louisville and Jefferson County Metropolitan Sewer District, as of June 30, 2021 and 2020, and the changes in financial position and cash flows thereof for the years then ended in accordance with accounting principles generally accepted in the United States of America.

***Other Matters***

*Required Supplementary Information*

Accounting principles generally accepted in the United States of America require that the Management's Discussion and Analysis on pages 3 through 11, the Schedule of Proportionate Share of the Net Pension Liability on page 63, and the Schedule of Employer Contributions - Pension on page 65, the Schedule of Proportionate Share of the Net OPEB Liability on page 66, and the Schedule of Employer Contributions – OPEB on page 67 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

*Supplementary Information*

Our audits were conducted for the purpose of forming an opinion on the financial statements that collectively comprise the Louisville and Jefferson County Metropolitan Sewer District's basic financial statements. The introductory and statistical sections are presented for purposes of additional analysis and are not a required part of the basic financial statements. The introductory and statistical sections have not been subjected to the auditing procedures applied in the audits of the basic financial statements, and accordingly, we do not express an opinion or provide any assurance on them.

***Other Reporting Required by Governmental Auditing Standards***

In accordance with *Government Auditing Standards,* we have also issued our report dated October 28, 2021 on our consideration of the Louisville and Jefferson County Metropolitan Sewer District's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts and grant agreements and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the Louisville and Jefferson County Metropolitan Sewer District's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the Louisville and Jefferson County Metropolitan Sewer District's internal control over financial reporting and compliance.

Crowe LLP

Crowe LLP

Louisville, Kentucky
October 28, 2021

The management of Louisville and Jefferson County Metropolitan Sewer District (MSD) present this Management's Discussion and Analysis (MD&A) for the fiscal year ended June 30, 2021 and 2020. This narrative provides the reader with condensed comparative financial data, an analysis of the results of our operations, a description of capital asset and long term debt activity, and a discussion of future economic factors that will impact our operations. This MD&A is intended to be read in conjunction with the financial statements immediately following this section.

## FINANCIAL HIGHLIGHTS

- Total net position increased from fiscal 2020 to fiscal 2021 by $51.0 million, or 6.4%.
- Total assets and deferred outflows of resources increased $167.8 million, or 4.6%, from fiscal 2020 to fiscal 2021.
- Operating revenues increased $10.3 million, or 3.2%, from fiscal 2020 to fiscal 2021.
- Service and administrative costs decreased $0.5 million, or 0.5%, from fiscal 2020 to fiscal 2021.
- MSD maintained unrestricted cash and investments totaling $107.4 million as of June 30, 2021 compared to $100 million as of June 30, 2020.
- MSD had 357 days cash on hand at June 30, 2021 compared to 331 days cash on hand at June 30, 2020.
- Senior debt coverage was 1.86x for fiscal 2021 compared to 1.88x for fiscal 2020.

## OVERVIEW OF THE FINANCIAL STATEMENTS

MSD uses the accrual basis of accounting to prepare its financial statements wherein revenues are recorded when earned and expenses are recorded at the time a liability is incurred. MD&A serves as a narrative introduction to the financial statements which consist of the following parts:

*Statement of Net Position:* This statement includes all of MSD's assets, liabilities and deferred outflow and inflow of resources. It provides information about the nature and amounts of investments in assets and the obligations to creditors. In addition, it provides the basis for computing rate of return, evaluating the capital structure of MSD and assessing the liquidity and financial flexibility of the organization.

*Statement of Revenues, Expenses and Changes in Net Position:* This statement identifies the revenues generated and expenses incurred during the fiscal year and helps the user to assess the financial efficiency of MSD during the time period for which the statement relates.

*Statement of Cash Flows*: This statement provides information related to MSD's cash receipts and cash expenditures during the fiscal year. It reports cash receipts, cash payments, and net changes in cash resulting from operations, investing, and financing activities.

*Notes to the Financial Statements:* The notes contain descriptions of the policies underlying the amounts displayed in the financial statements along with other information that is essential to a full understanding of the data provided in the financial statements.

*Required Supplementary Information:* Information is presented related to MSD's pension and Other Post-Employment Benefits (OPEB) including annual contributions made to the plans and annual investment returns.

Other supplemental information is presented for comparative analysis and is not part of the basic financial statements. Other supplemental information consists of:

*Statistical Section:* Ten years of financial statement information, operating indicators, and demographic information is presented for comparative analysis.

## STATEMENT OF NET POSITION

| FIGURE 1 - CONDENSED NET POSITION INFORMATION | | | | 2021-2020 | | 2020-2019 | |
|---|---|---|---|---|---|---|---|
| *(amounts in thousands)* | FY 2021 | FY 2020 | FY 2019 | Increase (Decrease) | % Change | Increase (Decrease) | % Change |
| Unrestricted current assets | $ 143,541 | $ 136,424 | $ 116,928 | $ 7,117 | 5.2% | $ 19,496 | 16.7% |
| Restricted current assets | 21,181 | 17,776 | 52,520 | 3,405 | 19.2% | (34,744) | (66.2%) |
| Capital assets | 3,458,906 | 3,302,757 | 3,118,659 | 156,149 | 4.7% | 184,098 | 5.9% |
| Restricted non-current assets | 82,930 | 79,555 | 76,678 | 3,375 | 4.2% | 2,877 | 3.8% |
| Other non-current assets | 26,361 | 29,799 | 31,644 | (3,438) | (11.5%) | (1,845) | (5.8%) |
| Total assets | 3,732,919 | 3,566,311 | 3,396,429 | 166,608 | 4.7% | 169,882 | 5.0% |
| Deferred outflows of resources | 80,984 | 79,767 | 52,018 | 1,217 | 1.5% | 27,749 | 53.3% |
| Total assets and deferred outflows | 3,813,903 | 3,646,078 | 3,448,447 | 167,825 | 4.6% | 197,631 | 5.7% |
| Current liabilities | 29,099 | 24,176 | 18,168 | 4,923 | 20.4% | 6,008 | 33.1% |
| Current liabilities from restricted assets | 118,469 | 105,856 | 95,537 | 12,613 | 11.9% | 10,319 | 10.8% |
| Non-current liabilities | 2,808,293 | 2,702,796 | 2,551,235 | 105,497 | 3.9% | 151,561 | 5.9% |
| Total liabilities | 2,955,861 | 2,832,828 | 2,664,940 | 123,033 | 4.3% | 167,888 | 6.3% |
| Deferred inflows of resources | 10,277 | 16,520 | 12,955 | (6,243) | (37.8%) | 3,565 | 27.5% |
| Total liabilities and deferred outflows | 2,966,138 | 2,849,348 | 2,677,895 | 116,790 | 4.1% | 171,453 | 6.4% |
| Net investment in capital assets | 762,848 | 684,412 | 672,304 | 78,436 | 11.5% | 12,108 | 1.8% |
| Restricted, net | 84,429 | 80,421 | 81,207 | 4,008 | 5.0% | (786) | (1.0%) |
| Unrestricted | 488 | 31,897 | 17,041 | (31,409) | (98.5%) | 14,856 | 87.2% |
| Total net position | 847,765 | 796,730 | 770,552 | 51,035 | 6.4% | 26,178 | 3.4% |
| Total liabilities, deferred inflows & net position | $ 3,813,903 | $ 3,646,078 | $ 3,448,447 | $ 167,825 | 4.6% | $ 197,631 | 5.7% |

**Net Position:** MSD's net position increased $51.0 million, or 6.4%, in fiscal 2021 and increased $26.1 million, or 3.4%, in fiscal 2020 (see Figure 1). Increases or decreases in net position serve as useful indicators of MSD's financial condition over time.

The largest portion of MSD's net position is its net investment in capital assets. Net investment in capital assets increased $78.4 million in fiscal 2021 and increased $12.1 million in fiscal 2020. Capital asset construction and acquisitions were funded in 2021 by $120 million of commercial paper notes[1], a draw on a State Revolving Fund loan[2], cash generated from operations, and contributions in aid of construction from developers. Capital asset construction and acquisitions were funded in 2020 by $135 million of commercial paper notes, cash generated from operations, and contributions in aid of construction from developers.

Funds restricted for a specific purpose by the 1993 Sewer and Drainage System Revenue Bond Resolution (the General Bond Resolution) are classified as restricted net position. MSD is required by the resolution to make monthly transfers to its debt service accounts sufficient to meet the semi-annual debt service payments on outstanding bonds. The General Bond Resolution sets a debt service reserve requirement equal to at least 10% of the face amount of all bonds issued under the resolution, 100% of the maximum aggregate net debt service in the current or any future fiscal year or 125% of the average aggregate net debt service in the current or any future fiscal year. MSD funds the reserve at 100% of maximum aggregate net debt service with a combination of cash and investments and a $75 million debt service reserve surety policy[3]. Restricted net position increased $4.0 million from fiscal 2020 to fiscal 2021 due to higher cash and investments on hand for debt service and debt reserves. Restricted net position decreased $0.7 million from fiscal 2019 to fiscal 2020.

The remaining balance of MSD's net position is unrestricted and may be used for any allowable purpose. Unrestricted net position decreased $31.4 million from fiscal 2020 to fiscal 2021 primarily as the result of increases to the net pension and net OPEB liabilities. Unrestricted net position increased $14.8 million from fiscal 2019 to fiscal 2020 primarily as the result of the merger with Oldham County Environmental Authority[4].

[1] See Note 7 – Long-Term Debt.

[2] See Note 7 – Long-Term Debt.

[3] See Note 3 for additional information.

[4] See Note 1 for additional information.

Total assets and deferred outflows of resources increased by $167.8 million in fiscal 2021 from fiscal 2020. This increase can be attributed primarily to additions to plant, lines and other facilities. Total assets and deferred outflows of resources increased by $197.6 million in fiscal 2020 from fiscal 2019. This increase can be attributed primarily to additions to plant, lines and other facilities.

Total liabilities and deferred inflows of resources increased in 2021 by $116.7 million from fiscal 2020. Noncurrent liabilities account for most of this growth with $101 million in additional long term debt issued and outstanding at the end of the year. Deferred inflows of resources decreased by $6.2 million due to reductions in the pension and OPEB deferred inflows. Total liabilities and deferred inflows of resources increased in 2020 by $171.4 million from fiscal 2019. Noncurrent liabilities account for most of this growth with $135 million in additional commercial paper notes issued and outstanding at the end of the year. Deferred inflows of resources increased by $3.5 million primarily due to an increase in the OPEB deferred inflow.

## STATEMENT OF REVENUES, EXPENSES AND CHANGES IN NET POSITION

**FIGURE 2 - CONDENSED STATEMENT OF REVENUES, EXPENSES AND CHANGES IN NET POSITION INFORMATION**

| | | | | 2021-2020 | | 2020-2019 | |
|---|---|---|---|---|---|---|---|
| *(amounts in thousands)* | FY 2021 | FY 2020 | FY 2019 | Increase (Decrease) | % Change | Increase (Decrease) | % Change |
| Operating revenues | | | | | | | |
| Service charges | $ 325,717 | $ 312,859 | $ 289,173 | $ 12,858 | 4.1% | $ 23,686 | 8.2% |
| Other operating income | 3,701 | 6,198 | 5,195 | (2,497) | (40.3%) | 1,003 | 19.3% |
| Total operating revenues | 329,418 | 319,057 | 294,368 | 10,361 | 3.2% | 24,689 | 8.4% |
| Non-operating revenues | 12,154 | 592 | 18,692 | 11,562 | 1953.0% | (18,100) | (96.8%) |
| Total revenues | 341,572 | 319,649 | 313,060 | 21,923 | 6.9% | 6,589 | 2.1% |
| Operating expenses | | | | | | | |
| Service and administrative costs | 109,741 | 110,302 | 103,699 | (561) | (0.5%) | 6,603 | 6.4% |
| GASB 68/75 pension expense | 18,547 | 17,826 | 12,243 | 721 | 4.0% | 5,583 | 45.6% |
| Depreciation & amortization expense | 97,874 | 98,872 | 87,882 | (998) | (1.0%) | 10,990 | 12.5% |
| Total operating expenses | 226,162 | 227,000 | 203,824 | (838) | (0.4%) | 23,176 | 11.4% |
| Non-operating expenses | | | | | | | |
| Interest expense | 103,915 | 100,387 | 96,214 | 3,528 | 3.5% | 4,173 | 4.3% |
| Amortization of debt discount/premium | (14,322) | (10,284) | (11,527) | (4,038) | 39.3% | 1,243 | (10.8%) |
| Change in fair value - swaps | (8,796) | (812) | 13,597 | (7,984) | 983.3% | (14,409) | (106.0%) |
| Total non-operating expenses | 80,797 | 89,291 | 98,284 | (8,494) | (9.5%) | (8,993) | (9.2%) |
| Total expenses | 306,959 | 316,291 | 302,108 | (9,332) | (3.0%) | 14,183 | 4.7% |
| Income before capital contributions | 34,613 | 3,358 | 10,952 | 31,255 | 930.8% | (7,594) | (69.3%) |
| Capital contributions | 16,422 | 9,085 | 50,926 | 7,337 | 80.8% | (41,841) | (82.2%) |
| Increase (decrease) in net position | 51,035 | 12,443 | 61,878 | 38,592 | 310.2% | (49,435) | (79.9%) |
| Net position - Beginning | 796,730 | 770,552 | 708,674 | 26,178 | 3.4% | 61,878 | 8.7% |
| Net position - OCEA Merger | - | 13,735 | - | (13,735) | 0.0% | 13,735 | 0.0% |
| Net position - Ending | $ 847,765 | $ 796,730 | $ 770,552 | $ 51,035 | 6.4% | $ 26,178 | 3.4% |

**Operating Revenues:** Operating revenues as of June 30, 2021 were $329.4 million (see Figure 2). This represents an increase of $10.3 million, or 3.2%, from fiscal 2020. The increase in operating revenues was driven by a Board-approved rate increase of 5.0% effective August 1, 2020. Wastewater service charges totaled $245.8 million which is an increase of $7.9 million, or 3.4%, from a year ago. Drainage service charges totaled $79.9 million which represents an increase of $4.8 million, or 6.5%, from a year ago. Other operating income totaled $3.7 million, which is a decrease of $2.4 million, or 40.3%, from one year ago.

Operating revenues as of June 30, 2020 were $319 million (see Figure 2). This represents an increase of $24.6 million, or 8.4%, from fiscal 2019. The increase in operating revenues was driven by a Board-approved rate increase of 6.9% effective August 1, 2019. In addition, $6.9 million in wastewater service charges were recognized in connection with the OCEA merger[5]. Wastewater service charges totaled $237.8 million which is an increase of $18.3 million, or 8.4%, from a year ago. Drainage service charges totaled $75 million which represents an increase of $5.3 million, or 7.7%, from a year ago. Other operating income totaled $6.2 million, which is $1 million more than one year ago.

**Non-operating Revenues:** Non-operating revenues, which represent gain or loss on disposal of assets, interest income earned on investments and the federal interest subsidy on MSD's Build America Bonds, increased $11.5 million in fiscal 2021 compared to fiscal 2020. Net investment income decreased $3.4 million, or 21.9%, from fiscal 2020; however, there were no losses on disposal of assets in fiscal 2021.

Non-operating revenues decreased $18.1 million in fiscal 2020 from fiscal 2019. Liquidation of investments previously held in the debt service reserve account for $3 million of this decrease. These funds were released upon the issuance of a debt service reserve surety policy in June 2019[6]. The remaining $15.1 million is a loss on the disposal of the remaining drum dryer assets at the Morris Forman Water Quality Treatment Center.

**Operating Expenses:** Service and administrative costs decreased by $0.5 million, or 0.5%, in fiscal 2021 from fiscal 2020. This was achieved largely by eliminating funding for vacant positions in the fiscal 2021 budget due to uncertainty about revenues at the onset of the COVID-19 pandemic.

Service and administrative costs increased by $6.6 million, or 6.4%, in fiscal 2020 from fiscal 2019. This increase is largely due to service and administrative costs totaling $5.4 million recognized in connection with the OCEA merger[7].

**Non-operating Expenses:** Non-operating expenses increased $8.4 million, or 9.5%, in fiscal 2021 from fiscal 2020. Net interest expense increased $3.5 million due to higher debt service expenses. The change in fair value of MSD's swap portfolio decreased $7.9 million.

Non-operating expenses increased $8.9 million, or 9.2%, in fiscal 2020 from fiscal 2019. Net interest expense increased $4.1 million largely as a result of a decrease in capitalized interest expense due to lower borrowing costs. The change in fair value of MSD's swap portfolio decreased $14.4 million.

**Capital Contributions:** Capital contributions increased $7.3 million in fiscal 2021 from fiscal 2020. This change was driven by an increase in contributions of drainage infrastructure constructed by developers.

Capital contributions decreased $41.8 million in fiscal 2020 from fiscal 2019. This change was driven by a decrease in contributions of drainage infrastructure constructed by developers See Figure 3 for additional information.

**FIGURE 3 - CAPITAL CONTRIBUTIONS**

| *(amounts in thousands)* | FY 2021 | FY 2020 | FY 2019 | 2021-2020 Increase (Decrease) | 2021-2020 % Change | 2020-2019 Increase (Decrease) | 2020-2019 % Change |
|---|---|---|---|---|---|---|---|
| Cash flows from: | | | | | | | |
| Developer's capital - wastewater | $ 9,810 | $ 2,474 | $ 12,267 | $ 7,336 | 296.5% | $ (9,793) | (79.8%) |
| Developer's capital - drainage | 4,646 | 4,826 | 29,286 | (180) | 100.0% | (24,460) | 0.0% |
| Federal grants | 963 | 937 | 5,903 | 26 | 2.8% | (4,966) | (84.1%) |
| Capital recovery | 1,003 | 436 | 156 | 567 | 100.0% | 280 | 0.0% |
| Miscellaneous claims recovery | - | 412 | 3,314 | (412) | 100.0% | (2,902) | 0.0% |
| Total capital contributions | $ 16,422 | $ 9,085 | $ 50,926 | $ 7,337 | 80.8% | $ (41,841) | (82.2%) |

[5] See Note 1 – Reporting Entity for additional information.
[6] See Note 3 for additional information.
[7] See Note 1 – Reporting Entity for additional information.

## STATEMENT OF CASH FLOWS

FIGURE 4 - CONDENSED STATEMENT OF CASH FLOWS INFORMATION

| *(amounts in thousands)* | FY 2021 | FY 2020 | FY 2019 | 2021-2020 Increase (Decrease) | 2021-2020 % Change | 2020-2019 Increase (Decrease) | 2020-2019 % Change |
|---|---|---|---|---|---|---|---|
| Cash flows from: | | | | | | | |
| Operating activities | $ 224,645 | $ 214,052 | $ 189,618 | $ 10,593 | 4.9% | $ 24,434 | 12.9% |
| Capital and related financing activities | (211,694) | (231,573) | (245,133) | 19,879 | (8.6%) | 13,560 | (5.5%) |
| Investing activities | (53,782) | 93,525 | 40,666 | (147,307) | (157.5%) | 52,859 | 130.0% |
| Change in cash and cash equivalents | (40,831) | 76,004 | (14,849) | (116,835) | (153.7%) | 90,853 | (611.8%) |
| Cash and temporary investments, Beginning of year | 142,817 | 66,813 | 81,662 | 76,004 | 113.8% | (14,849) | (18.2%) |
| Cash and cash equivalents, End of year | $ 101,986 | $ 142,817 | $ 66,813 | $ (40,831) | (28.6%) | $ 76,004 | 113.8% |

Cash and cash equivalents were $101.9 million at the end of fiscal 2021 which is a decrease of $40.8 million from fiscal 2020 or 28.6% (see Figure 4). Cash flows from operating activities increased as revenue and customer receipts grew. Cash used by financing activities in fiscal 2021 decreased primarily as a result of a draw on a State Revolving Fund loan[8]. Cash provided by investing activities in fiscal 2021 decreased as MSD reinvested funds held in money market accounts at June 30, 2020.

Cash and cash equivalents were $142.8 million at the end of fiscal 2020 which is an increase of $76 million from fiscal 2019 or 113.8% (see Figure 4). Cash flows from operating activities increased as revenue and customer receipts grew. Cash used by financing activities in fiscal 2020 decreased primarily as a result of a reduction in borrowing. Cash provided by investing activities in fiscal 2020 increased as MSD liquidated investments previously held in the debt service reserve to finance construction[9].

## CAPITAL ASSETS

FIGURE 5 - CAPITAL ASSETS NET OF DEPRECIATION

| *(amounts in thousands)* | FY 2021 | FY 2020 | Increase (Decrease) 2021-2020 | FY 2019 | Increase (Decrease) 2020-2019 |
|---|---|---|---|---|---|
| Sewer lines | $ 1,355,259 | $ 1,363,408 | $ (8,149) | $ 1,292,272 | $ 71,136 |
| Wastewater treatment facilities | 208,553 | 215,163 | (6,610) | 222,196 | (7,033) |
| Drainage facilities | 794,261 | 697,632 | 96,629 | 651,346 | 46,286 |
| Pumping and lift stations | 147,917 | 157,849 | (9,932) | 159,063 | (1,214) |
| Administrative facilities | 10,279 | 11,379 | (1,100) | 11,869 | (490) |
| Maintenance facilities | 6,941 | 5,419 | 1,522 | 5,329 | 90 |
| Machinery and equipment | 18,490 | 23,722 | (5,232) | 28,188 | (4,466) |
| Miscellaneous | 1,801 | 1,481 | 320 | 2,074 | (593) |
| Capitalized interest | 290,292 | 288,691 | 1,601 | 285,821 | 2,870 |
| Construction in progress | 625,113 | 538,013 | 87,100 | 460,501 | 77,512 |
| Total | $ 3,458,906 | $ 3,302,757 | $ 156,149 | $ 3,118,659 | $ 184,098 |

[8] See Note 7 for additional information.
[9] See Note 3 for additional information.

MSD's total capital assets net of depreciation increased by $156.1 million in fiscal 2021 (see Figure 5). Construction in progress was the driver for the growth in capital assets. Depreciation expense was $97.8 million or $0.9 million less than fiscal 2020.

MSD's total capital assets net of depreciation increased by $184 million in fiscal 2020 (see Figure 5). Construction in progress contained the biggest increase with $77.5 million of additions due to capital project activity during the year. Sewer line increases are due to the completion of large scale sewer rehabilitation projects in the Camp Taylor area and the Ohio River Interceptor along Main Street. Depreciation expense was $98.9 million or $11 million more than fiscal 2019.

## DEBT ADMINISTRATION

**FIGURE 6 - SCHEDULE OF BONDS AND OTHER FINANCING**

| *(amounts in thousands)* | FY 2021 | FY 2020 | Increase (Decrease) 2021-2020 | FY 2019 | Increase (Decrease) 2020-2019 |
|---|---|---|---|---|---|
| **Senior Revenue Bonds** | | | | | |
| Series 2009B | - | - | - | 35,155 | (35,155) |
| Series 2009C | 180,000 | 180,000 | - | 180,000 | - |
| Series 2010A | 330,000 | 330,000 | - | 330,000 | - |
| Series 2011A | 243,910 | 246,225 | (2,315) | 248,440 | (2,215) |
| Series 2013A | 115,790 | 115,790 | - | 115,790 | - |
| Series 2013B | 110,970 | 112,575 | (1,605) | 114,100 | (1,525) |
| Series 2013C | 250 | 99,250 | (99,000) | 99,375 | (125) |
| Series 2014A | 79,700 | 79,750 | (50) | 79,800 | (50) |
| Series 2015A | 172,175 | 173,160 | (985) | 173,360 | (200) |
| Series 2015B | 68,815 | 71,515 | (2,700) | 74,160 | (2,645) |
| Series 2016A | 148,415 | 149,290 | (875) | 149,530 | (240) |
| Series 2016B | 21,960 | 23,915 | (1,955) | 25,825 | (1,910) |
| Series 2016C | 32,305 | 50,515 | (18,210) | 67,685 | (17,170) |
| Series 2017A | 155,790 | 161,895 | (6,105) | 169,270 | (7,375) |
| Series 2017B | 32,055 | 32,885 | (830) | 33,670 | (785) |
| Series 2018A | 60,380 | 60,380 | - | 60,380 | - |
| Series 2019A | 17,065 | 24,770 | (7,705) | - | 24,770 |
| Series 2020A | 224,750 | - | 224,750 | - | - |
| Series 2020C | 110,790 | - | 110,790 | - | - |
| **Bond Anticipation Notes** | | | | | |
| Series 2018A | - | - | - | 226,340 | (226,340) |
| Series 2019A | - | 226,340 | (226,340) | - | 226,340 |
| Series 2020A | 226,340 | - | 226,340 | - | - |
| **Other Subordinate Debt** | | | | | |
| General Obligation Bonds | 11,629 | 12,453 | (824) | - | 12,453 |
| Commercial Paper Notes | 150,000 | 255,000 | (105,000) | 120,000 | 135,000 |
| SRF Loans | 32,462 | 15,818 | 16,644 | 2,658 | 13,160 |
| KACO Lease | 2,030 | 2,180 | (150) | - | 2,180 |
| Notes Payable - LOC | - | 100 | (100) | 100 | - |
| | $ 2,527,581 | $ 2,423,806 | $ 103,775 | $ 2,305,638 | $ 118,168 |

*Excludes bond premiums/discounts*

MSD ended fiscal 2021 with $2.5 billion in outstanding long-term debt compared to $2.4 billion in outstanding long-term debt at the end of fiscal 2020[10] (see Figure 6). This is primarily due to the issuance of additional commercial paper to finance construction in progress. Short term debt outstanding payable from restricted assets at the end of fiscal 2021 totaled $49.3 million compared to $45.6 million at the end of fiscal 2020. Net interest expense totaled $89.5 million in fiscal 2021, a decrease of $0.6 million from fiscal 2020.

MSD ended fiscal 2020 with $2.4 billion in outstanding long-term debt compared to $2.3 billion in outstanding long-term debt at the end of fiscal 2019[11] (see Figure 6). This is primarily due to the issuance of additional commercial paper to finance construction in progress. Short term debt outstanding payable from restricted assets at the end of fiscal 2020 totaled $45.6 million compared to $42.7 million at the end of fiscal 2019. Net interest expense totaled $90.1 million in fiscal 2020, an increase of $54 million from fiscal 2019.

**Debt Service Ratio:** Although net operating income is the most significant component of determining MSD's debt service coverage ratio, other sources, including investment income and current period payments of property owner assessments, are also included in available revenues and net revenues for purposes of demonstrating MSD's compliance with the debt service ratio tests in the General Bond Resolution.

The General Bond Resolution and its supplements require MSD to provide available revenues for each fiscal year sufficient to pay the sum of 110% of each year's aggregate net debt service on revenue bonds, the amount, if any, required to be paid into the reserve account, all operating expenses as estimated in the annual budget, debt service on senior subordinated debt and any other subordinate debt and amounts necessary to pay and discharge all charges or liens payable out of available revenues. Available revenues, as used for purposes of the resolution, means all revenues and other amounts received by MSD and pledged as security for payment of bonds issued pursuant to the resolution, but excludes interest income which is capitalized in accordance with generally accepted accounting principles.

Net operating expenses include all reasonable, ordinary, usual or necessary current expenses of maintenance, repair, and operation determined in accordance with generally accepted accounting principles and the enterprise basis of accounting. Operating expenses do not include reserves for extraordinary maintenance and repair or administrative and engineering expenses of MSD which are necessary or incidental to capital improvements for which debt has been issued and which may be paid from proceeds of such debt.

Aggregate net debt service is debt service on all bonds issued pursuant to the resolution including principal payments, excluding (i) interest expense which, in accordance with generally accepted accounting principles, is capitalized and which may be paid from the proceeds of debt and (ii) other amounts, if any, available or expected to be available in the ordinary course of business for payment of debt service.

MSD's debt service coverage ratio[12], calculated on the foregoing basis, was 186% in 2021, 188% in 2020 and 181% in 2019 (see Figure 7).

[10] See Note 7 for additional information.
[11] See Note 7 for additional information.
[12] Excludes depreciation, amortization, GASB 68 pension expense and GASB 75 OPEB expense.

| FIGURE 7 - DEBT SERVICE COVERAGE | | | | | |
|---|---|---|---|---|---|
| *(amounts in thousands)* | FY 2021 | FY 2020 | Increase (Decrease) 2021-2020 | FY 2019 | Increase (Decrease) 2020-2019 |
| Total available revenues | $ 342,392 | $ 335,566 | 2.0% | $ 314,318 | 6.8% |
| Total net operating expenses | 109,741 | 110,302 | (0.5%) | 103,699 | 6.4% |
| Net revenue | 232,651 | 225,264 | 3.3% | 210,619 | 7.0% |
| Aggregate net debt service | $ 124,819 | $ 119,868 | 4.1% | $ 116,607 | 2.8% |
| Debt service coverage ratio | 186% | 188% | (0.8%) | 181% | 4.0% |

## FUTURE ECONOMIC FACTORS

As the federal, state, and local governments, including MSD, continue efforts to contain and limit the spread of COVID-19, billable revenue and revenue collections may deviate from historical performance and may have an adverse impact on the financial position and operations of MSD to a degree that cannot currently be estimated. As of June 30 2021, MSD has approximately $107.4 million of unrestricted operating cash and investments on hand, which is expected to be adequate to fund essential services and make timely debt service payments. In addition, MSD can issue program notes to provide short-term funding for its capital improvement program. MSD, however, is not able to predict and makes no representations as to the future economic impact of the COVID-19 pandemic on its operations.

On July 26, 2021, the MSD Board approved a 6.9% rate increase for wastewater and drainage volume and service charges as well as optional and quality charge rates that are assessed to commercial and industrial wastewater customers effective August 1, 2021. This rate increase is coupled with an Emergency Wastewater Rate Assistance Program (EWRAP) that provides a 10% discount on the wastewater portion of the bill to eligible households.

On September 1, 2021, Moody's Investors Service assigned its MIG 1 rating to MSD's $226.3 million sewer and drainage system subordinated bond anticipation notes, series 2021 maturing October 14, 2022. Moody's maintained its Aa3 ratings on MSD's approximately $2.2 billion in senior lien revenue bonds. The outlook is stable for MSD's long term rating.

On September 19, 2021, Standard and Poor's Rating Service assigned its SP-1+ rating to MSD's $226.3 million sewer and drainage system subordinated Bond Anticipation notes, series 2021. At the same time, S&P maintained its AA long-term rating and stable outlook on MSD's outstanding series of revenue bonds.

## CONSENT DECREE

In April 2009, MSD agreed to enter into an amended consent decree with the Commonwealth of Kentucky's Environmental and Public Protection Cabinet (KEPPC) and the U.S. Environmental Protection Agency (EPA) that superseded the original consent decree entered on August 12, 2005. The amended consent decree focuses on eliminating sewer overflows in MSD's service area through an Integrated Overflow Abatement Plan (IOAP). The IOAP was amended in 2014 to improve compliance and adjust capital project schedules. To date, MSD has spent approximately $1 billion developing and completing IOAP projects and compliance measures mandated by the Consent Decree.[13].

After several months of negotiation, MSD, the Commonwealth of Kentucky and United States of America have reached an agreement on important modifications to the 2009 Amended Consent Decree. The parties

[13] See Note 12 – EPA Consent Decree for additional information.

have agreed to enter into a Second Amended Consent Decree which will supersede and replace the 2009 Amended Consent Decree and update the IOAP modification approved on June 19, 2014 with the 2021 IOAP Modification.

The Second Amended Consent Decree, which was lodged in the Court on July 27, 2021, was negotiated to effectuate additional remedial measures for combined sewer overflow and sanitary sewer overflow control and regulatory compliance. Specifically, the Second Amended Consent Decree was negotiated to integrate the development of an asset management plan that provides for a long-term maintenance and funding strategy for rehabilitation and renewal of MSD's aging biosolids systems, failing critical interceptors and flood protection system. To facilitate MSD's ability to reprioritize projects and capital spending, the Commonwealth of Kentucky and United States of America have agreed to extend the time for completion of remaining Long Term Control Plan and Sanitary Sewer Discharge Plan projects from the 2009 Amended Consent Decree to 2035. In exchange for the time extension, MSD has agreed to invest a minimum of $25 million on average each fiscal year in asset management projects for a total of $375 million by June 30, 2035. MSD has also agreed to incorporate $70 million in its 5-year CIP for critical sewer rehabilitation. The Second Amended Consent Decree sets forth stipulated penalties to be assessed should the District fail to comply.

Final approval of the Second Amended Consent Decree by the Commonwealth of Kentucky and United States of America, and entry by the Court, are subject to the requirements of 28 C.F.R. §50.7, which provides for notice of the lodging of the Second Amended Consent Decree in the Federal Register, and an opportunity for public comment. The comment period has expired and entry of the Second Amended Consent Decree as a final judgement is currently pending the United States' consideration of comments.

## REQUESTS FOR ADDITIONAL INFORMATION

This report is intended to provide readers with a general overview of MSD's finances and to provide information regarding the receipts and uses of funds. If you need clarification regarding a statement(s) made in the report or need additional information, please contact the Louisville and Jefferson County Metropolitan Sewer District, 700 West Liberty Street, Louisville Kentucky 40203. You can also submit a request for additional information via MSD's website, www.msdlouky.org.

## LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## COMPARATIVE STATEMENT OF NET POSITION
## AS OF JUNE 30,
## DOLLARS IN THOUSANDS

| | 2021 | 2020 |
|---|---|---|
| **Current Assets** | | |
| Unrestricted Current Assets | | |
| Cash and cash equivalents | $ 79,281 | $ 99,973 |
| Investments | 28,124 | 100 |
| Accounts receivable, less allowance for doubtful accounts of $4,946 (2021), $2,054 (2020) | 24,664 | 27,227 |
| Inventories | 5,086 | 4,977 |
| Accrued interest receivable | 231 | 186 |
| Prepaid expenses and other current assets | 6,155 | 3,961 |
| Total unrestricted current assets | 143,541 | 136,424 |
| Restricted Current Assets | | |
| Cash and cash equivalents | 21,181 | 17,776 |
| Total restricted current assets | 21,181 | 17,776 |
| **Total Current Assets** | 164,722 | 154,200 |
| **Noncurrent Assets** | | |
| Unrestricted Noncurrent Assets | | |
| Accounts receivable, non-current | 10,478 | 12,776 |
| Restricted Noncurrent Assets: | | |
| Cash and cash equivalents | 1,524 | 25,068 |
| Investments | 81,406 | 54,487 |
| Other non-current assets | 15,883 | 17,023 |
| Total restricted non-current assets | 98,813 | 96,578 |
| Capital Assets | | |
| Utility plant in service | 4,278,016 | 4,114,641 |
| Less allowance for depreciation | (1,444,223) | (1,349,897) |
| | 2,833,793 | 2,764,744 |
| Construction in progress | 625,113 | 538,013 |
| Net capital assets | 3,458,906 | 3,302,757 |
| **Total Non-current Assets** | 3,568,197 | 3,412,111 |
| **Total Assets** | 3,732,919 | 3,566,311 |
| **Deferred Outflow of Resources** | | |
| Deferred outflow - pension | 25,932 | 31,784 |
| Deferred outflow - OPEB | 21,962 | 14,331 |
| Deferred outflow - derivative instruments | 8,541 | 20,822 |
| Unamortized loss on refunding | 24,549 | 12,830 |
| Total deferred outflow of resources | 80,984 | 79,767 |
| **Total Assets and Deferred Outflow of Resources** | **$ 3,813,903** | **$ 3,646,078** |

*See the accompanying notes to the financial statements.*

## LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## COMPARATIVE STATEMENT OF NET POSITION (continued)
## AS OF JUNE 30,
## DOLLARS IN THOUSANDS

| | 2021 | 2020 |
|---|---|---|
| **Current Liabilities** | | |
| Current Liabilities To Be Paid From Unrestricted Assets | | |
| Accounts payable | $ 18,345 | $ 14,689 |
| Accrued salaries and related benefits | 10,754 | 9,487 |
| Total unrestricted current liabilities | 29,099 | 24,176 |
| Current Liabilities To Be Paid From Restricted Assets | | |
| Accounts payable and accrued expenses (capital), includes contractor retainage of $12,634 (2021), $13,216 (2020) | 46,237 | 39,860 |
| Accrued interest payable | 20,093 | 17,315 |
| Refundable deposits | 2,757 | 2,954 |
| Revenue bonds payable | 47,565 | 43,460 |
| Bank notes | - | 100 |
| Other subordinate debt | 1,817 | 2,167 |
| Total restricted current liabilities | 118,469 | 105,856 |
| **Total Current Liabilities** | 147,568 | 130,032 |
| **Noncurrent Liabilities** | | |
| Bonds payable, net | 2,132,372 | 1,942,913 |
| Bond anticipation note | 226,340 | 226,340 |
| Commercial paper notes | 150,000 | 255,000 |
| Other subordinate debt | 44,304 | 28,284 |
| Investment derivative asset liability | 63,431 | 72,228 |
| At-market derivative asset liability | 8,541 | 20,822 |
| Net pension liability | 139,401 | 126,866 |
| Net OPEB obligation | 43,904 | 30,343 |
| **Total Noncurrent Liabilities** | 2,808,293 | 2,702,796 |
| **Total Liabilities** | 2,955,861 | 2,832,828 |
| **Deferred Inflow of Resources** | | |
| Deferred inflow - pension | - | 2,581 |
| Deferred inflow - OPEB | 7,420 | 10,609 |
| Other deferred inflows | 2,857 | 3,330 |
| Total deferred inflow of resources | 10,277 | 16,520 |
| **Total Liabilities and Deferred Inflow of Resources** | **$ 2,966,138** | **$ 2,849,348** |
| **Net Position** | | |
| Net investment in capital assets | $ 762,848 | $ 684,412 |
| Restricted for debt service | 84,429 | 80,421 |
| Unrestricted | 488 | 31,897 |
| Total net position | 847,765 | 796,730 |
| **Total Liabilities, Deferred Inflow of Resources and Net Position** | **$ 3,813,903** | **$ 3,646,078** |

*See the accompanying notes to the financial statements.*

## LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## COMPARATIVE STATEMENT OF REVENUES, EXPENSES AND CHANGES IN NET POSITION
## FOR THE YEARS ENDED JUNE 30,
## DOLLARS IN THOUSANDS

| | 2021 | 2020 |
|---|---|---|
| **Operating Revenues** | | |
| Service charges | $ 325,717 | $ 312,859 |
| Other operating income | 3,701 | 6,198 |
| Total operating revenues | 329,418 | 319,057 |
| | | |
| **Operating Expenses** | | |
| Service and administrative costs | 109,741 | 110,302 |
| GASB 68 pension/GASB 75 OPEB actuarial expense | 18,547 | 17,826 |
| Depreciation and amortization | 97,874 | 98,872 |
| Total operating expenses | 226,162 | 227,000 |
| | | |
| **Income from Operations** | 103,256 | 92,057 |
| | | |
| **Non-operating Revenue (Expenses)** | | |
| Gain/Loss disposal of assets | (21) | (15,008) |
| Investment income | 1,777 | 5,275 |
| Build America bond refund | 10,398 | 10,325 |
| Interest expense - bonds | (93,067) | (92,274) |
| Interest expense - swaps | (9,793) | (8,027) |
| Interest expense - other | (13,104) | (13,129) |
| Amortization of debt discount / premium | 17,429 | 12,688 |
| Amortization of loss on refunding | (3,107) | (2,404) |
| Capitalized interest | 12,049 | 13,043 |
| Change in fair value - swaps | 8,796 | 812 |
| Total non-operating revenue (expenses) - net | (68,643) | (88,699) |
| | | |
| **Income before capital contributions** | 34,613 | 3,358 |
| | | |
| **Capital contributions** | 16,422 | 9,085 |
| | | |
| **Increase in net position** | 51,035 | 12,443 |
| | | |
| **Net position, beginning of year** | 796,730 | 784,287 |
| | | |
| **Net position, ending** | $ 847,765 | $ 796,730 |

*See the accompanying notes to the financial statements.*

## LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## COMPARATIVE STATEMENT OF CASH FLOWS
## FOR THE YEARS ENDED JUNE 30,
## DOLLARS IN THOUSANDS

| | 2021 | 2020 |
|---|---|---|
| **Cash Flows from Operating Activities** | | |
| Cash received from customers | $ 331,767 | $ 319,701 |
| Cash paid to suppliers | (55,030) | (57,043) |
| Cash paid to employees | (52,092) | (48,606) |
| **Net Cash Provided by Operating Activities** | 224,645 | 214,052 |
| | | |
| **Cash Flows from Capital and Related Financing Activities** | | |
| Proceeds from issuance of revenue bonds | 233,133 | - |
| Proceeds from issuance of bond anticipation note | 237,295 | 230,079 |
| Proceeds from issuance of commercial paper | 365,000 | 770,000 |
| Proceeds from issuance of notes | - | 90,200 |
| Proceeds from other subordinate debt | 17,788 | - |
| Payments for retirement of revenue bonds | (48,033) | (43,120) |
| Payments for retirement of bond anticipation note | (226,340) | (226,340) |
| Payments for retirement of commercial paper | (470,000) | (635,000) |
| Payments for retirement of notes | (100) | (90,200) |
| Payments for retirement of other subordinated debt | (2,119) | (2,120) |
| Payments for interest expense | (103,393) | (106,312) |
| Payments for interest on swaps | (9,793) | (7,622) |
| Build America bond interest subsidy | 10,398 | 10,325 |
| Proceeds from capital grants | 1,914 | 1,786 |
| Payments for capital assets | (219,909) | (224,418) |
| Proceeds from assessments | 2,465 | 1,169 |
| **Net Cash Provided (Used) by Capital and Related Financing** | (211,694) | (231,573) |
| | | |
| **Cash Flows from Investing Activities** | | |
| Purchase of investments | (212,292) | (394,721) |
| Maturity of investments | 157,087 | 481,382 |
| Investment income | 1,423 | 6,864 |
| **Net Cash Provided (Used) by Investing Activities** | (53,782) | 93,525 |
| | | |
| Net Increase (Decrease) in Cash and Cash Equivalents | (40,831) | 76,004 |
| Cash and Cash Equivalents, Beginning of Year | 142,817 | 66,813 |
| **Cash and Cash Equivalents, End of Year** | $ 101,986 | $ 142,817 |

*See the accompanying notes to the financial statements.*

## LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## COMPARATIVE STATEMENT OF CASH FLOWS (continued)
## FOR THE YEARS ENDED JUNE 30,
## DOLLARS IN THOUSANDS

| | 2021 | 2020 |
|---|---|---|
| **Reconciliation of Operating Income to Net Cash provided by Operating Activities** | | |
| Income from operations | $ 103,256 | $ 92,057 |
| Adjustments to reconcile operating income to net cash provided by operating activities | | |
| Depreciation and amortization | 97,874 | 98,872 |
| Accounts receivable | 2,546 | 617 |
| Inventories | (109) | (354) |
| Prepaid expense | (2,194) | (1,000) |
| Accounts payable | 3,656 | 4,122 |
| Customer deposits | (198) | 26 |
| Accrued liabilities | 1,267 | 1,886 |
| Pension liability | 15,807 | 16,885 |
| OPEB liability | 2,740 | 941 |
| **Net Cash Provided by Operating Activities** | $ 224,645 | $ 214,052 |
| | | |
| ***Non-Cash Capital Financing and Investing Activities*** | | |
| Contribution of plant, lines and other facilities by developers and property owners | $ 14,456 | $ 7,300 |
| Construction costs in accounts payable | 46,237 | 39,860 |
| Change in fair value of investments | (499) | 1,208 |
| Decrease in interest rate swap deferred revenue | 497 | 672 |
| Change in fair value - swap agreements | 8,796 | 812 |
| Bonds issued for refunding of debt - Series 2020C | 112,065 | - |
| Bonds issued for refunding of debt - Series 2019A | - | 30,910 |
| Long term debt and other liabilities related to OCEA merger | - | 28,687 |
| Capital assets and other receivables related to OCEA merger | - | 41,751 |

*See the accompanying notes to the financial statements.*

## NOTE 1 – SIGNIFICANT ACCOUNTING POLICIES

The financial statements of the Louisville and Jefferson County Metropolitan Sewer District (MSD), a discretely presented component unit of Louisville/Jefferson County Metro Government, are prepared in conformity with accounting principles generally accepted in the United States of America as applied to government units. The Governmental Accounting Standards Board (GASB) is the accepted standard-setting body for establishing governmental accounting and financial reporting principles. MSD follows GASB Pronouncements as codified under GASB 62, including electing to report as a regulated operation. MSD uses proprietary fund accounting (enterprise fund). Due to the election as a regulated operation under GASB 62, to meet industry accounting standards and follow transactional intent, MSD uses, as applicable, ASC 980, Regulated Accounting.

**Reporting Entity:** MSD is a public body corporate, and political subdivision of the Commonwealth of Kentucky. MSD was created in 1946 pursuant to Chapter 76 of the Kentucky Revised Statutes, in the interest of the public health and for the purpose of providing adequate sewer and drainage facilities in the urbanized area of the Louisville Metropolitan Area. Pursuant to Chapter 76, MSD is governed by a Board which consists of eight members who are appointed by the Mayor of Louisville Metro Government, subject to approval of Louisville Metro Council. Not more than five Board members may be of the same political party. However, there is not a continuing supervisory relationship exercised by Louisville Metro Government over MSD with respect to MSD's statutory public functions.

Chapter 76 authorizes MSD to provide sewer and drainage facilities and services. MSD is further authorized by the statute to establish and collect service charges and to budget accordingly for operations and maintenance, capital outlays and debt service on obligations it is authorized by the statute to incur. No special financing relationship exists between Louisville Metro Government and MSD, nor is Louisville Metro Government empowered by law or custom to approve MSD’s operating or capital budgets; nor are they responsible for financing deficits or disposing of surplus funds.

MSD has complete control, possession and supervision of the sewer and drainage system in large portions of Jefferson County, and has statutory authority to construct additions, betterments and extensions within its service area. Additionally, MSD has statutory responsibility for approval of the design and proper construction of sewer and drainage facilities within the County's boundaries. There are cities within Jefferson County that, by statute, have the option of using MSD sewer services on a contractual basis. Third and fourth class cities also have the option of obtaining drainage services from MSD.

In 2018 the Kentucky General Assembly amended KRS 76.080 to allow MSD to enter into agreements with other entities to acquire by purchase, any real or personal property, or any interest, right, easement, or privilege therein, outside of its Jefferson County boundaries in connection with the acquisition, construction, operation, repair or maintenance of any sewage, wastewater or drainage facility. Subsequent to this change MSD has reached three agreements extending its service area outside of Jefferson County. On May 31, 2019, MSD acquired the Crestwood wastewater collection system pursuant to the terms and conditions of an Interlocal Cooperation Agreement (ILA) dated April 9, 2019. On April 27, 2020, MSD entered into an ILA with Shelby County to own, maintain, and operate sewer and wastewater facilities and collections systems in a prescribed service area in the easternmost corner of Shelby County. On June 30, 2020, MSD completed a merger with the Oldham County Environmental Authority (OCEA) pursuant to the terms of an ILA. This agreement provided for the transfer of the OCEA wastewater collection and treatment system to MSD and OCEA’s 6,000 customers became customers of MSD.

MSD classified the ILA with OCEA as a merger as no significant consideration was exchanged. GASB Statement No. 69, Government Combinations and Disposals of Government Operations, requires that for government mergers, the combined assets and liabilities should be recognized and measured in the Statement of Net Position as of the beginning of the initial reporting period, or July 1, 2019. No significant adjustments were made to bring amounts into conformity with MSD’s accounting policies or to adjust for impairment of capital assets resulting from the merger.

A summary of the amounts recognized as of the beginning of fiscal year 2020 follows:

| (dollars in thousands) | July 1, 2019 |
|---|---|
| Reported in Statements of Net Position: | |
| Current and other assets | $ 4,291 |
| Capital assets | 38,320 |
| Total assets | $ 42,611 |
| Current liabilities | $ 1,944 |
| Noncurrent liabilities | 26,932 |
| Total liabilities | $ 28,876 |
| Net investment in capital assets | $ 9,981 |
| Unrestricted | 3,754 |
| Total net position | 13,735 |
| Total liabilities and net position | $ 42,611 |

MSD’s enterprise business activities are managed by its Board, which has statutory authority to elect officers, enact bylaws and enter into agreements and contracts for the management and regulation of MSD's affairs. MSD's revenue is derived from wastewater and drainage service charges which are collected from residential, commercial and industrial customers. MSD controls the collection of all revenue, disbursement of payables and title to all sewer and drainage assets. Wastewater service charges are distributed among customer classes on the basis of actual costs incurred to collect and treat wastewater. Drainage service charges are distributed among customer classes on the basis of actual costs of drainage services per equivalent unit of impervious surface.

Changes in MSD's service charges are implemented by MSD's Board. Kentucky statute provides that MSD’s service charge revenues shall be sufficient to provide for the operation and maintenance of the system and for debt service. By ordinance, Louisville Metro Government has provided that MSD’s Board may amend its service charge schedule to maintain a debt service ratio of 1.10 for MSD’s sewer and drainage revenue bonds, and that such amendments will be effective within the metropolitan area when adopted by MSD's Board, so long as the amended rates do not generate additional revenue from service charges in excess of 7% during the twelve months succeeding the period in which the deficiency was identified. Amendments that would generate additional revenues in excess of 7% require Louisville Metro Council approval.

Chapter 76 permits MSD to finance sewer and drainage system construction, acquisition and other capital improvements through the issuance of its revenue bonds and with the proceeds of governmental grants, property owner contributions in aid of construction and bonds and loans for which pledge of repayment is subordinated to the pledge of all revenues given by MSD for the security of its revenue bond holders. MSD indebtedness does not constitute indebtedness of Louisville Metro Government or the Commonwealth, but Louisville Metro Government must authorize by ordinance the issuance by MSD of revenue bonds to finance projects within the service area.

**Basis of Accounting:** The sewer and drainage system owned and operated by MSD is accounted for using a flow of economic resources measurement focus. With this measurement focus, all assets and all liabilities associated with the operation of the system are included on the Statement of Net Position. Total net position is segregated into net investment in capital assets, restricted for payment of bond principal and interest and unrestricted. Operating statements present increases (e.g., revenues) and decreases (e.g., expenses) in net position. MSD utilizes the accrual basis of accounting wherein revenues are recorded when earned and expenses are recorded at the time the liability is incurred.

**Cash and Cash Equivalents:** For purposes of the Statements of Cash Flows, MSD includes repurchase agreements and other investments with an original maturity of three months or less in cash and cash equivalents. Both restricted and unrestricted amounts are included on the Statements of Cash Flows.

**Restricted and Unrestricted Funds:** Restricted funds are reserved for the purpose of bond debt service, funding of capital construction, cost of issuance, and debt service reserves. Unrestricted funds, generated from service fees and other operating income, are used to pay for operating expenses. When an expense or outlay is incurred for which both restricted and unrestricted net position is available, it is MSD's general practice is to use revenue from operations to finance construction, then to reimburse from restricted net position for construction as it is needed.

**Investment Securities:** Investments are stated at fair value. Investment income consists of interest income and the change in fair value of investments[1]. Investment income is reduced by applicable estimated federal arbitrage liability.[2]

**Revenues, Expenses and Receivables:** Operating revenues are those revenues that are generated directly from the primary activity of MSD. These revenues are wastewater and drainage service charges and other operating income. The Louisville Water Company and Oldham County Water are responsible for the billing and collection of these charges on behalf of MSD on a monthly basis. Operating expenses are expenses incurred through the activities of operating and maintaining MSD facilities.

Non-operating revenues and expenses are comprised of investment and financing earnings and costs, changes in the fair value of derivatives, as well as contributions from outside sources.

Accounts receivable are stated at the amount management expects to collect from outstanding customer accounts. Accounts are considered past due 30 days from the invoice date. Management provides an allowance for doubtful account that is based on historical collection experience and a review of the current status of individual accounts. Accounts that remain outstanding after management has exerted reasonable collection efforts are written off through a charge to allowance for doubtful accounts and a credit to accounts receivable. The allowance for doubtful accounts was valued at June 30, 2021 and June 30, 2020 as $4,946,357 and $2,054,343, respectively.

Assessment receivables represent amounts billed to residents to have sewer lines installed in their neighborhood. Assessment receivables are considered past due once the balance is 90 days in arrears. Management considers all amounts collectible on the basis that liens are placed on properties at the time of assessment. These receivables may be current or non-current assets.

**Inventory:** Inventory is stated at cost. Inventory consists of supplies and parts used in the operation of MSD's treatment plants and for the maintenance of sewers, fleet vehicles and other related equipment. Inventory totaled $5,086,088 at June 30, 2021 and $4,977,115 at June 30, 2020.

**Contributed Capital and Construction Grants:** MSD finances construction of sewer and drainage plant, lines and other facilities, in part, through government grants and contributions from property owners and developers. Governmental grants in aid of construction represent the estimated portion of construction costs incurred for which grants are expected to be paid to MSD by the governmental grantor. These amounts are recorded as a receivable and revenues from contributions at the time the related expenditures are incurred. Revenues from contributions are part of the change in net position. Government grants in aid

[1] See Note 2 – Deposits and Investments
[2] See Note 7 – Long-Term Debt

of construction and other recoveries at June 30, 2021 and June 30, 2020 were $1,966,789 and $1,784,849, respectively. Contributed capital in the form of sewer and drainage infrastructure constructed by developers at June 30, 2021 and June 30, 2020 were $14,455,781 and $7,300,151, respectively.

**Capital Assets - Plant, Lines and Other Facilities:** Plant, lines and other facilities are recorded at historical cost or, if contributed, at acquisition value as determined by engineering estimates on the date the contribution is received. It is MSD's policy to depreciate the costs of these assets over their estimated useful lives on a straight line basis[3].

Estimated useful lives on depreciable assets are as follows:

| | |
|---|---|
| Building and other structures | 30-50 years |
| Land improvements | 10-30 years |
| Miscellaneous machinery | 10-20 years |
| Vehicles | 6-12 years |
| Equipment, heavy | 15-30 years |
| Equipment, light | 5-15 years |
| Sewer lines and drainage channels | 20-80 years |

Costs incurred for capital construction and acquisition are carried in construction in progress until disposition or completion of the related projects. The major components of construction in progress are sewer lines, wastewater treatment and drainage facilities. Costs relating to projects not pursued are expensed, while costs relating to completed projects are capitalized as plant, lines and other facilities.

**Capitalized Interest:** Interest capitalized on projects funded from bond proceeds is recorded as the average cumulative expenditures multiplied by the weighted average borrowing rate.[4] Interest is not capitalized on project costs that are reimbursed by contributions of capital from government, property owners and developers.

**Impairment of Capital Assets:** In accordance with GASB Statement No. 42, *Accounting and Financial Reporting for Impairment of Capital Assets and for Insurance Recoveries*, management evaluates prominent events or changes in circumstances affecting capital assets to determine whether impairment of a capital asset has occurred. Such events or changes in circumstances that may be indicative of impairment include evidence of physical damage, enactment or approval of laws or regulations, other changes in environmental factors, technology changes or evidence of obsolescence, changes in the manor of duration of use of a capital asset, and construction stoppage. A capital asset is generally considered impaired if both (a) the decline in service utility of the capital asset is large in magnitude and (b) the event or change in circumstance is outside the normal life cycle of the capital asset. No impairment losses were recognized in fiscal year 2021 or 2020.

**Bonds Payable:** Bonds payable are recorded at the principal amount outstanding, net of any applicable premium or discount[5].

Bonds outstanding, which have been refunded and economically defeased, are not included in long-term debt. The related assets are not included in investments. Any loss on refunding, which is the difference between the reacquisition price and the net carrying amount of the old debt, is deferred outflow of resources and amortized as a component of interest expense over the shorter of either 1) the original life of the refunded debt or 2) the life of the refunding debt.

MSD enters into interest rate swap agreements to modify interest rates on outstanding debt. MSD records the net interest expenditures resulting from these agreements and amortizes gains/losses resulting from

[3] See Note 5 – Capital Assets – Plant, Lines, and Other Facilities
[4] See Note 6 – Capitalized Interest
[5] See Note 7 – Long-Term Debt

the termination of these agreements until the original termination date of the agreement. The changes in fair value of derivative instruments that are classified as hedging derivative instruments are reported in the Statement of Net Position as deferred outflow of resources. Changes in fair value of investment derivative instruments are reported in non-operating revenue (expenses) on the Statement of Revenues, Expenses and Changes in Net Position[6].

Bond issue costs are capitalized and amortized over the life of the respective bond issue using the straight-line method, which approximates the effective interest method, pursuant to the election of regulatory operation under GASB 62, as they are deemed recoverable through future rates.

Original issue discounts and premiums on bonds are amortized as a component of interest expense using the straight-line method, which approximates the effective interest method, over the lives of the bonds to which they relate.

**Compensated Absences:** Vacation and personal pay benefits are accrued as accumulated and vested by MSD employees.

**Allocation of Overhead:** MSD allocates overhead costs to its core business processes: operations and maintenance; design, construction and acquisition of plant lines and other facilities; and subsidiary business enterprises.

**Use of Estimates:** The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make assumptions and estimates that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

**Income Tax Status:** MSD is exempt from federal income tax under the Internal Revenue Code as a political subdivision of the Commonwealth of Kentucky.

**Risks and Uncertainties:** In December 2019, a novel strain of coronavirus surfaced in Wuhan, China, and has spread around the world, with resulting business and social disruption. The coronavirus was declared a Public Health Emergency of International Concern by the World Health Organization on January 30, 2020. The operations and business results of MSD could be materially adversely affected. The extent to which the coronavirus may impact business activity or investment results will depend on future developments, which are highly uncertain and cannot be predicted, including new information which may emerge concerning the severity of the coronavirus and the actions required to contain the coronavirus or treat its impact, among others.

**Adoption of New Accounting Pronouncements:** Effective July 1, 2020 MSD adopted the following GASB pronouncements and implementation guide:

- Statement No. 84*: Fiduciary Activities*
- Statement No. 90: *Majority Equity Interests – An Amendment of GASB Statements No. 14 and No. 61*
- Implementation Guide No. 2019-2: *Fiduciary Activities*

GASB Statements No. 84 and No. 90 and Implementation Guide 2019-2 do not have a material impact on MSD's financial reporting.

**Recent Accounting Pronouncements:** GASB has issued additional guidance that is not yet effective. MSD is currently reviewing the provisions of the following GASB Statements and Implementation Guides to determine the impact of implementation in future periods.

[6] See Note 9 – Derivative Instruments.

- Statement No. 87: *Leases (fiscal 2022)*
- Statement No. 89: *Accounting for Interest Cost Incurred Before The End of a Construction Period (fiscal 2022)*
- Statement No. 91: *Conduit Debt Obligations (fiscal 2023)*
- Statement No. 92: *Omnibus 2020 (fiscal 2022)*
- Statement No. 93: *Replacement of Interbank Offered Rates (fiscal 2022)*
- Statement No. 94: *Public-Private and Public-Public Partnerships and Availability Payment Arrangements (fiscal 2023)*
- Statement No. 96: *Subscription-based Information Technology Arrangements (fiscal 2023)*
- Statement No. 97: *Certain Component Unit Criteria, and Accounting and Financial Reporting for Internal Revenue Code Section 457 Deferred Compensation Plans – an Amendment of GASB Statements No. 14 and No. 84 and a Supersession of GASB Statement No. 32 (Except for paragraphs 4-5 which were implemented in fiscal 2020, all remaining paragraphs will be implemented in fiscal 2022)*
- Implementation Guide No. 2019-3: *Leases (fiscal 2022)*

**Reclassifications:** Prior period financial statement amounts have been reclassified to conform to current period presentation. These reclassifications had no effect on the changes in net position or total net position.

## NOTE 2 – CASH DEPOSITS AND INVESTMENTS

A reconciliation of cash, cash equivalents and investments as shown on the Comparative Statement of Net Position for MSD follows:

| (dollars in thousands) | June 30, 2021 | June 30, 2020 |
|---|---|---|
| Reported in Statements of Net Position: | | |
| Cash and cash equivalents | | |
| Unrestricted | $ 79,281 | $ 99,973 |
| Restricted - current | 21,181 | 17,776 |
| Restricted - noncurrent | 1,524 | 25,068 |
| Total cash and cash equivalents | 101,986 | 142,817 |
| Investments | | |
| Unrestricted | 28,124 | 100 |
| Restricted - noncurrent | 81,406 | 54,487 |
| Total investments | 109,530 | 54,587 |
| Total Cash, Cash Equivalents and Investments | $ 211,516 | $ 197,404 |

The following comparative schedule presents the cash, cash equivalents and investments in MSD's portfolio at fair value with investment maturities and credit risk ratings from Moody's Investors Service.

| June 30, 2021 *(dollars in thousands)* | Reported Value | | Weighted Average Maturity in Years | Credit Rating |
|---|---|---|---|---|
| Commercial paper | $ | 24,996 | 0.21 | P-1 |
| U.S. treasuries | | 22,746 | 0.38 | Aaa |
| U.S. agency securities | | 36,003 | 1.19 | Aaa |
| Municipal bonds | | 40,685 | 2.38 | Aaa, Aa, A |
| Money market funds | | 30,254 | 0.06 | Aaa |
| Repurchase agreement/cash | | 56,732 | | |
| Certificate of deposit | | 100 | 0.00 | |
| Total cash, cash equivalents and investments | $ | 211,516 | 4.27 | |
| Accrued interest | $ | 231 | | |

| June 30, 2020 *(dollars in thousands)* | Reported Value | | Weighted Average Maturity in Years | Credit Rating |
|---|---|---|---|---|
| U.S. treasuries | $ | 12,434 | 0.05 | Aaa |
| U.S. agency securities | | 24,823 | 0.07 | Aaa |
| Municipal bonds | | 17,230 | 1.07 | Aa |
| Money market funds | | 103,368 | 0.08 | Aaa |
| Repurchase agreement/cash | | 39,449 | | |
| Certificate of deposit | | 100 | 0.00 | |
| Total cash, cash equivalents and investments | $ | 197,404 | 4.27 | |
| Accrued interest | $ | 186 | | |

Section 66.480 of the Kentucky Revised Statutes and MSD's bond resolutions authorize MSD to invest money subject to its control in, among other securities, (i) obligations of the United States and of its agencies and instrumentalities, including obligations subject to repurchase agreements, (ii) certificates of deposit or other interest-bearing accounts of any bank or savings and loan institution which are insured by the Federal Deposit Insurance Corporation or, to the extent not so insured, collateralized by obligations described in clause (i) above, (iii) securities issued by a state or local government, or any instrumentality or agency thereof, in the United States, and rated in either of the two highest categories by a nationally recognized rating agency, and (iv) money market mutual funds investing in any of the securities described above.

Investments are made based upon prevailing market conditions at the time of the transaction with the intent to hold the instrument until maturity. With this strategy, investments would be expected to reach maturity with limited realized gains or losses. If the yield of the portfolio can be improved upon by the sale of an investment, prior to its maturity, with the reinvestment of the proceeds, then this provision is also allowed.

**Risks:** *Concentration of Credit Risk:* MSD's Investment Policy (the Policy) requires that investments be diversified to eliminate the risk of loss resulting from over-concentration of assets in a specific maturity, a specific issuer, or a specific class of securities. Section 4.4.1 of the Policy limits the amount of money invested at any time in one or more categories of the investments authorized by KRS 66.480 1e, 1f, 1g, and 1i shall not exceed 20% of the total amount invested. MSD was in compliance with its investment policy at June 30, 2021 and 2020.

*Interest Rate Risk:* MSD minimizes interest rate risk by structuring the investment portfolio so that securities mature to meet cash requirements for ongoing operations, thereby avoiding the need to sell securities on the open market prior to maturity. The weighted average maturity in years represents the interest rate risk for MSD.

*Custodial Credit Risk:* This is the risk that, in the event of the failure of the counterparty, MSD would not be able to recover the value of its investments or collateral securities that are in the possession of an outside party. The collateral provided by financial institutions is considered adequate to cover all balances in excess of limits set forth by the Federal Deposit Insurance Corporation. All of MSD's investments are held by MSD or in the name of MSD by a Trustee.

*Foreign Currency Risk:* This risk relates to any potential adverse effects on the fair value of an investment from changes in exchange rates. MSD did not hold any foreign currency as of June 30, 2021 and 2020.

**Fair Value Measurement:** GASB 72 requires MSD to disclose how we measure the fair value of investments and the underlying valuation techniques. Debt and equity securities classified in Level 1 of the fair value hierarchy are valued using prices quoted in active markets for these securities or repurchase agreements. Debt securities classified in Level 2 of the fair value hierarchy are valued using a matrix pricing approach. Matrix pricing is used to value securities based on the securities' relationship to the benchmark quoted prices. A comparative statement of investments subject to fair value measurements and valuation techniques follows:

| June 30, 2021<br>*(dollars in thousands)* | Quoted Prices in Active Markets for Identical Assets (Level 1) | Significant Other Observable Inputs (Level 2) | Significant Unobservable Inputs (Level 3) | Total |
|---|---|---|---|---|
| Investments by fair value level: | | | | |
| Commercial paper | $ - | $ 9,996 | $ - | $ 9,996 |
| U.S. treasuries | - | 22,746 | - | 22,746 |
| U.S. agencies | - | 36,003 | - | 36,003 |
| State and municipal obligations | - | 40,685 | - | 40,685 |
| Total investments by fair value level | $ - | $ 109,430 | $ - | $ 109,430 |

| June 30, 2020<br>*(dollars in thousands)* | Quoted Prices in Active Markets for Identical Assets (Level 1) | Significant Other Observable Inputs (Level 2) | Significant Unobservable Inputs (Level 3) | Total |
|---|---|---|---|---|
| Investments by fair value level: | | | | |
| U.S. treasuries | $ - | $ 12,434 | $ - | $ 12,434 |
| U.S. agencies | - | 24,823 | - | 24,823 |
| State and municipal obligations | - | 17,230 | - | 17,230 |
| Total investments by fair value level | $ - | $ 54,487 | $ - | $ 54,487 |

## NOTE 3 - RESTRICTED CASH, CASH EQUIVALENTS, AND INVESTMENTS

MSD's General Bond Resolution sets a debt service reserve requirement equal to at least 10% of the face amount of all bonds issued under the resolution, 100% of the maximum aggregate net debt service in the current or any future fiscal year or 125% of the average aggregate net debt service in the current or any future fiscal year. MSD funded its debt service reserve as of June 30, 2021, at 100% of the maximum aggregate net debt service in the current or any future fiscal year or, $151,252,519. The General Bond Resolution allows, in lieu of cash and investments in that amount, a letter of credit or policy of bond insurance payable in the required amount.

On June 26, 2019 MSD purchased a debt service reserve surety policy (the Reserve Policy) from Build America Mutual Assurance Company with a maximum policy limit of $75,000,000. The Reserve Policy terminates on May 15, 2048. Draws under the Reserve Policy may only be used to make payments of principal and interest on the bonds. Cash and investments in the debt service reserve funds shall be transferred to the debt service funds for payment of debt service on the bonds before any draw may be made on the Reserve Policy.

Cash and investments restricted for debt service reserve at June 30, 2021 totaled $82,929,526. Total assets restricted for debt service were $104,110,840, which includes the debt service reserve and other debt service trust accounts of $21,181,314. Cash and investments restricted for debt service reserve at June 30, 2020 totaled $79,555,123. Total assets restricted for debt service were $97,330,639 which includes the debt service reserve and other debt service trust accounts of $17,775,516.

Total restricted cash, cash equivalents, and investments at June 30, 2021 and 2020 totaled $104,110,840 and $97,330,639, respectively.

## NOTE 4 - SCHEDULE OF NET POSITION

A comparative Schedule of Net Position follows:

| *(dollars in thousands)* | June 30, 2021 | June 30, 2020 |
|---|---|---|
| Net investment in capital assets: | | |
| Plant, lines and other facilities net of depreciation | $ 3,458,906 | $ 3,302,757 |
| Outstanding debt that applies to plant, lines and other facilities | (2,674,370) | (2,591,315) |
| Accounts payable and accrued expenses (capital) | (46,237) | (39,860) |
| Deferred outflows and inflows of resources | 24,549 | 12,830 |
| Total | 762,848 | 684,412 |
| Restricted for: | | |
| Assets restricted for debt service | 104,111 | 97,331 |
| Liabilities associated with restricted debt service | (19,682) | (16,910) |
| | 84,429 | 80,421 |
| Unrestricted net position | 488 | 31,897 |
| Total net position | $ 847,765 | $ 796,730 |

## NOTE 5 - CAPITAL ASSETS - PLANT, LINES AND OTHER FACILITIES

A comparative schedule of plant, lines and other facilities follows:

| June 30, 2021<br>*(dollars in thousands)* | Beginning Balance | Transfers In/ Additions | Retirements / Reclassifications | Ending Balance |
|---|---|---|---|---|
| Capital assets: | | | | |
| Sewer lines | $ 1,746,706 | $ 14,719 | $ - | $ 1,761,425 |
| Wastewater treatment facilities | 627,902 | 13,512 | - | 641,414 |
| Drainage facilities | 880,863 | 116,598 | - | 997,461 |
| Pumping and lift stations | 256,229 | 4,207 | (205) | 260,231 |
| Administrative facilities | 52,297 | 51 | - | 52,348 |
| Maintenance facilities | 12,459 | 1,842 | - | 14,301 |
| Machinery and equipment | 89,137 | 1,652 | (2,296) | 88,493 |
| Miscellaneous | 32,129 | 1,246 | - | 33,375 |
| Capitalized interest | 416,919 | 12,049 | - | 428,968 |
| Total capital assets | 4,114,641 | 165,876 | (2,501) | 4,278,016 |
| Less accumulated depreciation and amortization: | | | | |
| Sewer lines | (383,297) | (22,869) | - | (406,166) |
| Wastewater treatment facilities | (412,741) | (20,120) | - | (432,861) |
| Drainage facilities | (183,231) | (19,969) | - | (203,200) |
| Pumping and lift stations | (98,378) | (13,936) | - | (112,314) |
| Administrative facilities | (40,918) | (1,151) | - | (42,069) |
| Maintenance facilities | (7,040) | (320) | - | (7,360) |
| Machinery and equipment | (65,414) | (6,884) | 2,295 | (70,003) |
| Miscellaneous | (30,649) | (925) | - | (31,574) |
| Capitalized interest | (128,229) | (10,447) | - | (138,676) |
| Total accumulated depreciation/amortization | (1,349,897) | (96,621) | 2,295 | (1,444,223) |
| Construction in progress | 538,013 | 221,005 | (133,905) | 625,113 |
| Net capital assets | $ 3,302,757 | $ 290,260 | $ (134,111) | $ 3,458,906 |

Capital assets include non-depreciable assets for land related to all facilities and pumping and lift stations. The carrying value was $38,161,779 and $34,716,044 at June 30, 2021 and 2020 respectively.

In fiscal year 2020, MSD disposed of the remaining three dryers that comprised the drum dryer asset at the Morris Forman Water Quality Treatment Center. The dryers were sold for scrap. The resulting loss on disposal was $15,008,849 and is recorded as a component of non-operating revenue (expenses).

| June 30, 2020 *(dollars in thousands)* | Beginning Balance* | Transfers In/ Additions | Retirements / Reclassifications | Ending Balance |
|---|---|---|---|---|
| Capital assets: | | | | |
| Sewer lines | $ 1,668,227 | $ 78,479 | $ - | $ 1,746,706 |
| Wastewater treatment facilities | 691,122 | 15,131 | (78,351) | 627,902 |
| Drainage facilities | 817,128 | 63,735 | - | 880,863 |
| Pumping and lift stations | 248,801 | 7,427 | - | 256,228 |
| Administrative facilities | 51,735 | 563 | - | 52,298 |
| Maintenance facilities | 12,459 | - | - | 12,459 |
| Machinery and equipment | 87,253 | 2,190 | (306) | 89,137 |
| Miscellaneous | 32,129 | - | - | 32,129 |
| Capitalized interest | 403,876 | 13,043 | - | 416,919 |
| Total capital assets | 4,012,730 | 180,568 | (78,657) | 4,114,641 |
| Less accumulated depreciation and amortization: | | | | |
| Sewer lines | (362,098) | (21,199) | - | (383,297) |
| Wastewater treatment facilities | (451,191) | (24,893) | 63,343 | (412,741) |
| Drainage facilities | (165,782) | (17,449) | - | (183,231) |
| Pumping and lift stations | (85,103) | (13,275) | - | (98,378) |
| Administrative facilities | (39,866) | (1,052) | - | (40,918) |
| Maintenance facilities | (6,746) | (294) | - | (7,040) |
| Machinery and equipment | (59,065) | (6,655) | 306 | (65,414) |
| Miscellaneous | (29,735) | (914) | - | (30,649) |
| Capitalized interest | (118,132) | (10,097) | - | (128,229) |
| Total accumulated depreciation/amortization | (1,317,718) | (95,828) | 63,649 | (1,349,897) |
| Construction in progress | 460,501 | 219,100 | (141,588) | 538,013 |
| Net capital assets | $ 3,155,513 | $ 303,840 | $ (156,596) | $ 3,302,757 |

*Beginning balance changes from prior year are due to OCEA merger.

## NOTE 6 - CAPITALIZED INTEREST

A comparative schedule of capitalized interest and net interest expense reported in non-operating expenses follows:

| *(dollars in thousands)* | June 30, 2021 | June 30, 2020 |
|---|---|---|
| Interest incurred | $ 101,642 | $ 103,145 |
| Less interest capitalization | (12,049) | (13,043) |
| Interest expense, net | $ 89,593 | $ 90,102 |

## NOTE 7 - LONG-TERM DEBT

A schedule of long-term debt outstanding at June 30, 2021 and 2020 follows.

June 30, 2021
*(dollars in thousands)*

| Issue Description | Outstanding at Beginning of Year | Issued | Retired | Outstanding at End of Year | Payable Within One Year |
|---|---|---|---|---|---|
| Revenue bonds | $1,911,915 | $ 337,065 | $ 143,860 | $2,105,120 | $ 47,565 |
| Unamortized premium/discount | 74,458 | 18,072 | 17,713 | 74,817 | - |
| General obligation bonds | 12,453 | - | 824 | 11,629 | 855 |
| Commercial paper notes | 255,000 | 365,000 | 470,000 | 150,000 | - |
| Bank notes | 100 | - | 100 | - | - |
| SRF loans | 15,818 | 17,860 | 1,216 | 32,462 | 802 |
| Financing lease | 2,180 | - | 150 | 2,030 | 160 |
| Total | $2,271,924 | $ 737,997 | $ 633,863 | $2,376,058 | $ 49,382 |

June 30, 2020
*(dollars in thousands)*

| Issue Description | Outstanding at Beginning of Year | Issued | Retired | Outstanding at End of Year | Payable Within One Year |
|---|---|---|---|---|---|
| Revenue bonds | $1,956,540 | $ 30,910 | $ 75,535 | $1,911,915 | $ 43,460 |
| Unamortized premium/discount | 80,421 | 6,714 | 12,677 | 74,458 | - |
| General obligation bonds* | 13,267 | - | 814 | 12,453 | 824 |
| Commercial paper notes | 120,000 | 770,000 | 635,000 | 255,000 | - |
| Bank notes | 100 | 90,200 | 90,200 | 100 | 100 |
| SRF loans* | 15,250 | 1,729 | 1,161 | 15,818 | 1,193 |
| Financing lease* | 2,325 | - | 145 | 2,180 | 150 |
| Total | $2,187,903 | $ 899,553 | $ 815,532 | $2,271,924 | $ 45,727 |

*Beginning balance changes from prior year are due to OCEA merger.

**Revenue Bonds:** MSD's long-term revenue bonds are publicly issued under its General Bond Resolution adopted December 7, 1992, to pay at maturity program notes issued and outstanding as senior subordinated debt under the Program Note Resolution adopted June 25, 2018. Prior to 2018, MSD publicly issued revenue bonds to finance sewer and drainage projects. MSD has pledged all revenues to the payment of principal and interest on its outstanding revenue bonds. Pursuant to the General Bond Resolution, upon the occurrence of any event of default, holder or holders of twenty percent in principal amount or more of the bonds then outstanding may apply to a Judge in the Circuit Court of Jefferson County to appoint a trustee to represent all Bondholders and the trustee may declare all bonds due and payable. MSD has remedies available under the Resolution to cure the event of default even after all bonds are declared due and payable.

Federal tax regulations generally require the periodic payment to the U.S. Treasury of investment earnings on the proceeds of an issue of tax-exempt municipal bonds to the extent those earnings exceed the yield on the bonds. Such payments, known as arbitrage rebate, are normally payable every fifth year following the issuance of a Series of bonds and upon the retirement of the bond issue. MSD has arbitrage calculations performed as needed by an independent third party to comply with these regulations. As of June 30, 2021 and 2020, MSD's accrued liability for arbitrage rebate was $773,553 and $626,441, respectively.

A debt service coverage ratio covenant has been established under the 1992 General Bond Resolution. MSD was in compliance with the ratio covenant as of June 30, 2021 and 2020.

*Fiscal Year 2021 Significant Debt Transactions:* On July 30, 2020, MSD issued $225,000,000 of revenue bonds, Series 2020A. The proceeds of the Series 2020A bonds will be used (i) to pay at maturity, redeem, and refund program notes issued and outstanding as senior subordinated debt under the resolution and MSD's program note resolution, the proceeds of which were used for the purpose of financing the cost of capital improvements and additions to MSD's sewer and drainage stem and refinancing other program notes previously used under the program note resolution and (ii) to pay the costs of issuance of the Series 2020A bonds. The final maturity of Series 2020A bonds is May 15, 2050.

On September 22, 2020 MSD sold $112,065,000 of its taxable sewer and drainage system revenue refunding bonds Series 2020C. The proceeds of the Series 2020C bonds will be used: (i) together with other available funds of the District, to advance refund and redeem on May 15, 2023, MSD's sewer and drainage system revenue refunding bonds, Series 2013C maturing on and after May 15, 2024 and (ii) to pay the costs of issuance of the Series 2020C bonds. The proceeds of the prior bonds were used to pay the costs of capital improvements and additions to MSD's sewer and drainage system. The sale of the Series 2020C bonds closed on October 15, 2020. The refunding reduces debt service payments over the next twenty four years by $26,590,053 which is a net present value savings of $18,675,198.

Proceeds of the Series 2020C bonds were deposited in an escrow account at the Bank of New York Mellon and will be used to redeem the Series 2013C bonds at maturity. As of June 30, 2021, the amount outstanding on the refunded portion of the Series 2013C bond is $98,875,000 maturing on May 13, 2023. The refunded portion of the Series 2013C bonds is considered legally defeased. As such, the escrow accounts' assets and liabilities for the defeased bonds are not included in MSD's financial statements.

On March 15, 2021 MSD issued under the General Bond Resolution, to the United States Environmental Protection Agency (EPA), its sewer and drainage system revenue bonds, Series 2020B, in the principal amount of $96,126,000. The Series 2020B bonds evidence a loan from the EPA to MSD under the federal Water Infrastructure Finance and Innovation Act (WIFIA) for the purpose of financing the costs of constructing the Morris Forman Water Quality Treatment Center Biosolids Processing project. MSD's loan agreement with the EPA prohibits MSD from incurring additional debt without the permission of the EPA if a payment default has occurred and is continuing under the WIFIA loan agreement. As of June 30, 2021, the Biosolids Processing project is in the initiation and procurement phase and no draws on this loan have been made.

*Fiscal Year 2020 Significant Debt Transactions:* On August 19, 2019, MSD issued $30,910,000 of revenue refunding bonds, Series 2019. The proceeds of the Series 2019 bonds, together with certain amounts in the debt service account, were used to: (i) currently refund $35,155,000 of outstanding principal amount on MSD's sewer and drainage system revenue bonds, Series 2009B, maturing May 15, 2020 through May 15, 2023, the proceeds of which were used to pay, or to refund earlier Series of bond and notes issued to pay, the costs of improvements to MSD's sewer and drainage system, and (ii) pay the cost of issuance of the

Series 2019 bonds. The refunding reduces debt service payments over the next 4 years by $5,107,297 and resulted in a net present value savings of $2,573,449.

On March 25, 2020, MSD entered into a Forward Delivery Bond Purchase agreement to refund $243,910,000 of the Series 2011A bonds. Under the terms of the agreement, MSD has authorized the issuance, on a direct placement, forward delivery basis, of its sewer and drainage system revenue refunding bonds, Series 2021A. The bonds will be dated and delivered on August 17, 2021. Under the terms of a draft continuing covenant agreement for the 2021A bonds, if an event of default occurs the purchaser may declare the outstanding amount of principal and interest on the bonds to be immediately due and payable. The refunding reduces debt service payments by $56,554,774 beginning in 2022 through 2034 which results in a net present value savings of $45,575,104.

A comparative schedule of revenue bonds payable at June 30, 2021 and 2020 follows:

| *(dollars in thousands)* Revenue Bonds | Original Issue Amount | Interest Rates | Final Payment In | Outstanding as of June 30: 2021 | 2020 |
|---|---|---|---|---|---|
| 2009C Series Revenue Bonds | 180,000 | 5.98% | 2040 | 180,000 | 180,000 |
| 2010A Series Revenue Bonds | 330,000 | 6.25% | 2043 | 330,000 | 330,000 |
| 2011A Series Revenue Bonds | 263,360 | 3.00% - 5.00% | 2034 | 243,910 | 246,225 |
| 2013A Series Revenue Bonds | 115,790 | 4.00% | 2036 | 115,790 | 115,790 |
| 2013B Series Revenue Bonds | 119,515 | 4.00% - 5.00% | 2038 | 110,970 | 112,575 |
| 2013C Series Revenue Bonds | 100,000 | 3.00% - 5.00% | 2023 | 250 | 99,250 |
| 2014A Series Revenue Bonds | 80,000 | 4.00% - 5.00% | 2045 | 79,700 | 79,750 |
| 2015A Series Revenue Bonds | 175,000 | 3.125% - 5.00% | 2046 | 172,175 | 173,160 |
| 2015B Series Revenue Bonds | 81,750 | 2.65% - 5.00% | 2038 | 68,815 | 71,515 |
| 2016A Series Revenue Bonds | 150,000 | 3.00% - 5.00% | 2047 | 148,415 | 149,290 |
| 2016B Series Revenue Bonds | 28,315 | 2.00% - 5.00% | 2036 | 21,960 | 23,915 |
| 2016C Series Revenue Bonds | 67,685 | 5.00% | 2023 | 32,305 | 50,515 |
| 2017A Series Revenue Bonds | 175,000 | 3.00% - 5.00% | 2048 | 155,790 | 161,895 |
| 2017B Series Revenue Bonds | 35,725 | 5.00% | 2025 | 32,055 | 32,885 |
| 2018A Series Revenue Bonds | 60,380 | 4.00% | 2038 | 60,380 | 60,380 |
| 2019A Series Revenue Bonds | 30,910 | 4.00% | 2023 | 17,065 | 24,770 |
| 2020A Series Revenue Bonds | 225,000 | 2.00% - 5.00% | 2050 | 224,750 | - |
| 2020C Series Revenue Bonds | 112,065 | 0.29% - 2.65% | 2044 | 110,790 | - |
| Total revenue bonds | | | | 2,105,120 | 1,911,915 |
| Add: unamortized premium/discount | | | | 74,817 | 74,458 |
| Total bonds payable | | | | 2,179,937 | 1,986,373 |
| Less: current maturities | | | | (47,565) | (43,460) |
| Total bonds payable, long term portion | | | | $ 2,132,372 | $ 1,942,913 |

A schedule of future revenue bond debt service requirements after June 30, 2021 follows:

| *(dollars in thousands)* | Revenue Bonds | | |
|---|---|---|---|
| | Principal | Interest | Total |
| Year Ending June 30, | | | |
| 2022 | 47,565 | 92,907 | 140,472 |
| 2023 | 50,095 | 90,588 | 140,683 |
| 2024 | 49,580 | 88,138 | 137,718 |
| 2025 | 52,890 | 85,800 | 138,690 |
| 2026 | 51,680 | 83,282 | 134,962 |
| 2027-2031 | 277,055 | 373,167 | 650,222 |
| 2032-2036 | 357,155 | 320,568 | 677,723 |
| 2037-2041 | 572,060 | 225,631 | 797,691 |
| 2042-2046 | 533,565 | 77,172 | 610,737 |
| 2047-2051 | 113,475 | 5,564 | 119,039 |
| | $ 2,105,120 | $ 1,442,817 | $ 3,547,937 |

A comparative summary of current and long-term revenue bond activity follows:

| *(dollars in thousands)* | June 30, | |
|---|---|---|
| | 2021 | 2020 |
| Revenue bonds - beginning of year | $ 1,911,915 | $ 1,956,540 |
| Bonds issued | 337,065 | 30,910 |
| Principal paid on bonds and bond refunding | (143,860) | (75,535) |
| Revenue bonds - end of year | $ 2,105,120 | $ 1,911,915 |

**General Obligation Bonds:** MSD merged with the OCEA on June 30, 2020. Oldham County previously issued its County of Oldham general obligation bonds Series 2009, Series 2014, and general obligation Series 2017 refunding bonds, the proceeds of which financed the costs of various improvements to the sanitary sewer system owned by OCEA. The balance of the bonds outstanding as of June 30, 2021 and June 30, 2020 was $11,628,805 and $12,452,783, respectively. MSD agreed to support Oldham County's payment of debt service for the supported bonds subject to the terms of an Assistance Agreement dated June 30, 2020. Upon the occurrence of an uncured event of default under the Assistance Agreement, Oldham County is entitled to exercise any and all remedies available at law or in equity.

A comparative summary of current and long-term general obligation bond activity follows:

| *(dollars in thousands)* General Obligation Bonds | Original Issue Amount | Interest Rates | Final Payment In | Outstanding as of June 30: 2021 | 2020 |
|---|---|---|---|---|---|
| 2009 Series general obligation bonds | 7,335 | 2.00% - 4.00% | 2023 | 785 | 1,155 |
| 2017 Series general obligation bonds | 3,750 | 2.08% | 2030 | 3,399 | 3,433 |
| 2014 Series general obligation bonds | 9,790 | 3.00% - 3.20% | 2035 | 7,445 | 7,865 |
| Total general obligation bonds | | | | 11,629 | 12,453 |
| Less: current maturities | | | | (855) | (824) |
| Total bonds payable, long term portion | | | | $ 10,774 | $ 11,629 |

**Commercial Paper and Bank Notes:** On June 25, 2018, the MSD Board adopted a Program Note Resolution authorizing the issuance of one or more Series of sewer and drainage system subordinated program notes in an aggregate principal amount not to exceed $500,000,000 for the purpose of financing eligible sewer and drainage projects and to refund program notes or subordinate lien bond anticipation notes. Program notes issued under the Program Note Resolution are subordinate and junior in all respects to revenue bonds issued under the General Bond Resolution. Program notes are issued as senior subordinated debt secured on a parity with the bond anticipation notes[7].

MSD has issued two subseries of commercial paper notes under the Program Note Resolution: Series 2018A-1 with a maximum outstanding of $250,000,000 and Series 2018A-2 with a maximum outstanding of $250,000,000. Commercial paper notes may be issued and sold, at public or private sale, as taxable or tax-exempt notes, maturing in 270 days or less (but in any event not later than June 30, 2023) as determined by MSD, and bearing interest at a rate not in excess of 12% per annum for taxable notes or 10% per annum for tax-exempt notes. Commercial paper notes are payable only from (i) proceeds of the sale of other commercial paper notes issued under the Program Note Resolution and used to refund outstanding commercial paper notes, (ii) the proceeds of direct purchase notes or other loans used to refund outstanding commercial paper notes, and (iii) the proceeds of revenue bonds issued to pay outstanding commercial paper notes.

Liquidity support for the Commercial Paper Series 2018A-1 is provided by Bank of America, N.A (BANA) pursuant to a Revolving Credit Agreement dated July 1, 2018 and amended December 22, 2020. BANA has provided a commitment of $250,000,000 for the payment of the principal of and interest on the Series 2018A-1 notes. MSD and BANA entered into a Note Purchase Agreement dated July 1, 2018 and amended December 22, 2020 providing for the purchase of direct purchase notes by BANA up to the aggregate principal amount of $250,000,000. The BANA Revolving Credit Agreement and the BANA Note Purchase Agreement limit the aggregate principal amount of commercial paper notes Series 2018A-1 and the BANA direct purchase notes to $250,000,000. Merrill Lynch, Pierce, Fenner & Smith Inc. is acting as the dealer for Series 2018A-1 notes.

Liquidity support for the Commercial Paper Series 2018A-2 is provided by JPMorgan Chase Bank (JPMCB) pursuant to a revolving credit agreement dated July 1, 2018 and amended December 22, 2020. JPMCB has provided a commitment of $250,000,000 for the payment of the principal of and interest on the Series 2018A-2 notes. MSD and JPMCB entered into a Note Purchase Agreement dated July 1, 2018 and amended December 22, 2020 providing for the purchase of direct purchase notes by JPMCB up to the aggregate principal amount of $250,000,000. The JPMCB Revolving Credit Agreement and the JPMCB Note Purchase Agreement limit the aggregate principal amount of commercial paper notes Series 2018A-

[7] See Note 8 – Bond Anticipation Notes.

2 and the JPMCB direct purchase notes to $250,000,000. J.P. Morgan Securities is acting as the dealer for Series 2018A-2 notes.

Upon the occurrence of any special event of default under the Revolving Credit Agreements and Note Purchase Agreements, the commitment shall immediately terminate with respect to all commercial paper notes and the banks shall have no obligation to make any loan or to fund any outstanding commercial paper note. Upon the occurrence of an event of default that is not a special event of default, the banks may, by notice to MSD, terminate the commitment, if any (except as provided below), deliver a notice of no-issuance to MSD and to the Issuing and Paying Agent directing the Issuing and Paying Agent to cease issuing all commercial paper notes. The available commitment shall immediately be reduced to the then outstanding principal amount of commercial paper notes plus the amount of interest to accrue on such notes and the available commitment shall be further reduced in a similar manner when commercial paper notes mature provided the commitment does not terminate, and the right of the bank to accelerate the maturity of the note and the loans shall not affect the obligation of the bank to make loans in aggregate principal amount equal to the commitment to the extent necessary for MSD to make required payments of principal on the commercial paper notes issued and sold prior to the date upon which the notice of no-issuance is received by the Issuing and Paying Agent; provided further that if any loans are made that would not have been made but for the application of the preceding provision, such loans shall be immediately due and payable on the date such loans are made.

Moody's Investors Service and Standard and Poor's Ratings Services assigned ratings of P-1 and A-1+, respectively, to the commercial paper notes on June 29, 2018.

Commercial paper notes of $150,000,000 were outstanding as of June 30, 2021 in accordance with the respective Revolving Credit Agreements. Interest rates on the notes outstanding range from 0.10% to 0.15% and maturities range from 1 to 139 days.

The following tables summarize the outstanding and available balance of the commercial paper program for the years ended June 30, 2021 and 2020:

June 30, 2021
*(dollars in thousands)*

| Issue Description | Authorized Amount | Amount Outstanding | Unissued Portion |
|---|---|---|---|
| Series 2018A-1 | $ 250,000 | $ 75,000 | $ 175,000 |
| Series 2018A-2 | 250,000 | 75,000 | 175,000 |
| Total | $ 500,000 | $ 150,000 | $ 350,000 |

June 30, 2020
*(dollars in thousands)*

| Issue Description | Authorized Amount | Amount Outstanding | Unissued Portion |
|---|---|---|---|
| Series 2018A-1 | $ 250,000 | $ 155,000 | $ 95,000 |
| Series 2018A-2 | 250,000 | 100,000 | 150,000 |
| Total | $ 500,000 | $ 255,000 | $ 245,000 |

MSD has classified all outstanding commercial paper notes as long-term debt in accordance with GASB 62 as it intends to redeem the notes with the proceeds of long-term revenue bonds.

The following tables summarize transactions of the commercial paper program for the years ended June 30, 2021 and 2020:

June 30, 2021
*(dollars in thousands)*

| Issue Description | Outstanding Notes at Beginning of Year | Notes Issued | Notes Retired | Outstanding Notes at End of Year | Payable Within One Year |
|---|---|---|---|---|---|
| Series 2018A-1 | $ 155,000 | $ 205,000 | $ 285,000 | $ 75,000 | $ - |
| Series 2018A-2 | 100,000 | 160,000 | 185,000 | 75,000 | - |
| Total | $ 255,000 | $ 365,000 | $ 470,000 | $ 150,000 | $ - |

June 30, 2020
*(dollars in thousands)*

| Issue Description | Outstanding Notes at Beginning of Year | Notes Issued | Notes Retired | Outstanding Notes at End of Year | Payable Within One Year |
|---|---|---|---|---|---|
| Series 2018A-1 | $ 60,000 | $ 405,000 | $ 310,000 | $ 155,000 | $ - |
| Series 2018A-2 | 60,000 | 365,000 | 325,000 | 100,000 | - |
| Total | $ 120,000 | $ 770,000 | $ 635,000 | $ 255,000 | $ - |

**State Revolving Fund Loans:** MSD utilizes funding provided through the Kentucky Infrastructure Authority's (KIA) State Revolving Fund (SRF). The SRF financing program provides low interest loans for infrastructure projects that are considered a priority based on the water pollution control criteria outlined in the Clean Water Act. MSD's SRF loans are considered direct placement debt and carry interest rates ranging between 1.75% and 3.8%. Under the assistance agreements entered into with the KIA, upon the occurrence and continuance of any event of default, the Authority may declare all payments due at a default rate of 8%. Additionally, when an event of default occurs and is continuing, the Authority can declares all payments due, exercise all rights and remedies, take legal action to enforce its rights under the agreement, and submit a formal referral to the appropriate federal agency.

*Fiscal Year 2021 Significant SRF Transactions:* On March 5, 2021, KIA approved loan number A21-022 for $8,270,000 to rehabilitate or replace several sewer pump stations. MSD anticipates it will execute an assistance agreement for this project with the KIA in fiscal year 2022. Interest will be payable semiannually at a fixed rate of 2.5% per annum commencing after funds are first drawn on the loan. The loan will be repaid over a period not to exceed 20 years from the date the project is placed in operation. No draws have been made as of June 30, 2021.

As of June 30, 2021, MSD has expended $24,200,000 in eligible project costs for loan number A19-028. $17,788,487 has been drawn and the remainder will be drawn in fiscal year 2022.

As of June 30, 2021, MSD has expended $1,690,760 in eligible project costs for loan number A19-015. These project costs will be drawn in fiscal year 2022.

*Fiscal Year 2020 Significant SRF Transactions:* MSD entered into an assistance agreement with the KIA on December 20, 2019 for a SRF loan (loan number A19-028) in an amount not to exceed $24,200,000 to finance the rehabilitation of aging infrastructure at its Hite Creek Water Quality Treatment Center. The capacity of the treatment center will be expanded to eliminate sanitary sewer overflows upstream of the treatment center and allow for future growth. Interest will be payable semiannually at a fixed rate of 2% per annum commencing after funds are first drawn on the loan. The loan will be repaid over a period not to exceed twenty years from the date the project is placed in operation.

MSD entered into an assistance agreement with the KIA on December 20, 2019 for a SRF loan (loan number A19-015) in an amount not to exceed $3,870,000 to finance the rehabilitation 47,000 linear feet of sewer lines. Interest will be payable semiannually at a fixed rate of 2% per annum commencing after funds are first drawn on the loan. The loan will be repaid over a period not to exceed twenty years from the date the project is placed in operation.

MSD entered into an assistance agreement with the KIA on June 30, 2020, as part of its merger with OCEA, to assume eight existing SRF loans extended to the OCEA with total outstanding principal in the amount of $13,705,711. These loans financed various sewer system infrastructure projects in the OCEA service area. Six of these loans are for completed projects and principal repayment has begun. Two loans are financing projects that are still under construction. Principal repayment will begin once the projects are placed in operation. Interest will be paid semiannually at fixed rates ranging from 1.75% to 3% per annum. The loans will be repaid over a period not to exceed twenty years.

At June 30, 2021 and 2020 MSD had the following SRF direct placement debt outstanding:

June 30, 2021
*(dollars in thousands)*

| Loan Number | Loan Amount | Drawn Amount | Interest Rate | Final Payment In | Outstanding at end of Year |
|---|---|---|---|---|---|
| A98-04 | 6,498 | 6,498 | 3.80% | 2021 | - |
| A09-41 | 2,395 | 2,395 | 3.00% | 2033 | 1,548 |
| A10-04 | 2,843 | 2,843 | 2.00% | 2033 | 1,839 |
| A10-05 | 1,000 | 1,000 | 3.00% | 2033 | 670 |
| A10-06 | 121 | 121 | 2.00% | 2033 | 76 |
| A10-07 | 2,538 | 2,538 | 2.00% | 2034 | 1,703 |
| A11-15 | 671 | 671 | 2.00% | 2033 | 434 |
| A12-29 | 6,500 | 6,500 | 1.75% | 2037 | 5,228 |
| A17-028 | 6,300 | 2,013 | 1.75% | * | 2,084 |
| A18-010 | 1,116 | 1,116 | 1.75% | 2040 | 1,092 |
| A19-028 | 24,200 | 17,788 | 2.00% | ** | 17,788 |
| Total loans payable | | | | | 32,462 |
| Less: current maturities | | | | | (802) |
| Total long-term loans payable, long term portion | | | | | $ 31,660 |

* Loan is partially drawn. Final payment will be 20 years following project completion currently scheduled for FY23.
**Loan is partially drawn. Final payment will be 20 years following project completion currently scheduled for FY22.

June 30, 2020
*(dollars in thousands)*

| Loan Number | Loan Amount | Drawn Amount | Interest Rate | Final Payment In | Outstanding at end of Year |
|---|---|---|---|---|---|
| A98-04 | 6,498 | 6,498 | 3.80% | 2021 | 454 |
| A09-41 | 2,395 | 2,395 | 3.00% | 2033 | 1,659 |
| A10-04 | 2,843 | 2,843 | 2.00% | 2033 | 1,974 |
| A10-05 | 1,000 | 1,000 | 3.00% | 2033 | 715 |
| A10-06 | 121 | 121 | 2.00% | 2033 | 81 |
| A10-07 | 2,538 | 2,538 | 2.00% | 2034 | 1,821 |
| A11-15 | 671 | 671 | 2.00% | 2033 | 465 |
| A12-29 | 6,500 | 6,500 | 1.75% | 2037 | 5,520 |
| A17-028 | 6,300 | 2,013 | 1.75% | * | 2,013 |
| A18-010 | 2,000 | 1,116 | 1.75% | ** | 1,116 |
| Total loans payable | | | | | 15,818 |
| Less: current maturities | | | | | (1,193) |
| Total long-term loans payable, long term portion | | | | | $ 14,625 |

* Loan is partially drawn. Final payment will be 20 years following project completion currently scheduled for FY23.
**Loan is partially drawn. Final payment will be 20 years following project completion currently scheduled for FY21.

**KACO Financing Lease:** Oldham County Fiscal Court, on behalf of OCEA, previously entered into a lease financing obligation with the Kentucky Association of Counties Leasing Trust in the amount of $4,000,000 at an interest rate of 4.94% to finance various treatment facilities. MSD entered into a sublease agreement with the County of Oldham Kentucky, as part of its merger with OCEA, on June 30, 2020 to make the remaining lease rental payments when due. In the event of default, the sublessor may by written notice, take possession of the project, sell or lease the project, or exercise any remedy available to it under applicable law. At June 30, 2021 and 2020, the remaining principal balance is $2,030,000 and 2,180,000, respectively. Final maturity is in 2031.

**Line of Credit:** MSD secured an uncommitted $25,000,000 line of credit in October 2015. As of June 30, 2021 and 2020 MSD does not owe anything on its line of credit. There was no activity on the line of credit in fiscal year 2021 or 2020.

## NOTE 8 – BOND ANTICIPATION NOTES

MSD issues bond anticipation notes (BAN) under its Subordinated Bond Resolution adopted April 26, 2010. Bonds issued under the Subordinated Resolution are superior in priority to all revenue debt of the district except bonds issued under the General Bond Resolution. Pursuant to the Subordinated Resolution, upon the occurrence and continuance of any event of default, the paying agent may or the holders of more than fifty percent in principal amount of outstanding notes may, by notice delivered to MSD, declare the principal and interest of all notes immediately due and payable. MSD has remedies under the resolution to cure the event of default and annul the declaration of acceleration.

MSD first publicly offered and issued a $226,340,000 BAN to partially refund its then outstanding sewer and drainage system revenue bonds, Series 1999A and a portion of its Series 1997A and 1998A revenue bonds on August 19, 2009. The BAN has been reissued annually. Under GASB 62, the BAN is considered a non-current liability because MSD intends to replace the Series 2020 BAN with a new BAN in October 2021 which will extend the debt to October 2022. Total BAN outstanding at June 30, 2021 and June 30, 2020 was $226,340,000 and $226,340,000, respectively. MSD's plan is to continue to reissue the BAN annually and amortize the BAN principal over the same period as Series 1999A bonds.

*Fiscal Year 2021 Significant Debt Transactions*: On September 22, 2020, MSD sold $226,340,000 of sewer and drainage system subordinated BAN, Series 2020 with a coupon rate of 5.00% and an effective interest rate of 0.228%. The proceeds of the notes were used to (i) refund the 2019 notes at maturity on October 23, 2020 and (ii) to pay the costs of issuance of the Series 2020 notes. The 2020 notes closed on October 14, 2020 and mature on October 20, 2021.

*Fiscal Year 2020 Significant Debt Transactions*: On September 19, 2019, MSD issued $226,340,000 of sewer and drainage system subordinated BAN, Series 2019, with a coupon rate of 3.0% and an effective interest rate of 1.37%. The proceeds of the notes were used to refund the 2018 notes that matured on November 1, 2019. The 2019 notes closed on September 26, 2019 and mature on October 23, 2020.

A summary of changes in the BAN in fiscal years 2021 and 2020 follows:

June 30, 2021
*(dollars in thousands)*

| Issue Description | Outstanding at Beginning of Year | Issued | Retired | Outstanding at End of Year | Payable Within One Year |
|---|---|---|---|---|---|
| 2019 Bond anticipation note | $ 226,340 | $ - | $ 226,340 | $ - | $ - |
| 2020 Bond anticipation note | - | 226,340 | - | 226,340 | 226,340 |
| Total | $ 226,340 | $ 226,340 | $ 226,340 | $ 226,340 | $ 226,340 |

June 30, 2020
*(dollars in thousands)*

| Issue Description | Outstanding at Beginning of Year | Issued | Retired | Outstanding at End of Year | Payable Within One Year |
|---|---|---|---|---|---|
| 2018 Bond anticipation note | $ 226,340 | $ - | $ 226,340 | $ - | $ - |
| 2019 Bond anticipation note | - | 226,340 | - | 226,340 | 226,340 |
| Total | $ 226,340 | $ 226,340 | $ 226,340 | $ 226,340 | $ 226,340 |

## NOTE 9 – DERIVATIVE INSTRUMENTS

At June 30, 2021, MSD had the following two interest rate derivative instruments outstanding:

*(dollars in thousands)*

| Derivative Instrument | Type | Objective | Counterparty | Original Notional | Notional Amount 6/30/2021 | Effective Date | Termination Date | Terms |
|---|---|---|---|---|---|---|---|---|
| A | Pay-fixed interest rate swap | Hedge interest rate risk on Series 2020 BAN | Wells Fargo, N.A. | $ 180,716 | $ 180,716 | 6/15/2013 | 5/15/2033 | Pay 4.4125% Receive 67% USD-LIBOR -BBA |
| B | Pay-fixed interest rate swap | Hedge interest rate risk on Series 2020 BAN | Bank of America, N.A. | 56,433 | 45,284 | 11/16/2009 | 5/15/2033 | Pay 4.4125% Receive 67% USD-LIBOR -BBA |
| | | | | 237,149 | 226,000 | | | |

MSD originally entered into interest rate swaps as a hedging derivative instrument in anticipation of refinancing the 1999 Series bonds at their call date. Two swaps remain in the portfolio to lower interest rate risk associated with the BAN[8]. The hedgeable item is interest rate risk associated with the expected future issuance of fixed-rate BAN. The BAN are expected to be reissued every year. The swaps are structured so that the notional amounts of the swaps decrease over time corresponding with the planned amortization of the BAN principal.

Interest rate swaps are classified as hedging derivative instruments if they meet the criteria outlined in GASB 53 or as investment derivative instruments if they do not. MSD has designated its interest rate swaps as hedging derivatives under GASB 53 as of July 1, 2019. At June 30, 2021, MSD's interest rate derivatives are effective cash flow hedges and were classified as hedging derivatives in its financial statement. The fair value of the at-market portion, the hedging derivative, is reported as other assets and deferred inflows if positive and other liabilities and deferred outflows if negative on the Statement of Net Position. The difference between the fair value of the at-market hedging derivatives and the fair value of the interest rate swaps is reported as investment derivatives on the Statement of Net Position. All changes in fair value of the derivatives are recorded as a separate component of non-operating revenue (expense).

Both swaps have termination dates of May 15, 2033. Payments are due on the fifteenth of each month. MSD receipt terms are 67% of the 30-day London Inter-Bank Offered Rate (LIBOR). A comparative summary of the change in fair value of the swaps for the years ended June 30, 2021 and 2020 follows:

| *(dollars in thousands)* | June 30, 2021 | June 30, 2020 |
|---|---|---|
| Fair value - beginning of year | $ (93,455) | $ (73,040) |
| Change in fair value | 21,071 | (20,415) |
| Fair value - end of year | $ (72,384) | $ (93,455) |

[8] See Note 8 – Bond Anticipation Notes

Fair values at June 30, 2021 for the non-credit adjusted, at-market portion of the derivatives follows:

| *(dollars in thousands)* | June 30, 2021 | |
|---|---|---|
| Derivatives (at-market) | Clean | Accrued |
| 1999-1 - $180.7M 67% LIBOR fixed payer | $ (6,831) | $ (91) |
| 1999-2 - $56.4M 67% LIBOR fixed payer | (1,710) | (23) |
| Total | $ (8,541) | $ (114) |

Classification at June 30, 2021 of the at-market portion and investment portion of the derivatives follows:

| *(dollars in thousands)* | Changes in Fair Value | | Fair Value as of June 30, 2021 | | |
|---|---|---|---|---|---|
| Governmental Activties | Classification | Amount | Classification | Amount | Notional |
| Cash flow hedges: | | | | | |
| Pay-fixed interest rate swaps | Deferred outflows | $ (8,541) | Other liabilities | $ (71,973) | $ 226,000 |
| | | | Accrued interest | (411) | |
| | | | | $ (72,384) | |
| Investment derivatives: | | | | | |
| Pay-fixed interest rate swaps | Non-operating expenses | (63,432) | | | |
| | | $ (71,973) | | | |

**Valuation Techniques:** The fair values of the interest rate swaps were estimated using the zero-coupon method. This method calculates the future net settlement payments required by the swap, assuming that the current forward rates implied by the yield curve correctly anticipate future spot interest rates. These payments are then discounted using the spot rates implied by the current yield curve for hypothetical zero-coupon bonds due on the date of each future net settlement on the swaps.

Non-performance risk was measured using credit spreads implied by the credit rating for debt issues by entities with similar credit characteristics. This is the best method available under current market conditions since MSD has no credit default swaps that actively trade in the marketplace. For a derivative asset, the adjustment for non-performance risk of counterparties is determined by analyzing counterparty-specific credit default swaps, if available. If not available, credit default swaps in the market for entities of similar type and rating are used with information found in various public and private information services. This analysis is used to construct a credit curve that is applied to the discount curve on the net settlement payments of the derivative. A level two (2) category hierarchy was employed for fair valuation measurement. The positive and negative fair values of the swap agreements were provided by a third-party financial advisor.

**Risks:** *Credit Risk* - MSD has implemented steps to safeguard it against the risks associated with the aforementioned swap transactions. If the swap counterparties do not maintain A1/A+ ratings from Moody's Investors Service and Standard and Poor's Rating Service, the swaps contain provisions that require them to be marked to market weekly with monthly statements sent to MSD and the value will be collateralized with U.S. Treasury and Agency securities with the securities held by a tri-party custodian approved by MSD. All costs of collateralization will be borne by the downgraded party who must post the collateral. In addition, the swaps were awarded to multiple firms to further mitigate the credit risk associated with the transactions.

The credit ratings as of June 30th, 2021 for the swap counterparties are as follows:

| | Credit Ratings | |
|---|---|---|
| | Moody's | Standard & Poor's |
| Bank of America, N.A. | P-1 | A-1 |
| Wells Fargo Bank, N.A. | P-1 | A-1+ |

The agreements also provide for automatic termination if MSD's unenhanced bond rating is downgraded below BBB/Baa. MSD's obligations under all of its outstanding swap agreements are unsecured and subordinate to all bonds issued and outstanding.

The credit adjusted at-market portion, the accrued interest portion and off-market fair value of derivative instruments A and B are in liability positions of $8,541,269, $411,070 and $63,431,428, respectively, at June 30, 2021. The aggregate fair value is negative $72,383,767 (gross of implied note outstanding balance as of June 30, 2021). This represents the maximum loss that would be recognized at the reporting date if one or both swap counterparties failed to perform as contracted. There is no posted collateral to net against the aforementioned fair value.

The contracts for derivative instruments A and B are held by Wells Fargo, N.A. and Bank of America, N.A., respectively, and comprise 100% of the net exposure to credit risk.

*Termination Risk* - Termination risk is generally referred to as the risk that a derivative instrument could be terminated causing MSD to owe a termination payment as a result of any of several events, which may include: a ratings downgrade of the swap counterparty; covenant violations by either party; bankruptcy of either party; a swap payment default of either party; and other default events as defined by the derivative instrument. Any such termination may require MSD to make significant termination payments in the future. The approximate amount of termination payment that MSD would have to pay if each of the derivative instruments were terminated on June 30, 2021 is approximately $72,384,000. It should be noted that this is the non-credit adjusted (non GASB 72) mark-to-market valuation as of last business day of the fiscal year. The provisions of the agreements related to each derivative instrument allow for the offset of certain reimbursable costs related to the termination process.

To further mitigate the effect of termination risk relative to derivative instruments A and B, the agreements contain certain safeguards which include (i) collateral posting requirements as discussed in the preceding Credit Risk section and (ii) except for certain types of termination events there is no automatic early termination.

Derivative instruments A and B may be terminated, if the underlying rating of MSD's obligations that are subject to annual appropriation falls below "BBB" from Standard and Poor's Ratings Service or below "Baa2" from Moody's Investors Service.

While there is no optional termination language in the confirmations of derivative instruments A and B, Wells Fargo, N.A. and Bank of America, N.A., respectively, may accommodate MSD to terminate the derivative instruments early, subject to credit approval.

If, at the time of termination, a swap has a negative fair value, MSD could be liable to the counterparty for a payment equal to the derivative instrument's fair value. If any of the derivative instruments are terminated, either the associated variable rate bonds would no longer be hedged with a synthetic fixed interest rate or the nature of the basis risk associated with the derivative instrument may change. As of June 30, 2021, MSD is not aware of any pending event that would lead to a termination event with respect to any of its existing derivative instruments, which are in force and effect as of such date.

*Basis Risk* – Each of the derivative instruments is associated with certain debt obligations. The debt associated with each of the derivative instruments pays interest at variable interest rates. MSD receives variable payments under the derivative instrument. To the extent these variable payments are not equal to the variable interest payments on the associated debt there may be either a net loss or net benefit to MSD. The net swap payments made by MSD in fiscal year 2021 and fiscal year 2020 were $9,792,937 and $8,026,318, respectively.

*Rollover Risk* – Rollover risk occurs when the term of the derivative instrument is not coincident with the repayment term of the underlying debt obligation. Derivative instruments A and B have terms equal to the critical terms of the hedged interest rate exposure.

*Interest Rate Risk* – MSD is exposed to interest rate risk on its interest rate derivative instruments. On it pay-fixed, receive-variable interest rate swaps, there may be either a net loss or net benefit to MSD depending upon decrease or increases in the USD-LIBOR-BBA yield curve.

**Swap Terminations:** MSD entered into swaps and other derivative contracts to lock in long term rates in advance of issuing long term debt to create and manage variable rate exposure in its debt portfolio and to take advantage of market opportunities to hedge embedded interest rate risk and tax regulation risk that exists on its Statement of Net Position.

Upon a termination of a swap, any termination receipt or payment is amortized into income or expense until the original expiration date of that swap. Any unamortized portion of the receipt or payment is recorded as a deferred debit or credit in long-term liabilities. MSD has swap agreement terminations with deferred inflow of resources balances accreting to non-operating revenue as follows:

- On January 24, 2001, MSD terminated a nineteen-year interest rate swap agreement for $100,000,000 of its fixed-rate 1999 Series sewer and drainage revenue bonds. The termination of this swap agreement resulted in the receipt of a payment in the amount of $7,935,000. This payment will be amortized annually into income until 2019, the original termination date on the agreement.

- In April 2006, MSD entered into a swap agreement with Deutsche Bank AG for an initial notional amount of $171,405,000 which provided that beginning May 15, 2006, a net payment will be made based on MSD paying 78.78% of the 3-month LIBOR index on the notional amount and receiving 73.45% of the 5-year LIBOR Index on the notional amount. On January 23, 2008, MSD terminated this swap agreement and received a termination payment of $4,170,000 that will be amortized until 2023, the original termination date of the agreement.

- On January 25, 2008, MSD terminated a twenty-seven year floating to floating (basis) interest rate swap agreement with a notional amount of $282,165,000. MSD entered into this agreement with Morgan Stanley in April 2006 and paid 67% of the 1-month LIBOR index and received 62.2% of the 5-year LIBOR index. The termination of this swap agreement resulted in the receipt of a payment in the amount of $5,756,000. This payment will be amortized annually into income until 2033, the original termination date of the agreement.

## NOTE 10 - RISK MANAGEMENT

MSD is exposed to various risks of loss related to torts; theft of, damage to and destruction of assets; errors and omissions; natural disasters; and injuries to MSD's employees. These risks are provided through the insurance programs described below.

**Self-Insurance – Group Liability:** MSD participates in the Louisville Area Governmental Self-Insurance Trust (LAGIT). LAGIT, which is certified by the Kentucky Department of Insurance to practice as a group liability self-insurance trust, was created on January 1, 1987. LAGIT members currently include Louisville Metro Government, six smaller cities, and six government agencies. LAGIT was formed to provide better risk protection and lower cost liability insurance by sharing the risk with all of its members. MSD's payments to LAGIT are reflected on the financial statements as an expense. LAGIT provides, after a $300,000 deductible, various liability coverages up to $5,000,000 per occurrence. Excess insurance may provide an additional $2,000,000 of coverage, above the LAGIT $5,000,000, to MSD. The amount of coverage available to MSD could be limited by the total assets of LAGIT and/or claims of other Members under the excess insurance policy.

For fiscal year 2021, MSD exceeded its $300,000 deductible on two LAGIT claims. In *Michael Drew v. MSD, et al*, MSD settled the plaintiff's case for $100,000 at mediation in June 2020. MSD's fees and expenses to defense counsel totaled $282,396. In total LAGIT paid $82,396 towards MSD's defense fees and costs which were paid in fiscal year 21. MSD also resolved the matter of *Brenda Stotts-Young as Administrator of the Estate of Deidre Mengedoht, et al., v. Roger Burdette and MSD* in fiscal year 21. Specifically, MSD paid the Estate of Det. Mengedoht, $10,000,000; Jason Mengedoht, as father, guardian and next of kin of P.M., a minor, $3,650,000; and the "Brady" plaintiffs, the four occupants of the vehicle driven by Quentin Brady, a global $250,000. Of this total settlement, LAGIT contributed the first $7,000,000. MSD's excess liability policies that were in effect at the time of the accident contributed the remainder of the settlement with Nationwide making payment of $5,000,000 and Gemini Berkley making payment of approximately $1,900,000.

MSD maintained additional excess liability coverage for fiscal year 2021. Allied World National Assurance Company (A) provided $10,000,000 of excess liability coverage beyond the $7,000,000 provided through LAGIT. Gemini Insurance Company (A+) provided another $10,000,000 of excess liability coverage beyond $17,000,000. In total, MSD maintained liability coverage of $27,000,000.

For fiscal year 2020, LAGIT provided, after a $300,000 deductible, various liability coverages up to $5,000,000 per occurrence. Excess insurance may provide an additional $2,000,000 of coverage, above the LAGIT $5,000,000, to MSD. The amount of coverage available to MSD could be limited by the total assets of LAGIT and/or claims of other Members under the excess insurance policy. For fiscal year 2021, LAGIT did not make any claim payments on behalf of MSD.

MSD maintained additional excess liability coverage for fiscal year 2020. Scottsdale Insurance Company (A+) provided $5,000,000 of excess liability coverage beyond the $7,000,000 provided through LAGIT. Gemini Insurance Company (A+) provided another $15,000,000 of excess liability coverage beyond $12,000,000. In total, MSD maintained liability coverage of $27,000,000.

**Workers Compensation Insurance:** MSD has chosen to self-insure the basic worker's compensation insurance. Claims administration is handled by a third-party administrator and includes claims monitoring check issuance, settlement negotiations and loss control services. Liabilities are reported when it is probable that a loss has occurred and the amount of the loss can be reasonably estimated. A separate insurance policy provides maximum coverage of $1,000,000 per occurrence and aggregate. A roll forward of worker's compensation claims follows:

| *(dollars in thousands)* | June 30, | | |
|---|---|---|---|
| | 2021 | 2020 | 2019 |
| Liability - beginning of year | $ 2,280 | $ 2,326 | $ 1,557 |
| Claims and changes in estimates | 1,143 | 775 | 1,945 |
| Payments | (797) | (821) | (1,176) |
| Liability - end of year | $ 2,626 | $ 2,280 | $ 2,326 |

**Self-Insurance – Property:** MSD joined the Louisville Area Governmental General Insurance Trust (LAGGIT) in September 2002. LAGGIT was created to provide lower cost to participants and broader coverage for property risks. MSD is responsible for covered property damage up to $100,000 except for flood and vehicle collision coverage, which have separate deductibles. LAGGIT provides coverage for the next $1,000,000 per occurrence, except for Flood Zone A locations. An excess insurance policy with a third-party carrier covers claims in excess of $1,100,000.

No claims were made under the LAGGIT policy in fiscal year 2021.

MSD's facilities were affected by Ohio River flooding in February of 2018 and MSD made a claim on the LAGGIT policy. Payments on this claim totaled $3,757,562. The final payment of $637,408 on this claim was received in fiscal year 2020.

## NOTE 11 - DEFERRED COMPENSATION

MSD offers its employees deferred compensation plans created in accordance with Internal Revenue Service Code Sections 401(k) and 457. These plans, available to all MSD employees, permit them to defer the payment of a portion of their salary until future years. Participation in these plans is voluntary and MSD makes no contributions to these plans on behalf of the employee. The deferred compensation is not available to employees until termination, retirement, death, or unforeseen emergency. All amounts of compensation deferred, including the investments and earnings thereon, vest with the employee and are not subject to the claims of MSD's general creditors.

## NOTE 12 - COMMITMENTS AND CONTINGENCIES

**Sale of Sewer Assessments:** MSD has entered into agreements to sell sanitary sewer assessments to a local bank. These assessments reflect the portion of the cost that residents pay to have sewer lines installed in their neighborhood. Residents are given the opportunity to pay the assessment in full or to finance it over a twenty-year period at 7% interest per annum. The original agreement called for the bank to accept up to $25,000,000 of outstanding assessments and for MSD to receive 104% of the face value of the assessments.

The subsequent agreement allows an additional $5,000,000 of assessments to be sold to the bank at face value. These agreements give the bank the option to place the assessments back with MSD if the property owner's payments are 90 days in arrears or the property owner does not respond to the bank's demand for payment within a 90-day period after the issuance of the assessment. Sales to the bank are net of any subsequent repurchases of warrants by MSD. The unpaid principal balance of loans held by the bank at June 30, 2021 and 2020 was $353,974 and $511,843, respectively.

**EPA Consent Decree:** On August 12, 2005, MSD agreed to enter into a consent decree with the Commonwealth of Kentucky's Environmental and Public Protection Cabinet (KEPPC) and the U.S. Environmental Protection Agency (EPA). The consent decree called for MSD to submit a final Long-Term Control Plan (LTCP) to the KEPPC and EPA for review and joint approval. The final Sanitary Sewer Discharge Plan (SSDP) and the LTCP were certified on December 19, 2008 under the title of the Integrated Overflow Abatement Plan (IOAP). The SSDP included schedules and deadlines for capital projects to be completed by the end of 2024. The LTCP included schedules, and deadlines for combined sewer overflow projects to be completed by December 31, 2020. MSD agreed to pay a civil penalty to the Commonwealth of Kentucky in the amount of $1,000,000 to resolve the violations alleged in the KEPPC's and EPA's complaints up through the date of entry of the consent decree. The agreement called for MSD to perform supplemental environmental projects at an amount of not less than $2,250,000. MSD neither admitted nor denied the alleged violations but acknowledged that discharges occurred and accepted the obligations imposed in the consent decree.

On April 10, 2009, MSD agreed to enter into an amended consent decree with the KEPPC and the EPA. The amended consent decree resolved all pending claims of violations of the Federal Water Pollution Control Act and the Water Quality Act of 1987. The amended consent decree superseded and replaced the original consent decree entered on August 12, 2005. The amended consent decree contains stipulated penalties for MSD's failure to comply with the provisions contained therein. The IOAP was amended in 2012 and 2014 to improve compliance and adjust capital project schedules. To date, MSD has complied with all submittal and report requirements contained in the amended consent decree.

MSD proactively approached Federal and State Regulators in 2019 to renegotiate the timing for completing the remaining LTCP and SSDP projects required by the Amended Consent Decree in order to reprioritize capital dollars for rehabilitation of MSD's aging biosolids systems, failing sewer interceptors and flood protection system rehabilitation. MSD, along with the Commonwealth of Kentucky and the United States of America, have negotiated the Second Amended Consent Decree which grants a time extension for completing the remaining LTCP and SSDP projects to 2035. In exchange, MSD agreed to invest a minimum of $25 million annually for asset management projects through 2035. Additionally, MSD agreed to incorporate $70 million for critical sewer rehabilitation in its 5-year capital improvement plan. These financial commitments are achievable within the MSD Board's rate increase authority of 6.9% per year. Final approval of the Second Amended Consent Decree is pending.

**Claims and Litigation:** MSD is a defendant in various active lawsuits. Although the outcome of these lawsuits is not presently determinable, it is the opinion of the MSD's management that resolution of these matters will not have a material adverse effect on the financial statements of MSD. All material claims and litigation settlements that are both probable and reasonably measureable are recorded in accounts payable.

**Construction Commitments:** The value of construction contracts signed where work has not yet been performed amounted to $88,744,063 at June 30, 2021 and was $144,323,365 at June 30, 2020.

## NOTE 13 - SUBSEQUENT EVENTS

**Bullitt County Sanitation District:** On May 24, 2021, MSD agreed to acquire the Bullitt County Sanitation District (BCSD), subject to the approval of the Kentucky Attorney General and the Louisville and Jefferson County Metro Council. BCSD owns and operates a sewer and wastewater treatment system in Bullitt County, Kentucky serving approximately 4,200 residential customers with eight small "package" wastewater treatment plants. MSD will develop a capital improvement plan to replace the obsolescent facilities of the BCSD and to take advantage of regional economies of scale. Closing of the transaction is expected to occur on or before November 30, 2021.

**KIA Loan A17-028 Increase:** On July 1, 2021, the KIA approved an increase to loan A17-028 in the amount of $1,100,000 to fund additional work eliminating a pump station and increasing pipe diameter to facilitate future regionalization opportunities in Oldham County. The new total loan amount is $7,400,000. Interest is payable semiannually at a fixed rate of 1.75% per annum commencing after funds are first drawn on the loan. The loan shall be repaid over a period not to exceed 20 years from the date of initiation of operation for the project.

**KIA Loan A20-040:** On July 1, 2021, the KIA approved loan A20-040 for the lift station rehabilitation, renovation and replacement project. This project will rehabilitate or replace three lift stations at Club Drive, Cliffwood Drive and Cardinal Harbor in Oldham County. The total amount of the loan shall not exceed $2,944,345. Interest is payable semiannually at a fixed rate of 1.0% per annum commencing after funds are first drawn on the loan. The loan shall be repaid over a period not to exceed 20 years from the date of initiation of operation for the project.

**Second Amended Consent Decree:** The Second Amended Consent Decree was lodged in the Court on July 27, 2021. Final approval of the Second Amended Consent Decree by the Commonwealth of Kentucky and United States of America, and entry by the Court, are subject to the requirements of 28 C.F.R. §50.7, which provides for notice of the lodging of the Second Amended Consent Decree in the Federal Register, and an opportunity for public comment. The comment period has expired and entry of the Second Amended Consent Decree as a final judgement is currently pending consideration of comments by the United States of America.

**Rate Increase:** On August 1, 2021, MSD's rates for wastewater and drainage service charges increased by 6.9%.

**Series 2021A Revenue Refunding Bonds:** On August 17, 2021 MSD closed on the Series 2021A sewer and drainage system revenue refunding bonds.

**Series 2021 BAN:** On September 16, 2021, MSD sold $226,340,000 of sewer and drainage system subordinated BAN, Series 2021 with a coupon rate of 3.00% and an effective interest rate of 0.100%. The proceeds of the notes were used to (i) refund the 2020 notes at maturity on October 20, 2021 and (ii) to pay the costs of issuance of the Series 2021 notes. The 2021 notes closed on October 12, 2021 and mature on October 14, 2022.

**Commercial Paper Program:** Commercial paper notes of $195,000,000 are outstanding as of October 28, 2021 in accordance with the respective Revolving Credit Agreements. Interest rates on the notes outstanding range from 0.10% to 0.13% and maturities range from 4 to 112 days. MSD intends to reissue maturing commercial paper in accordance with the refinancing terms of the Revolving Credit Agreements and periodically refund such maturities with proceeds from the issuance of long-term revenue bonds.

## NOTE 14 - DEFINED BENEFIT PENSION AND OTHER POSTEMPLOYMENT BENEFITS PLAN – COST SHARING – CERS

**General Information about the Pension and OPEB Plan:** All full-time and eligible part-time employees of MSD participate in County Employee Retirement System (CERS), a cost-sharing, multiple-employer defined benefit pension plan administered by the Kentucky Retirement System (KRS, the System), an agency of the Commonwealth. Under the provisions of Kentucky Revised Statute Section 78.520, the Board of Trustees (the Board) of KRS administers CERS, Kentucky Employee Retirement System, and State Police Retirement System. Although the assets of the systems are invested as a whole, each system's assets are used only for the payment of benefits to members of that plan and a pro rata share of administrative costs.

The plan provides for retirement, disability and death benefits to plan members. Retirement benefits may also be extended to beneficiaries of plan members under certain circumstances. Under the provisions of Kentucky Revised Statute Section 61.701, the Board of KRS also administers the Kentucky Retirement System's Insurance Fund. The statutes provide for a single insurance fund to provide group hospital and medical benefits to retirees drawing a benefit from the three pension funds administered by KRS. The assets of the insurance fund are invested as a whole. KRS and the Commonwealth have statutory authority to determine Plan benefits and employer contributions.

KRS issues a publicly available financial report that includes financial statements and required supplementary information for CERS. The report may be obtained by writing to Kentucky Retirement System, Perimeter Park West, 1260 Louisville Road, Frankfort, Kentucky 40601, or it may be found at the KRS website at www.kyret.ky.gov.

**Basis of Accounting:** For purposes of measuring the net pension and other post-employment benefits plan (OPEB) liabilities, deferred outflow of resources and deferred inflow of resources related to pensions and OPEB, pension and OPEB expense, information about the fiduciary net position of CERS and additions to/deductions from CERS's fiduciary net position have been determined on the same basis as they are reported by CERS. For this purpose, benefit payments (including refunds of employee contributions) are recognized when due and payable in accordance with the benefit terms. Investments are reported at fair value.

**Pension Benefits Provided:**

The information below summarizes the major retirement benefit provisions of CERS-Nonhazardous. It is not intended to be, nor should it be interpreted as, a complete statement of all benefit provisions.

*Members whose participation began before 8/1/2004*:

Age and Service Requirement: Age 65 with at least one month of Nonhazardous duty service credit, or at any age with 27 or more years of service credit.

Benefit: If a member has at least 48 months of service, the monthly benefit is 2.20% times final average compensation times years of service depending on participation and retirement dates. Final compensation is calculated by taking the average of the highest five (5) fiscal years of salary. If the number of months of service credit during the five (5) year period is less than forty-eight (48), one (1) or more additional fiscal years shall be used. If a member has less than 48 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.

*Members whose participation began on or after 8/1/2004, but before 9/1/2008:*

Age and Service Requirement: Age 65 with at least one month of Nonhazardous duty service credit, or at any age with 27 or more years of service credit.

Benefit: If a member has at least 48 months of service, the monthly benefit is 2.00% multiplied by final average compensation, multiplied by years of service. Final compensation is calculated by taking the average of the highest five (5) fiscal years of salary. If the number of months of service credit during the five (5) year period is less than forty-eight (48), one (1) or more additional fiscal years shall be used. If a member has less than 48 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.

*Members whose participation began on or after 9/1/2008, but before 1/1/2014:*

Age and Service Requirement: Age 65 with 60 months of Nonhazardous duty service credit, or age 57 if age plus service equals at least 87.

Benefit: The monthly benefit is the following benefit factor based on service credit at retirement plus 2.00% for each year of service greater than 30 years, multiplied by final average compensation, multiplied by years of service.

| Service Credit | Benefit Factor |
|---|---|
| 10 years or less | 1.10% |
| 10+ - 20 years | 1.30% |
| 20+ - 26 years | 1.50% |
| 26+ - 30 years | 1.75% |

Final compensation is calculated by taking the average of the last (not highest) five (5) complete fiscal years of salary. Each fiscal year used to determine final compensation must contain twelve (12) months of service credit.

*Members whose participation began on or after 1/1/2014:*

Age and Service Requirement: Age 65 with 60 months of Nonhazardous duty service credit, or age 57 if age plus service equals at least 87.

Benefit: Each year that a member is an active contributing member to the System, the member contributes 5% of creditable compensation, and the member's employer contributes 4.00% of creditable compensation, which is a portion of the total employer contribution, into a hypothetical account. The hypothetical account will earn interest annually on both the member's and employer's contribution at a minimum rate of 4%. If the System's geometric average net investment return for the previous five years exceeds 4%, then the hypothetical account will be credited with an additional amount of interest equal to 75% of the amount of the return which exceeds 4%. All interest credits will be applied to the hypothetical account balance on June 30 based on the account balance as of June 30 of the previous year. Upon retirement the hypothetical account which includes member contributions, employer contributions and interest credits can be withdrawn from the System as a lump sum or annuitized into a single life annuity option.

**OPEB Benefits Provided:**

The information below summarizes the major retirement benefit provisions of CERS-Nonhazardous. It is not intended to be, nor should it be interpreted as, a complete statement of all benefit provisions.

*Insurance Tier 1: Participation began before 7/1/2003*

Benefit Eligibility**:** Recipient of a retirement allowance

Benefit: The percentage of member premiums paid by the retirement system are dependent on the number of years of service. Benefits also include duty disability retirements, duty death in service, non-duty death in service and surviving spouse of a retiree.

*Insurance Tier 2: Participation began on or after 7/1/2003, but before 9/1/2008*

Benefit Eligibility: Recipient of a retirement allowance with at least 120 months of service at retirement

Benefit: The system provides a monthly contribution subsidy of $10 for each year of earned service. The monthly contribution is increased by 1.5% each July 1. Benefits also include duty disability retirements, duty death in service and non-duty death in service.

*Insurance Tier 3: Participation began on or after 9/1/2008*

Benefit Eligibility: Recipient of a retirement allowance with at least 180 months of service at retirement

Benefit: The system provides a monthly contribution subsidy of $10 for each year of earned service. The monthly contribution is increased by 1.5% each July 1. Benefits also include duty disability retirements, duty death in service and non-duty death in service.

**Contributions***:* MSD was required to contribute at an actuarially determined rate determined by Statute. Per Kentucky Revised Statute Section 78.545(33) normal contribution and past service contribution rates shall be determined by the KRS Board on the basis of an annual valuation last preceding July 1 of a new biennium. The KRS Board may amend contribution rates as of the first day of July of the second year of a biennium, if it is determined on the basis of a subsequent actuarial valuation that amended contribution rates are necessary to satisfy requirements determined in accordance with actuarial bases adopted by the KRS Board.

For the fiscal years ended June 30, 2021 and 2020, participating employers contributed 24.06% (19.3% allocated to pension and 4.76% allocated to OPEB) of each Nonhazardous employee's creditable compensation. These percentages are inclusive of both pension and insurance payments for employers. Administrative costs of KRS are financed through employer contributions and investments earnings. House bill 362 passed during the 2018 legislative session caps CERS employer contribution rate increases up to 12% per year over the prior fiscal year for the period of July 1, 2018 to June 30, 2028. Kentucky Senate Bill passed April 8, 2020 pauses the employer contribution rate for CERS for one year keeping the 2021 rates at the 2020 level.

MSD has met 100% of the contribution funding requirement for the fiscal years ended June 30, 2021 and 2020. Total current year contributions recognized by the Plan were $12,279,191 ($9,849,892 related to pension and $2,429,300 related to OPEB) and $11,384,941 ($9,132,559 related to pension and $2,252,382 related to OPEB) for the years ended June 30, 2021 and 2020, respectively. The OPEB contribution amounts do not include the implicit subsidies reported in the amount of $1,077,498 and $651,513, respectively.

*Members whose participation began before 9/1/2008:*

Nonhazardous member contributions equal 5% of all creditable compensation. Interest paid on the members' accounts is currently 2.5%; and per statute shall not be less than 2.0%. Members are entitled to a full refund of contributions with interest.

*Members whose participation began on or after 9/1/2008, but before 1/1/2014:*

Nonhazardous member contributions equal to 6% of all creditable compensation, with 5% being credited to the member's account and 1% deposited to the KRS 401(h) Account. Interest paid on the members' accounts will be set at 2.5%. Members are entitled to a full refund of contributions and interest in their individual account, however, the 1% contributed to the insurance fund is non-refundable.

*Members whose participation began on or after 1/1/2014*

Nonhazardous member contributions equal to 6% of all creditable compensation, with 5% being credited to the member's account and 1% deposited to the KRS 401(h) Account. M embers are entitled to a full refund of contributions and interest on the member's portion of the hypothetical account, however, the 1% contributed to the insurance fund is non-refundable.

**Pension Plan Information for June 30, 2021 Financial Statements:**

**Total Pension Liability:** The total pension liability (TPL) was determined by an actuarial valuation as of June 30, 2020. An expected TPL was determined at June 30, 2020 using standard roll-forward techniques. The following actuarial assumptions were applied to all period included in the measurement:

| | |
|---|---|
| Price Inflation | 2.30% |
| Salary increases | 3.30 to 10.30% varies by service |
| Investment rate of return | 6.25%, net of pension plan investment expense, including inflation |

The mortality table used for active members was a Pub-2010 General Mortality table, for the Non-Hazardous System, and the Pub-2010 Public Safety Mortality table for the Hazardous System, projected with the ultimate rates from the MP-2014 mortality improvement scale using a base year of 2010. The mortality table used for healthy retired members is a system-specific mortality table based on mortality experience from 2013-2018, projected with the ultimate rates from MP-2014 mortality improvement scale using a base year of 2020. The mortality table used for the disabled members was PUB-2010 Disabled Mortality table, with a 4-year set-forward for both male and female rates, projected with the ultimate rates from the MP-2014 mortality improvement scale using a base year of 2010.

Discount rate assumptions:

(a) Discount Rate: The discount rate used to measure the total pension liability was 6.25% which did not change from the prior year.

(b) Projected Cash Flows: The projection of cash flows used to determine the discount rate assumed the local employers and plan members would contribute the statutorily determined contribution rate of projected compensation over the remaining 24-year amortization period of the unfunded actuarial accrued liability. The actuarial determined contribution rate is adjusted to reflect the phase-in of anticipated gains on the actuarial value of assets over the first four years of the projection period.

(c) Long-Term Rate of Return: The long-term expected return on plan assets is reviewed as part of the regular experience studies prepared every five years for the System. The most recent analysis, performed for the period covering fiscal years 2008 through 2013 is outlined in a report dated April 30, 2014. However, the Board of KRS has the authority to review the assumptions on a more frequent basis and adopt new assumptions prior to the next scheduled experience study. The long-term expected rate of return was determined by using a building-block method in which best-estimate ranges of expected future real rate of returns are developed for each asset class. The ranges are combined by weighting the expected future real rate of return by the target asset allocation percentage.

(d) Municipal Bond Rate: The discount rate determination does not use a municipal bond rate.

(e) Periods of Projected Benefit Payments: The long-term assumed rate of return was applied to all periods of projected benefit payments to determine the total pension liability.

(f) Assumed Asset Allocation: The target asset allocation and best estimates of arithmetic real rates of return for each major asset class are summarized in the following table:

| Asset Class | Target Allocation | Long Term Expected Real Rate of Return |
|---|---|---|
| U.S. equity | 18.75% | 4.50% |
| Non-US equity | 18.75% | 5.25% |
| Private equity | 10.00% | 6.65% |
| Specialty credit/high yield | 15.00% | 3.90% |
| Core bonds | 13.50% | -0.25% |
| Cash | 1.00% | -0.75% |
| Real estate | 5.00% | 5.30% |
| Opportunistic | 3.00% | 2.25% |
| Real return | 15.00% | 3.95% |
| **Total** | **100.00%** | |

The long-term expected rate of return on pension plan assets was established by the KRS Board of Trustees at 6.25% based on a blending of the factors described above.

(g) Sensitivity Analysis: This paragraph requires disclosure of the sensitivity of the net pension liability to changes in the discount rate. The following presents MSD's allocated portion of the net pension liability of the System, calculated using the discount rate of 6.25%, as well as what MSD's allocated portion of the net pension liability would be if it were calculated using a discount rate that is one percentage-point lower (5.25%) or 1 percentage-point higher (7.25%) than the current rate:

| *(dollars in thousands)* | 1% Decrease (5.25%) | Current Discount Rate (6.25%) | 1% Increase (7.25%) |
|---|---|---|---|
| MSD's net pension liability | $ 171,912 | $ 139,401 | $ 112,481 |

**Employer's Portion of the Collective Net Pension Liability:** MSD's proportionate share of the net pension liability, as indicated in the prior table, is $139,400,975 or approximately 1.82%, an increase of 0.02% from fiscal year 2020. The net pension liability was distributed based on 2020 actual employer contributions to the plan.

**Measurement Date:** The total pension liability, net pension liability and sensitivity information shown in this report are based on an actuarial valuation date of June 30, 2019. The total pension liability was rolled forward from the valuation date to the plan's fiscal year ending June 30, 2020 using generally accepted actuarial principles.

**Changes in Assumptions and Benefit Terms:** Since the prior measurement date, there were no changes in assumptions, however benefit terms were updated as follows, which did not have a material impact on the total pension liability:

- The monthly payment to a surviving spouse of a member whose death was due to a duly-related injury upon remarriage of the spouse was reduced.
- Benefits were increased for a small number of beneficiaries.

**Changes Since Measurement Date:** There were no changes between the measurement date of the collective net pension liability and the employer's reporting date.

**Pension Expense:** MSD was allocated pension expense of $21,408,455 related to the CERS for the year ending June 30, 2021.

**Deferred Outflows and Deferred Inflows:** Since certain expense items are amortized over closed periods each year, the deferred portions of these items must be tracked annually. If the amounts serve to reduce pension expense, they are labeled as deferred inflows. If they will increase pension expense, they are labeled deferred outflows. The amortization of these amounts is accomplished on a level dollar basis, with no interest included in the deferred amounts. Experience gains/losses and the impact of changes in actuarial assumptions, if any, are amortized over the average remaining service life of the active and inactive System members at the beginning of the fiscal year. Investment gains and losses are amortized over a fixed five-year period. Deferred inflows and outflows as of the measurement date include:

| *(dollars in thousands)* | Deferred Outflow of Resources | Deferred Inflow of Resources |
|---|---|---|
| Difference between expected and actual experience | $ 3,476 | $ - |
| Change of assumptions | 5,443 | - |
| Changes in proportion and differences between employer contributions and proportionate shares of contributions | 3,488 | - |
| Differences between expected and actual investment earning on plan investments | 3,674 | - |
| | 16,081 | - |
| Contributions subsequent to the measurement date | 9,850 | - |
| Total | $ 25,931 | $ - |

Deferred outflows of resources resulting from employer contributions subsequent to the measurement date of $9,849,892 will be recognized as a reduction of net pension liability in the year ending June 30, 2022. The remainder of the deferred outflows and deferred inflows of resources are amortized over three to five years with remaining amortization as follows:

| *(dollars in thousands)* | | |
|---|---|---|
| Year Ending June 30: | | |
| 2021 | $ | 8,261 |
| 2022 | | 4,678 |
| 2023 | | 1,741 |
| 2024 | | 1,401 |
| | $ | 16,081 |

**Pension Plan Fiduciary Net Position:** Detailed information about the pension plans' fiduciary net position is available in the separately issued pension plan financial reports.

**OPEB Information for June 30, 2021 Financial Statements:**

**Total OPEB Liability:** The total other post-employment benefits plan (OPEB) was determined by an actuarial valuation as of June 30, 2020. An expected total OPEB liability was determined at June 30, 2020 using standard roll-forward techniques. The following actuarial assumptions were applied to all periods included in the measurement:

| | |
|---|---|
| Price inflation | 2.30% |
| Payroll growth rate | 2.00% |
| Salary increases | 3.30% to 10.30%, varies by service |
| Investment rate of return | 6.25% |
| Healthcare trend rates: | |
| Pre-65 | Initial trend starting at 7.00 % at January 1, 2020 and gradually decreasing to an ultimate trend rate of 4.05% over a period of 12 years. |
| Post-65 | Initial trend starting at 5.00% at January 1, 2020 and gradually decreasing to an ultimate trend rate of 4.05% over a period of 10 years. |
| Mortality: | |
| Pre-retirement | PUB-2010 General Mortality table, for the Non-Hazardous Systems, and the PUB-2010 Public Safety Mortality table for the Hazardous Systems, projected with the ultimate rates from the MP-2014 mortality improvement scale using a base year of 2010 |
| Post-retirement (non-disabled) | System-specific mortality table based on mortality experience from 2013-2018 projected with the ultimate rates form MP-2104 mortality improvement scale using a base year of 2019 |
| Post-retirement (disabled) | PUB-2010 Disabled Mortality table with a 4-year set-forward for both male and female rates, projected with the ultimate rates from the MP-2014 mortality improvement scale using a base year of 2010 |

Discount rate assumptions:

(a) Discount Rate: The discount rate used to measure the total OPEB liability was 5.34%, which decreased from the prior year rate of 5.68%.

(b) Projected Cash Flows: The projection of cash flows used to determine the discount rate assumed the local employers and plan members would contribute the actuarially determined contribution rate of projected compensation over the remaining 23-year amortization period of the unfunded actuarial accrued liability.

(c) Long-Term Rate of Return: The long-term expected return on plan assets is reviewed as part of the regular experience studies prepared every five years for the System. The most recent analysis, performed for the period covering fiscal years 2013 through 2018 is outlined in a report dated April 12, 2019. However, the Board of KRS has the authority to review the assumptions on a more frequent basis and adopt new assumptions prior to the next scheduled experience study. The long-term expected rate of return was determined by using a building-block method in which best-estimate ranges of expected future real rate of returns are developed for each asset class. The ranges are combined by weighting the expected future real rate of return by the target asset allocation percentage.

(d) Municipal Bond Rate: The discount rate determination used a municipal bond rate of 2.45% as reported in Fidelity Index's "20 – Year Municipal GO AA Index" as of June 30, 2020.

(e) Period of Projected Benefit Payments: Current assets, future contributions, and investment earnings are projected to be sufficient to pay the projected benefit payments from the retirement system. However, the cost associated with the implicit employer subsidy is not currently being included in the calculation of the system's actuarial determined contributions, and it is the actuary's understanding that any cost associated with the implicit subsidy will not be paid out of the system's trust. Therefore, the municipal bond rate was applied to future expected benefit payments associated with the implicit subsidy.

(f) Assumed Asset Allocations: The target asset allocation and best estimates of arithmetic real rates of return for each major asset class are summarized in the following table:

| Asset Class | Target Allocation | Long Term Expected Real Rate of Return |
|---|---|---|
| U.S. equity | 18.75% | 4.50% |
| Non-US equity | 18.75% | 5.25% |
| Private equity | 10.00% | 6.65% |
| Specialty credit/high yield | 15.00% | 3.90% |
| Core bonds | 13.50% | -0.25% |
| Cash | 1.00% | -0.75% |
| Real estate | 5.00% | 5.30% |
| Opportunistic | 3.00% | 2.25% |
| Real return | 15.00% | 3.95% |
| **Total** | **100.00%** | |

The long-term expected rate of return on pension plan assets was established by the KRS Board of Trustees at 6.25% based on a blending of the factors described above.

(g) Sensitivity Analysis: This paragraph requires disclosure of the sensitivity of the net OPEB liability to changes in the discount rate and changes in the healthcare cost trend rate. The following presents MSD's allocated portion of the net OPEB liability of the System, calculated using the discount rate of 5.34%, as well as what the MSD's allocated portion of the System's net OPEB liability would be if it were calculated using a discount rate that is 1-percentage-point lower (4.34%) or 1-percentage-point higher (6.34%) than the current rate for Nonhazardous:

| *(dollars in thousands)* | 1% Decrease (4.34%) | Current Discount Rate (5.34%) | 1% Increase (6.34%) |
|---|---|---|---|
| MSD's net OPEB liability | $ 56,404 | $ 43,904 | $ 33,638 |

The following presents the MSD's allocated portion of the net OPEB liability of the System, calculated using the healthcare cost trend rate of percent, as well as what the MSD's allocated portion of the System's net OPEB liability would be if it were calculated using a healthcare cost trend rate that is 1-percentage-point lower or 1-percentage-point higher than the current rate for Nonhazardous:

| *(dollars in thousands)* | 1% Decrease | Current Healthcare Cost Trend Rate | 1% Increase |
|---|---|---|---|
| MSD's net OPEB liability | $ 33,993 | $ 43,904 | $ 55,932 |

**Employer's Portion of the Collective OPEB Liability:** MSD's proportionate share of the net OPEB liability, as indicated in the prior table, is $43,904,049 or approximately 1.82%, or an increase of 0.02% from fiscal year 2020. The net OPEB liability was distributed based on 2020 actual employer contributions to the plan.

**Measurement Date:** The total OPEB liability, net OPEB liability, and sensitivity information shown in this report are based on an actuarial valuation date of June 30, 2019. The total OPEB liability was rolled-forward from the valuation date to the plan's fiscal year ending June 30, 2020 using generally accepted actuarial principles.

**Changes in Assumptions and Benefit Terms:** Since the prior measurement date, the demographic and economic assumptions that affect the measurement of the total OPEB liability have been updated as follows:

- The discount rate used to calculate the total OPEB liability decreased from 5.68% to 5.34%.
- The assumed increase in future health care costs, or trend assumption, is reviewed on an annual basis and was updated (i.e. increased) to better reflect more current expectations relating to anticipated future increase in the medical costs.
- Actuarial information has been updated to reflect anticipated savings from the repeal of the "Cadillac Tax" and "Health Insurer Fee", which occurred in December 2019.

**Changes Since Measurement Date:** There were no changes between the measurement date of the collective net OPEB liability and the employer's reporting date.

**OPEB Expense:** MSD was allocated OPEB expense of $5,946,362 related to the CERS for the year ending June 30, 2021.

**Deferred Outflows and Deferred Inflows:** Since certain expense items are amortized over closed periods each year, the deferred portions of these items must be tracked annually. If the amounts serve to reduce OPEB expense they are labeled as deferred inflows. If they will increase OPEB expense they are labeled deferred outflows. The amortization of these amounts is accomplished on a level dollar basis, with no interest included in the deferred amounts. Experience gains/losses and the impact of changes in actuarial assumptions, if any, are amortized over the average remaining service life of the active and inactive System members at the beginning of the fiscal year. Investment gains and losses are amortized over a fixed five-year period. Deferred inflows and outflows as of the measurement date include:

| *(dollars in thousands)* | Deferred Outflow of Resources | Deferred Inflow of Resources |
|---|---|---|
| Difference between expected and actual experience | $ 7,335 | $ 7,341 |
| Change of assumptions | 7,637 | 46 |
| Changes in proportion and differences between employer contributions and proportionate shares of contributions | 1,459 | - |
| Differences between expected and actual investment earning on plan investments | 2,024 | 32 |
| | 18,455 | 7,419 |
| Contributions subsequent to the measurement date | 3,507 | - |
| Total | $ 21,962 | $ 7,419 |

Deferred outflows of resources resulting from employer contributions subsequent to the measurement date of $3,506,798 which include the implicit subsidy reported of $1,077,498, will be recognized as a reduction of net OPEB liability in the year ending June 30, 2022. The remainder of the deferred outflows and deferred inflows of resources are amortized over three to five years with remaining amortization as follows:

| *(dollars in thousands)* | |
|---|---|
| Year Ending June 30: | |
| 2021 | $ 2,935 |
| 2022 | 3,367 |
| 2023 | 2,539 |
| 2024 | 2,240 |
| 2025 | (45) |
| Thereafter | - |
| | $ 11,036 |

**OPEB Plan Fiduciary Net Position:** Detailed information about the OPEB plans' fiduciary net position is available in the separately issued OPEB plan financial reports.

**Pension Plan Information for June 30, 2020 Financial Statements:**

**Total Pension Liability:** The total pension liability (TPL) was determined by an actuarial valuation as of June 30, 2019 using the following actuarial assumptions, applied to all periods included in the measurement:

| | |
|---|---|
| Price Inflation | 2.30% |
| Salary increases | 3.30 to 11.55% varies by service |
| Investment rate of return | 6.25%, net of pension plan investment expense, including inflation |

The mortality table used for active members was a Pub-2010 General Mortality table, for the Non-Hazardous System, and the Pub-2010 Public Safety Mortality table for the Hazardous System, projected with the ultimate rates from the MP-2014 mortality improvement scale using a base year of 2010. The mortality table used for healthy retired members is a system-specific mortality table based on mortality experience from 2013-2018, projected with the ultimate rates from MP-2014 mortality improvement scale using a base year of 2019. The mortality table used for the disabled members was PUB-2010 Disabled Mortality table, with a 4-year set-forward for both male and female rates, projected with the ultimate rates from the MP-2014 mortality improvement scale using a base year of 2010.

Discount rate assumptions:

(a) Discount Rate: The discount rate used to measure the total pension liability was 6.25%.

(b) Projected Cash Flows: The projection of cash flows used to determine the discount rate assumed the local employers and plan members would contribute the statutorily determined contribution rate of projected compensation over the remaining 25-year amortization period of the unfunded actuarial accrued liability. The actuarial determined contribution rate is adjusted to reflect the phase-in of anticipated gains on the actuarial value of assets over the first four years of the projection period.

(c) Long-Term Rate of Return: The long-term expected return on plan assets is reviewed as part of the regular experience studies prepared every five years for the System. The most recent analysis, performed for the period covering fiscal years 2008 through 2013 is outlined in a report dated April 30, 2014. However, the Board of KRS has the authority to review the assumptions on a more frequent basis and adopt new assumptions prior to the next scheduled experience study. The long-term expected rate of return was determined by using a building-block method in which best-estimate ranges of expected future real rate of returns are developed for each asset class. The ranges are combined by weighting the expected future real rate of return by the target asset allocation percentage.

(d) Municipal Bond Rate: The discount rate determination does not use a municipal bond rate.

(e) Periods of Projected Benefit Payments: The long-term assumed rate of return was applied to all periods of projected benefit payments to determine the total pension liability.

(f) Assumed Asset Allocation: The target asset allocation and best estimates of arithmetic real rates of return for each major asset class are summarized in the following table:

| Asset Class | Target Allocation | Long Term Expected Real Rate of Return |
|---|---|---|
| U.S. equity | 18.75% | 4.30% |
| Non-US equity | 18.75% | 4.80% |
| Private equity | 10.00% | 6.65% |
| Specialty credit/high yield | 15.00% | 2.60% |
| Core bonds | 13.50% | 1.35% |
| Cash | 1.00% | 0.20% |
| Real estate | 5.00% | 4.85% |
| Opportunistic | 3.00% | 2.97% |
| Real return | 15.00% | 4.10% |
| **Total** | **100.00%** | |

The long-term expected rate of return on pension plan assets was established by the KRS Board of Trustees at 6.25% based on a blending of the factors described above.

(h) Sensitivity Analysis: This paragraph requires disclosure of the sensitivity of the net pension liability to changes in the discount rate. The following presents MSD's allocated portion of the net pension liability of the System, calculated using the discount rate of 6.25%, as well as what MSD's allocated portion of the net pension liability would be if it were calculated using a discount rate that is one percentage-point lower (5.25%) or 1 percentage-point higher (7.25%) than the current rate:

| *(dollars in thousands)* | 1% Decrease (5.25%) | Current Discount Rate (6.25%) | 1% Increase (7.25%) |
|---|---|---|---|
| MSD's net pension liability | $ 158,673 | $ 126,866 | $ 100,355 |

**Employer's Portion of the Collective Net Pension Liability:** MSD's proportionate share of the net pension liability, as indicated in the prior table, is $126,865,574 or approximately 1.8%, an increase of 0.1% from fiscal year 2019. The net pension liability was distributed based on 2019 actual employer contributions to the plan.

**Measurement Date:** The total pension liability, net pension liability and sensitivity information shown in this report are based on an actuarial valuation date of June 30, 2018. The total pension liability was rolled forward from the valuation date to the plan’s fiscal year ending June 30, 2019 using generally accepted actuarial principles.

**Changes in Assumptions and Benefit Terms:** There have been no plan provision changes since June 30, 2018. However the Board of Trustees has adopted new actuarial assumptions since June 30, 2018. These assumptions are documented in the report titled “Kentucky Retirement Systems 2018 Actuarial Experience Study for the Period Ending June 30, 2019”. The total pension liability as of June 30, 2019 is determined using these updated assumptions.

**Changes Since Measurement Date:** There were no changes between the measurement date of the collective net pension liability and the employer's reporting date.

**Pension Expense:** MSD was allocated pension expense of $21,999,022 related to the CERS for the year ending June 30, 2020.

**Deferred Outflows and Deferred Inflows:** Since certain expense items are amortized over closed periods each year, the deferred portions of these items must be tracked annually. If the amounts serve to reduce pension expense, they are labeled as deferred inflows. If they will increase pension expense, they are labeled deferred outflows. The amortization of these amounts is accomplished on a level dollar basis, with no interest included in the deferred amounts. Experience gains/losses and the impact of changes in actuarial assumptions, if any, are amortized over the average remaining service life of the active and inactive System members at the beginning of the fiscal year. Investment gains and losses are amortized over a fixed five-year period. Deferred inflows and outflows as of the measurement date include:

| *(dollars in thousands)* | Deferred Outflow of Resources | Deferred Inflow of Resources |
|---|---|---|
| Difference between expected and actual experience | $ 3,239 | $ 536 |
| Change of assumptions | 12,840 | - |
| Changes in proportion and differences between employer contributions and proportionate shares of contributions | 6,572 | - |
| Differences between expected and actual investment earning on plan investments | - | 2,045 |
| | 22,651 | 2,581 |
| Contributions subsequent to the measurement date | 9,133 | - |
| Total | $ 31,784 | $ 2,581 |

Deferred outflows of resources resulting from employer contributions subsequent to the measurement date of $9,132,559 will be recognized as a reduction of net pension liability in the year ending June 30, 2021. The remainder of the deferred outflows and deferred inflows of resources are amortized over three to five years with remaining amortization as follows:

| *(dollars in thousands)* | |
|---|---|
| Year Ending June 30: | |
| 2021 | $ 12,594 |
| 2022 | 5,449 |
| 2023 | 1,882 |
| 2024 | 145 |
| | $ 20,070 |

**Pension Plan Fiduciary Net Position:** Detailed information about the pension plans' fiduciary net position is available in the separately issued pension plan financial reports.

**OPEB Information for June 30, 2020 Financial Statements:**

**Total OPEB Liability:** The total other post-employment benefits plan (OPEB) was determined by an actuarial valuation as of June 30, 2019 using the following actuarial assumptions, applied to all periods included in the measurement:

| | |
|---|---|
| Price inflation | 2.30% |
| Payroll growth rate | 2.00% |
| Salary increases | 3.30 to 11.55%, varies by service |
| Investment rate of return | 6.25% |
| Healthcare trend rates: | |
| Pre-65 | Initial trend starting at 7.25% at January 1, 2019 and gradually decreasing to an ultimate trend rate of 4.05% over a period of 13 years. |
| Post-65 | Initial trend starting at 5.10% at January 1, 2019 and gradually decreasing to an ultimate trend rate of 4.05% over a period of 11 years. |
| Mortality: | |
| Pre-retirement | PUB-2010 General Mortality table, for the Non-Hazardous Systems, and the PUB-2010 Public Safety Mortality table for the Hazardous Systems, projected with the ultimate rates from the MP-2014 mortality improvement scale using a base year of 2010 |
| Post-retirement (non-disabled) | System-specific mortality table based on mortality experience from 2013-2018 projected with the ultimate rates form MP-2104 mortality improvement scale using a base year of 2019 |
| Post-retirement (disabled) | PUB-201 Disabled Mortality table with a 4-year set-forward for both male and female rates, projected with the ultimate rates from the MP-2014 mortality improvement scale using a base year of 2010 |

Discount rate assumptions:

(a) Discount Rate: The discount rate used to measure the total OPEB liability was 5.68%.

(b) Projected Cash Flows: The projection of cash flows used to determine the discount rate assumed the local employers and plan members would contribute the actuarially determined contribution rate of projected compensation over the remaining 24-year amortization period of the unfunded actuarial accrued liability.

(c) Long-Term Rate of Return: The long-term expected return on plan assets is reviewed as part of the regular experience studies prepared every five years for the System. The most recent analysis, performed for the period covering fiscal years 2008 through 2013 is outlined in a report dated April 30, 2014. However, the Board of KRS has the authority to review the assumptions on a more frequent basis and adopt new assumptions prior to the next scheduled experience study. The long-term expected rate of return was determined by using a building-block method in which best-estimate ranges of expected future real rate of returns are developed for each asset class. The ranges are combined by weighting the expected future real rate of return by the target asset allocation percentage.

(d) Municipal Bond Rate: The discount rate determination used a municipal bond rate of 3.13% as reported in Fidelity Index's "20 – Year Municipal GO AA Index" as of June 28, 2019.

(e) Period of Projected Benefit Payments: Current assets, future contributions, and investment earnings are projected to be sufficient to pay the projected benefit payments from the retirement system. However, the cost associated with the implicit employer subsidy is not currently being included in the calculation of the system's actuarial determined contributions, and it is the actuary's understanding that any cost associated with the implicit subsidy will not be paid out of the system's trust. Therefore, the municipal bond rate was applied to future expected benefit payments associated with the implicit subsidy.

(f) Assumed Asset Allocations: The target asset allocation and best estimates of arithmetic real rates of return for each major asset class are summarized in the following table:

| Asset Class | Target Allocation | Long Term Expected Real Rate of Return |
|---|---|---|
| U.S. equity | 18.75% | 4.30% |
| Non-US equity | 18.75% | 4.80% |
| Private equity | 10.00% | 6.65% |
| Specialty credit/high yield | 15.00% | 2.60% |
| Core bonds | 13.50% | 1.35% |
| Cash | 1.00% | 0.20% |
| Real estate | 5.00% | 4.85% |
| Opportunistic | 3.00% | 2.97% |
| Real return | 15.00% | 4.10% |
| **Total** | **100.00%** | |

The long-term expected rate of return on pension plan assets was established by the KRS Board of Trustees at 6.25% based on a blending of the factors described above.

(g) Sensitivity Analysis: This paragraph requires disclosure of the sensitivity of the net OPEB liability to changes in the discount rate and changes in the healthcare cost trend rate. The following presents MSD's allocated portion of the net OPEB liability of the System, calculated using the discount rate of 5.68%, as well as what the MSD's allocated portion of the System's net OPEB liability would be if it were calculated using a discount rate that is 1-percentage-point lower (4.68%) or 1-percentage-point higher (6.68%) than the current rate for Nonhazardous:

| *(dollars in thousands)* | 1% Decrease (4.68%) | Current Discount Rate (5.68%) | 1% Increase (6.68%) |
|---|---|---|---|
| MSD's net OPEB liability | $ 40,647 | $ 30,343 | $ 21,853 |

The following presents the MSD's allocated portion of the net OPEB liability of the System, calculated using the healthcare cost trend rate of percent, as well as what the MSD's allocated portion of the System's net OPEB liability would be if it were calculated using a healthcare cost trend rate that is 1-percentage-point lower or 1-percentage-point higher than the current rate for Nonhazardous:

| *(dollars in thousands)* | 1% Decrease | Current Healthcare Cost Trend Rate | 1% Increase |
|---|---|---|---|
| MSD's net OPEB liability | $ 22,566 | $ 30,343 | $ 39,773 |

**Employer's Portion of the Collective OPEB Liability:** MSD's proportionate share of the net OPEB liability, as indicated in the prior table, is $30,342,854 or approximately 1.8%, or an increase of 0.01% from fiscal year 2019. The net OPEB liability was distributed based on 2019 actual employer contributions to the plan.

**Measurement Date:** The total OPEB liability, net OPEB liability, and sensitivity information shown in this report are based on an actuarial valuation date of June 30, 2018. The total OPEB liability was rolled-forward from the valuation date to the plan's fiscal year ending June 30, 2019 using generally accepted actuarial principles.

**Changes in Assumptions and Benefit Terms:** There have been no plan provision changes since June 30, 2019. However, the Board of Trustees has adopted new actuarial assumptions since June 30, 2018. These assumptions are documented in a report titled “Kentucky Retirement Systems 2018 Actuarial Experience Study for the Period Ending June 30, 2018”. The total OPEB liability as of June 30, 2019 is determined using these updated assumptions. The discount rate used to measure the total OPEB liability was 5.85% in the prior year compared to 5.68% used for the current year.

**Changes Since Measurement Date:** There were no changes between the measurement date of the collective net OPEB liability and the employer's reporting date.

**OPEB Expense:** MSD was allocated OPEB expense of $3,327,973 related to the CERS for the year ending June 30, 2020.

**Deferred Outflows and Deferred Inflows:** Since certain expense items are amortized over closed periods each year, the deferred portions of these items must be tracked annually. If the amounts serve to reduce OPEB expense they are labeled as deferred inflows. If they will increase OPEB expense they are labeled deferred outflows. The amortization of these amounts is accomplished on a level dollar basis, with no interest included in the deferred amounts. Experience gains/losses and the impact of changes in actuarial assumptions, if any, are amortized over the average remaining service life of the active and inactive System members at the beginning of the fiscal year. Investment gains and losses are amortized over a fixed five-year period. Deferred inflows and outflows as of the measurement date include:

| *(dollars in thousands)* | Deferred Outflow of Resources | Deferred Inflow of Resources |
|---|---|---|
| Difference between expected and actual experience | $ - | $ 9,155 |
| Change of assumptions | 8,979 | 60 |
| Changes in proportion and differences between employer contributions and proportionate shares of contributions | 2,448 | 46 |
| Differences between expected and actual investment earning on plan investments | - | 1,348 |
| | 11,427 | 10,609 |
| Contributions subsequent to the measurement date | 2,904 | - |
| Total | $ 14,331 | $ 10,609 |

Deferred outflows of resources resulting from employer contributions subsequent to the measurement date of $2,903,895 which include the implicit subsidy reported of $651,513, will be recognized as a reduction of net OPEB liability in the year ending June 30, 2021. The remainder of the deferred outflows and deferred inflows of resources are amortized over three to five years with remaining amortization as follows:

*(dollars in thousands)*

| Year Ending June 30: | | |
|---|---|---|
| 2021 | $ | 278 |
| 2022 | | 279 |
| 2023 | | 707 |
| 2024 | | (115) |
| 2025 | | (287) |
| Thereafter | | (44) |
| | $ | 818 |

**OPEB Plan Fiduciary Net Position:** Detailed information about the OPEB plans' fiduciary net position is available in the separately issued OPEB plan financial reports.

**Louisville and Jefferson County Metropolitan Sewer District**
**Schedule of Proportionate Share of the Net Pension Liability**
**For the Years Ended June 30,**
*(dollars in thousands)*

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 |
|---|---|---|---|---|---|---|---|
| MSD's proportion of the net pension liability | 1.82% | 1.80% | 1.72% | 1.60% | 1.51% | 1.60% | 1.60% |
| MSD's proportionate share of the net pension liability | $139,401 | $126,866 | $104,511 | $93,517 | $74,132 | $68,653 | $51,988 |
| MSD's covered payroll | 49,808 | 48,391 | 45,859 | 43,084 | 39,596 | 37,900 | 37,100 |
| MSD's proportion of the net pension liability as a percentage of its covered payroll | 279.9% | 262.2% | 227.9% | 217.1% | 187.2% | 181.1% | 140.1% |
| Plan fiduciary net postion as a percentage of the total pension liability | 47.81% | 60.44% | 53.54% | 53.32% | 55.50% | 59.97% | 66.80% |

***Notes:***

1) The amounts presented for each fiscal year were determined as of the prior year end.
2) This schedule is presented to illustrate the requirement to show information for 10 years. However, until a full 10-year trend is compiled, governments should present information for those years that information is available.

***Changes in Assumptions and Benefit Terms:***

***2015:*** Since the prior measurement date, the demographic and economic assumptions that affect the measurement of the total pension liability have been updated as described in Schedule D of the CERS actuary report. The changes are noted below:

- The assumed investment rate of return was decreased from 7.75% to 7.50%.
- The assumed rate of inflation was reduced from 3.50% to 3.25%.
- The assumed rate of wage inflation was reduced from 1.00% to 0.75%.
- Payroll growth assumption was reduced from 4.50% to 4.00%.
- The mortality table used for active members is RP-2000 Combined Mortality Table projected with Scale BB to 2013 (multiplied by 50% for males and 30% for females).
- For healthy retired members and beneficiaries, the mortality table used is the RP-2000 Combined Mortality Table projected with Scale BB to 2013 (set back 1 year for females). For disabled members, the RP-2000 Combined Disabled Mortality Table projected with Scale BB to 2013 (set back 4 years for males) is used for the period after disability retirement. There is some margin in the current mortality tables for possible future improvement in mortality rates and that margin will be reviewed again when the next experience investigation is conducted.
- The assumed rates of retirement, withdrawal and disability were updated to more accurately reflect experience.

***2016:*** There were no changes in assumptions and benefit terms since the prior measurement date.

***2017:*** Since the prior measurement date, the demographic and economic assumptions that affect the measurement of the total pension liability have been updated as follows:

- The assumed investment rate of return was decreased from 7.50% to 6.25%.
- The assumed rate of inflation was reduced from 3.25% to 2.30%.
- Payroll growth assumption was reduced form 4.00% to 3.05%.

***2018:*** Since the prior measurement date, there have been no changes in actuarial assumptions. However, during the 2018 legislative session, House Bill 185 was enacted, which updated the benefit provisions for active members who die in the line of duty. Benefits paid to the spouses of deceased members have been increased from 25% of the member's final rate of pay to 75% of the member's average pay. If the member does not have a surviving spouse, benefits paid to surviving dependent children have been increased from

10% of the member's final pay rate to 50% of average pay for one child, 65% of average pay for two children, or 75% of average pay for three children. The total pension liability as of June 30, 2018 was determined using these updated benefit provisions.

***2019:*** Since the prior measurement date, the demographic and economic assumptions that affect the measurement of the total pension liability have been updates as follows:

- Salary increases were increased from 3.05% to a range of 3.30% - 10.30%.
- The Mortality Table was changed from RP-2000 to PUB-2010.

***2020:*** Since the prior measurement date, there were no changes in assumptions, however benefit terms were updated as follows, which did not have a material impact on the total pension liability:

- The monthly payment to a surviving spouse of a member whose death was due to a duty-related injury upon remarriage of the spouse was reduced.
- Benefits were increased for a small number of beneficiaries.

**Louisville and Jefferson County Metropolitan Sewer District**
**Schedule of Employer Contributions - Pension**
**For the Years Ended June 30,**
*(dollars in thousands)*

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 |
|---|---|---|---|---|---|---|---|
| Statutorily required contribution for pension | $ 9,850 | $ 9,133 | $ 7,534 | $ 6,196 | $ 5,279 | $ 4,767 | $ 4,576 |
| Contribution in relation to the statutorily required contribution | (9,850) | (9,133) | (7,534) | (6,196) | (5,279) | (4,767) | (4,576) |
| Annual contribution deficiency (excess) | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| MSD contributions as a percentage of statutorily required contribution for pension | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| MSD covered payroll | $ 52,828 | $ 49,808 | $ 48,391 | $45,859 | $43,084 | $39,596 | $37,900 |
| Contributions as a percentage of MSD's covered payroll | 18.65% | 18.34% | 15.57% | 13.51% | 12.25% | 12.04% | 12.07% |

***Notes:***

1) This schedule is presented to illustrate the requirement to show information for 10 years. However, until a full 10-year trend is compiled, governments should present information for those years that information is available.

**Louisville and Jefferson County Metropolitan Sewer District**
**Schedule of Proportionate Share of the Net OPEB Liability**
**For the Years Ended June 30,**
*(dollars in thousands)*

| | 2021 | 2020 | 2019 | 2018 |
|---|---|---|---|---|
| MSD's proportion of the net OPEB liability | 1.82% | 1.80% | 1.72% | 1.60% |
| MSD's proportionate share of the net OPEB liability | $43,904 | $30,343 | $30,470 | $32,119 |
| MSD's covered payroll | 49,808 | 48,391 | 45,859 | 43,084 |
| MSD's proportion of the net OPEB liability as a percentage of its covered payroll | 88.15% | 62.70% | 66.44% | 74.55% |
| Plan fiduciary net position as a percentage of the total OPEB liability | 51.67% | 60.44% | 57.62% | 52.39% |

***Notes:***

1) This schedule is presented to illustrate the requirement to show information for 10 years. However, until a full 10-year trend is compiled, governments should present information for those years that information is available.

***Changes in Assumptions and Benefit Terms:***

***2017:*** Since the prior measurement date, the demographic and economic assumptions that affect the measurement of the total OPEB liability have been updated as follows:

- The assumed rate of return was decreased form 7.50% to 6.25%.
- The assumed rate of inflation was reduced from 3.25% to 2.30%.
- Payroll growth assumption was reduced from 4.0% to 3.05%.

***2018:*** Since the prior measurement date, there have been no changes in actuarial assumptions. However, during the 2018 legislative session, House Bill 185 was enacted, which updated the benefit provisions for active members who die in the line of duty. The system shall now pay 100% of the insurance premium for spouses and children of all active members who die in the line of duty. The total OPEB liability as of June 30, 2018 was determined using these updated benefit provisions.

***2019:*** Since the prior measurement date, the demographic and economic assumptions that affect the measurement of the total pension liability have been updates as follows:

- Salary increases were increased from 3.05% to a range of 3.30% - 10.30%.
- The Mortality Table was changed from RP-2000 to PUB-2010.

***2020:*** Since the prior measurement date, the demographic and economic assumptions that affect the measurement of the total OPEB liability have been updated as follows:

- The discount rate used to calculate the total OPEB liability decreased from 5.68% to 5.34%.
- The assumed increase in future health care costs, or trend assumption, is reviewed on an annual basis and was updated (i.e. increased) to better reflect more current expectations relating to anticipated future increases in the medical costs.
- Actuarial information has been updated to reflect anticipated savings from the repeal of the “Cadillac Tax” and “Health Insurer Fee” which occurred in December 2019.

**Louisville and Jefferson County Metropolitan Sewer District**
**Schedule of Employer Contributions - OPEB**
**For the Years Ended June 30,**
*(dollars in thousands)*

| | 2021 | 2020 | 2019 | 2018 |
|---|---|---|---|---|
| Statutorily required contribution | $ 2,429 | $ 2,252 | $ 2,443 | $ 2,011 |
| Contributions in relation to the statutorily required contribution | (2,429) | (2,252) | (2,443) | (2,011) |
| Annual contribution deficiency (excess) | $ - | $ - | $ - | $ - |
| MSD contributions as a percentage of statutorily required contribution for OPEB | 100% | 100% | 100% | 100% |
| MSD covered payroll | $52,828 | $49,808 | $48,391 | $45,859 |
| Contributions as a percentage of MSD's covered payroll | 4.60% | 4.52% | 5.05% | 4.39% |

***Notes:***

1) This schedule is presented to illustrate the requirement to show information for 10 years. However, until a full 10-year trend is compiled, governments should present information for those years that information is available.

# STATISTICAL SECTION

This section of the Louisville & Jefferson County Metropolitan Sewer District's (MSD) Annual Comprehensive Financial Report presents detailed information as a supplement to the information presented in the financial statements and note disclosures to assist readers in assessing MSD's overall financial health.



This schedule presents information to help readers assess MSD's debt burden and MSD's ability to issue additional debt in the future.



These schedules contain trend information to help readers understand how MSD's financial performance and position have changed over time. The information presented includes changes in net assets, an analysis of revenues and expenses and a comparative statement of cash flows



This schedule contains information to help readers assess MSD's most significant revenue sources.



These schedules contain service and infrastructure data to help the reader understand how the information in MSD's financial report relates to the services that it provides. The information provided includes service and administration costs, project schedules, and water treatment capacity.



These schedules offer demographic and economic indicators to help readers understand the environment within which MSD operates.

# LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT

## COMPARATIVE SCHEDULE OF DEBT SERVICE COVERAGE

## YEARS ENDED JUNE 30

## DOLLARS IN THOUSANDS

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Revenues:** | | | | | | | | | | |
| Service charges | $ 325,717 | $ 312,859 | $ 289,173 | $ 274,504 | $ 253,943 | $ 238,480 | $ 225,462 | $ 214,056 | $ 205,222 | $ 190,482 |
| Other operating income | 3,701 | 6,198 | 5,195 | 4,645 | 5,691 | 4,810 | 4,407 | 2,576 | 4,823 | 1,756 |
| Assessments | 799 | 909 | 1,258 | 1,232 | 1,375 | 9,457 | 1,901 | 2,129 | 2,392 | 2,405 |
| Investment income | 12,175 | 15,600 | 18,692 | 16,531 | 14,273 | 17,278 | 17,623 | 20,330 | 20,119 | 40,687 |
| Less: capitalized investment income | - | - | - | - | - | - | - | - | (3,817) | (1,851) |
| **Total revenues** | 342,392 | 335,566 | 314,318 | 296,912 | 275,282 | 270,025 | 249,393 | 239,091 | 228,739 | 233,479 |
| **Operating expenses:** | | | | | | | | | | |
| Service and administrative costs[1] | 151,526 | 149,945 | 142,082 | 131,948 | 119,586 | 117,671 | 106,301 | 108,814 | 108,041 | 108,325 |
| Less: capitalized overhead | (41,785) | (39,643) | (38,383) | (38,148) | (31,949) | (30,516) | (30,056) | (33,568) | (33,110) | (33,200) |
| Capitalization Rate | 28% | 26% | 27% | 29% | 27% | 26% | 28% | 31% | 31% | 31% |
| **Total operating expenses** | 109,741 | 110,302 | 103,699 | 93,800 | 87,637 | 87,155 | 76,245 | 75,246 | 74,931 | 75,125 |
| **Net revenues** | 232,651 | 225,264 | 210,619 | 203,112 | 187,645 | 182,870 | 173,148 | 163,845 | 153,808 | 158,354 |
| **Aggregate debt service:** | | | | | | | | | | |
| Current maturities of long-term debt | 43,802 | 40,637 | 40,358 | 33,906 | 33,655 | 31,825 | 29,415 | 28,525 | 27,035 | 25,740 |
| Interest expense - senior lien | 93,067 | 92,274 | 94,831 | 95,041 | 90,117 | 86,818 | 83,404 | 80,613 | 92,616 | 89,243 |
| Less: capitalized interest expense | (12,050) | (13,043) | (18,582) | (21,859) | (20,074) | (21,051) | (20,511) | (19,103) | (26,358) | (26,384) |
| **Aggregate net debt service** | $ 124,819 | $ 119,868 | $ 116,607 | $ 107,088 | $ 103,698 | $ 97,592 | $ 92,308 | $ 90,035 | $ 93,293 | $ 88,599 |
| **Debt service coverage ratio[2]** | 186% | 188% | 181% | 190% | 181% | 187% | 188% | 182% | 165% | 179% |

[1]Excludes the actuarial portion of changes to GASB 68 pension expense and GASB 75 OPEB for the year

[2]Excludes the actuarial portion of changes to GASB 68 pension expense and GASB 75 OPEB for the year

This table has been prepared using the definitions of revenue, expense and debt service contained in MSD's 1993 Sewer & Drainage System Revenue Bond Resolution.

The 1993 Resolution and its supplements require MSD to provide "Available Revenues", as defined in the Resolution, sufficient to pay 110% of each fiscal year's "Aggregate Net Debt Service" on Revenue Bonds and 100% of "Operating Expenses". "Available Revenues", as used only for purposes of the Resolution, means all revenues and other amounts received by MSD and pledged as security for payment of Bonds issued pursuant to the Resolution, but excludes any interest income which is capitalized in accordance with generally accepted accounting principles. "Operating Expenses" includes all reasonable, ordinary, usual or necessary current expenses of maintenance, repair and operation determined in accordance with generally accepted accounting principles and the enterprise basis of accounting. "Operating Expenses" does not include reserves for extraordinary maintenance and repair, nor does it include administrative and engineering expenses of MSD which are necessary or incidental to capital improvements for which debt has been issued and which may be paid from the proceeds of such debt. "Aggregate Net Debt Service" is aggregate current principal and interest requirements on all Bonds issued pursuant to the Resolution, excluding (i) interest expense, which in accordance with generally accepted accounting principles, is capitalized and which may be paid from the proceeds of debt, and (ii) other amounts, if any, available, or expected to become available in the ordinary course for payment of principal and interest, and not included in "Available Revenues".

# LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## COMPARATIVE STATEMENT OF NET POSITION
## ASSETS AND DEFERRED OUTFLOW OF RESOURCES
## YEARS ENDED JUNE 30
## DOLLARS IN THOUSANDS

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Current Assets:** | | | | | | | | | | |
| Unrestricted cash and cash equivalents | $ 79,281 | $ 99,973 | $ 43,728 | $ 50,276 | $ 42,449 | $ 69,481 | $ 63,013 | $ 84,780 | $ 66,376 | $ 12,040 |
| Unrestricted investments | 28,124 | 100 | 36,744 | 25,080 | 10,095 | 100 | 100 | 100 | 100 | 100 |
| Restricted cash and cash equivalents | 21,181 | 17,776 | 22,348 | 29,987 | 19,454 | 5,379 | 16,342 | 39,507 | 62,249 | 227,327 |
| Restricted investments | - | - | 30,172 | - | 22,675 | 14,999 | - | - | 90,574 | 94,639 |
| Accounts receivable | 24,664 | 27,227 | 27,915 | 26,332 | 23,480 | 26,696 | 23,787 | 21,809 | 18,465 | 16,666 |
| Inventories | 5,086 | 4,977 | 4,623 | 4,407 | 4,184 | 4,210 | 3,981 | 3,808 | 3,579 | 3,484 |
| Prepaid expenses and other current assets | 6,386 | 4,147 | 3,918 | 3,845 | 2,877 | 3,184 | 2,880 | 2,636 | 2,110 | 1,862 |
| **Total current assets** | **164,722** | **154,200** | **169,448** | **139,927** | **125,214** | **124,049** | **110,103** | **152,640** | **243,453** | **356,118** |
| **Plant, Lines and Other facilities:** | | | | | | | | | | |
| Utility plant in sercvice | 4,278,016 | 4,114,641 | 3,984,619 | 3,432,754 | 3,306,851 | 3,155,696 | 2,777,788 | 2,753,762 | 2,702,448 | 2,560,403 |
| Less: accumulated depreciation | (1,444,223) | (1,349,897) | (1,326,461) | (1,218,427) | (1,146,036) | (1,070,108) | (1,008,503) | (946,427) | (884,199) | (825,205) |
| | 2,833,793 | 2,764,744 | 2,658,158 | 2,214,327 | 2,160,815 | 2,085,588 | 1,769,285 | 1,807,335 | 1,818,249 | 1,735,198 |
| Construction in progress | 625,113 | 538,013 | 460,501 | 711,655 | 581,222 | 487,674 | 623,181 | 463,167 | 371,816 | 370,350 |
| **Net plant, lines and other facilities** | 3,458,906 | 3,302,757 | 3,118,659 | 2,925,982 | 2,742,037 | 2,573,262 | 2,392,466 | 2,270,502 | 2,190,065 | 2,105,548 |
| **Other non-current assets** | 109,291 | 109,354 | 108,322 | 184,659 | 156,960 | 178,762 | 169,587 | 154,717 | 36,262 | 35,876 |
| **Total non-current assets** | **3,568,197** | **3,412,111** | **3,226,981** | **3,110,641** | **2,898,997** | **2,752,024** | **2,562,053** | **2,425,219** | **2,226,327** | **2,141,424** |
| **Total assets** | **3,732,919** | **3,566,311** | **3,396,429** | **3,250,568** | **3,024,211** | **2,876,073** | **2,672,156** | **2,577,859** | **2,469,780** | **2,497,542** |
| **Deferred outflow of resources** | 80,984 | 79,767 | 52,018 | 54,267 | 35,911 | 23,708 | 20,407 | 22,862 | 13,511 | 15,176 |
| **Total assets and deferred outflows** | **$ 3,813,903** | **$ 3,646,078** | **$ 3,448,447** | **$ 3,304,835** | **$ 3,060,122** | **$ 2,899,781** | **$ 2,692,563** | **$ 2,600,721** | **$ 2,483,291** | **$ 2,512,718** |

## LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## COMPARATIVE STATEMENT OF NET POSITION
## LIABILITIES, DEFERRED INFLOW OF RESOURCES AND NET POSITION
## YEARS ENDED JUNE 30
## DOLLARS IN THOUSANDS

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Liabilities:** | | | | | | | | | | |
| **Current liabilities (payable from current assets):** | | | | | | | | | | |
| Accounts payable and accrued expenses | $ 29,099 | $ 24,176 | $ 18,168 | $ 16,342 | $ 16,550 | $ 17,420 | $ 14,936 | $ 13,653 | $ 12,693 | $ 16,470 |
| **Total current liabilities (payable from current assets)** | 29,099 | 24,176 | 18,168 | 16,342 | 16,550 | 17,420 | 14,936 | 13,653 | 12,693 | 16,470 |
| **Current liabilities (payable from restricted assets):** | | | | | | | | | | |
| Accounts payable and accrued expenses | 46,237 | 39,860 | 31,945 | 47,472 | 30,764 | 33,271 | 30,607 | 14,712 | 16,168 | 12,656 |
| Accrued interest | 20,093 | 17,315 | 17,819 | 18,455 | 15,935 | 17,533 | 13,036 | 12,834 | 12,458 | 13,959 |
| Revenue bonds payable | 47,565 | 43,460 | 42,200 | 40,190 | 33,655 | 31,825 | 29,415 | 28,525 | 27,035 | 25,740 |
| Bank notes | - | 100 | 100 | - | - | - | - | - | - | - |
| Other subordinate debt | 1,817 | 2,167 | 545 | 105 | - | - | - | - | - | - |
| Refundable deposits | 2,757 | 2,954 | 2,928 | 2,861 | 2,300 | 2,557 | 1,639 | 1,568 | 1,137 | 1,013 |
| **Total current liabilities (payable from restricted assets)** | 118,469 | 105,856 | 95,537 | 109,083 | 82,654 | 85,186 | 74,697 | 57,639 | 56,798 | 53,368 |
| **Non-current liabilities:** | | | | | | | | | | |
| Bonds payable | 2,057,555 | 1,868,455 | 1,914,340 | 1,956,540 | 1,831,605 | 1,722,745 | 1,583,390 | 1,549,700 | 1,478,225 | 1,536,770 |
| Bond anticiaption note | 226,340 | 226,340 | 226,340 | 226,340 | 226,340 | 226,340 | 226,340 | 226,340 | 226,340 | 226,340 |
| Commercial paper notes | 150,000 | 255,000 | 120,000 | - | - | - | - | - | - | - |
| Other subordinated debt | 44,304 | 28,284 | 2,113 | 1,766 | 1,973 | 2,072 | 2,168 | 2,261 | 2,351 | - |
| Unamortized debt premium/discount | 74,817 | 74,458 | 80,421 | 90,628 | 74,328 | 67,462 | 60,797 | 60,263 | 56,764 | 45,841 |
| Investment derivative asset liability | 63,431 | 72,228 | 73,040 | 59,443 | - | - | - | - | - | - |
| At-market derivative asset liability | 8,541 | 20,822 | - | - | - | - | - | - | - | - |
| Net Pension liability and OPEB liability | 183,305 | 157,209 | 134,981 | 125,636 | 74,132 | 68,653 | 51,988 | 58,825 | - | - |
| Other long-term liabilities | - | - | - | - | - | 690 | 944 | 761 | 973 | 5,663 |
| **Total long-term debt** | 2,808,293 | 2,702,796 | 2,551,235 | 2,460,353 | 2,208,378 | 2,087,962 | 1,925,627 | 1,898,150 | 1,764,653 | 1,814,614 |
| **Total liabilities** | 2,955,861 | 2,832,828 | 2,664,940 | 2,585,778 | 2,307,582 | 2,190,568 | 2,015,260 | 1,969,442 | 1,834,144 | 1,884,452 |
| **Deferred inflow of resources** | 10,277 | 16,520 | 12,955 | 10,383 | 84,052 | 108,633 | 92,233 | 82,293 | 82,233 | 119,680 |
| **Net position:** | | | | | | | | | | |
| Net investment in capital assets | 762,848 | 684,412 | 672,304 | 528,377 | 562,784 | 501,675 | 506,187 | 418,784 | 365,225 | 313,575 |
| Restricted | 84,429 | 80,421 | 81,207 | 156,425 | 150,386 | 84,639 | 80,424 | 148,451 | 136,939 | 157,002 |
| Unrestricted | 488 | 31,897 | 17,041 | 23,872 | (44,682) | 14,266 | (1,541) | (18,249) | 64,750 | 38,009 |
| **Total net assets** | 847,765 | 796,730 | 770,552 | 708,674 | 668,488 | 600,580 | 585,070 | 548,986 | 566,914 | 508,586 |
| **Total liabilities, deferred inflows and net position** | **$ 3,813,903** | **$ 3,646,078** | **$ 3,448,447** | **$ 3,304,835** | **$ 3,060,122** | **$ 2,899,781** | **$ 2,692,563** | **$ 2,600,721** | **$ 2,483,291** | **$ 2,512,718** |

# LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT

## COMPARATIVE STATEMENTS OF REVENUES, EXPENSES AND CHANGES IN NET POSITION

## YEARS ENDED JUNE 30

## DOLLARS IN THOUSANDS

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Operating revenue:** | | | | | | | | | | |
| Wastewater service charges | $ 245,802 | $ 237,807 | $ 219,467 | $ 210,636 | $ 194,965 | $ 183,592 | $ 173,895 | $ 165,599 | $ 159,791 | $ 149,626 |
| Drainage service charges | 79,915 | 75,052 | 69,706 | 63,868 | 58,978 | 54,888 | 51,567 | 48,457 | 45,431 | 40,856 |
| Other operating income | 3,701 | 6,198 | 5,195 | 4,645 | 5,691 | 4,810 | 4,407 | 2,576 | 4,823 | 1,756 |
| **Total operating revenue** | 329,418 | 319,057 | 294,368 | 279,149 | 259,634 | 243,290 | 229,869 | 216,632 | 210,045 | 192,238 |
| **Operating expenses:** | | | | | | | | | | |
| Service and administrative costs | 170,073 | 167,771 | 154,325 | 142,711 | 122,098 | 121,674 | 106,174 | 108,814 | 108,041 | 108,326 |
| Capitalization/recovery of cost | (41,785) | (39,643) | (38,383) | (38,147) | (31,949) | (30,516) | (30,056) | (33,568) | (32,200) | (30,860) |
| Capitalized overhead (over) under applied | - | - | - | 88 | - | - | - | - | (910) | (2,340) |
| Depreciation and amortization | 97,874 | 98,872 | 87,882 | 77,954 | 77,156 | 62,820 | 63,321 | 63,516 | 60,335 | 60,527 |
| **Total operating expenses** | 226,162 | 227,000 | 203,824 | 182,606 | 167,305 | 153,978 | 139,439 | 138,762 | 135,266 | 135,653 |
| **Income (loss) from operations** | 103,256 | 92,057 | 90,544 | 96,543 | 92,329 | 89,312 | 90,430 | 77,870 | 74,779 | 56,585 |
| **Non-operating revenue (expense):** | | | | | | | | | | |
| Gain/loss disposal of assets | (21) | (15,008) | 15 | - | - | - | - | - | - | - |
| Investment income | 1,777 | 5,275 | 8,338 | 6,280 | 4,047 | 7,559 | 7,527 | 10,234 | 3,695 | 29,682 |
| Build America bond refund | 10,398 | 10,325 | 10,339 | 10,249 | 10,226 | 10,332 | 10,096 | 10,096 | 10,986 | 10,986 |
| Interest expense - bonds | (93,067) | (92,274) | (94,831) | (95,041) | (90,117) | (86,818) | (83,404) | (80,613) | (92,616) | (89,243) |
| Interest expense - swaps | (9,793) | (8,027) | (6,468) | (7,724) | (8,926) | (9,514) | (9,737) | (9,733) | (10,200) | (11,235) |
| Interest expense - other | (13,104) | (13,129) | (13,497) | (9,873) | (9,317) | (8,601) | (4,611) | (4,629) | (4,829) | (6,595) |
| Amortization of debt discount/premium | 17,429 | 12,688 | 14,344 | 15,198 | 13,701 | 12,052 | 7,887 | 7,296 | 6,735 | 7,032 |
| Amoritzation of loss on refunding | (3,107) | (2,404) | (2,817) | (3,147) | (3,070) | (1,949) | (1,980) | (2,552) | - | - |
| Capitalized interest | 12,049 | 13,043 | 18,582 | 21,859 | 20,074 | 21,051 | 20,511 | 19,103 | 26,358 | 26,384 |
| Change in fair values - swaps | 8,796 | 812 | (13,597) | 16,317 | 26,072 | (22,951) | (5,240) | (1,222) | 36,286 | (52,897) |
| **Total non-operating revenue (expenses), net** | (68,643) | (88,699) | (79,592) | (45,882) | (37,310) | (78,839) | (58,951) | (52,020) | (23,585) | (85,886) |
| **Net income / (loss) before contributions** | 34,613 | 3,358 | 10,952 | 50,661 | 55,019 | 10,473 | 31,479 | 25,850 | 51,194 | (29,301) |
| **Contributions** | | | | | | | | | | |
| Property owner assessments | - | - | - | - | 2,376 | - | - | - | - | - |
| All other | 16,422 | 9,085 | 50,926 | 12,726 | 10,513 | 5,037 | 4,605 | 8,103 | 7,134 | 2,095 |
| **Increase (decrease) in net position** | 51,035 | 12,443 | 61,878 | 63,387 | 67,908 | 15,510 | 36,084 | 33,953 | 58,328 | (27,206) |
| **Net position, beginning of year** | 796,730 | 770,552 | 708,674 | 668,488 | 600,580 | 585,070 | 548,986 | 566,914 | 508,586 | 535,792 |
| **Net position, OCEA merger** | - | 13,735 | - | - | - | - | - | - | - | - |
| **Restatement for GASB 68 implementation** | - | - | - | - | - | - | - | (51,881) | - | - |
| **Restatement for GASB 75 implementation** | - | - | - | (23,201) | - | - | - | - | - | - |
| **Net Position, beginning of year, as restated** | 796,730 | 784,287 | 708,674 | 645,287 | 600,580 | 585,070 | 548,986 | 515,033 | 508,586 | 535,792 |
| **Net position, end of year** | $ 847,765 | $ 796,730 | $ 770,552 | $ 708,674 | $ 668,488 | $ 600,580 | $ 585,070 | $ 548,986 | $ 566,914 | $ 508,586 |

# LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## COMPARATIVE STATEMENTS OF CASH FLOWS
## YEARS ENDED JUNE 30
## DOLLARS IN THOUSANDS

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cash flows from operating activities:** | | | | | | | | | | |
| Cash received from customers | $ 331,767 | $ 319,701 | $ 292,791 | $ 276,711 | $ 262,055 | $ 240,202 | $ 227,976 | $ 213,215 | $ 207,905 | $ 193,446 |
| Cash paid to suppliers and employees | (107,122) | (105,649) | (103,173) | (95,150) | (88,300) | (85,202) | (75,258) | (73,175) | (79,926) | (76,077) |
| **Net cash provided by operating activities** | 224,645 | 214,052 | 189,618 | 181,561 | 173,755 | 155,000 | 152,718 | 140,040 | 127,979 | 117,369 |
| **Cash flows from capital and related financing activities:** | | | | | | | | | | |
| Proceeds from issuance of revenue bonds | 233,133 | - | - | 175,000 | 150,000 | 175,000 | 80,000 | 100,000 | 115,790 | 263,360 |
| Proceeds from issuance of bond anticipation note | 237,295 | 230,079 | 230,334 | 226,340 | 226,340 | 226,340 | 226,340 | 226,340 | 228,735 | 226,340 |
| Proceeds from issuance of commercial paper | 365,000 | 770,000 | 319,112 | - | - | - | - | - | - | - |
| Proceeds from issuance of notes | - | 90,200 | 100 | - | - | - | - | - | - | - |
| Proceeds from issuance of other subordinate debt | 17,788 | - | - | - | - | - | - | - | - | - |
| Premium from sale of bonds | - | - | - | 21,894 | 15,715 | 16,887 | - | - | - | - |
| Payments for retirement of revenue bonds | (48,033) | (43,120) | (40,190) | - | - | - | - | - | - | - |
| Payments for retirement of bond anticipation note | (226,340) | (226,340) | (226,340) | - | - | - | - | - | - | - |
| Payments for retirement of commercial paper | (470,000) | (635,000) | (200,000) | - | - | - | - | - | - | - |
| Payments for retirement of notes | (100) | (90,200) | - | - | - | - | - | - | - | - |
| Payments for retirement of other subordinate debt | (2,119) | (2,120) | (317) | - | - | - | - | - | - | - |
| Principal paid on debt | - | - | - | (263,395) | (271,064) | (255,291) | (271,853) | (253,465) | (399,424) | (543,700) |
| Payments for interest expense | (103,393) | (106,312) | (108,511) | (102,394) | (103,919) | (92,246) | - | - | - | - |
| Payments for interest on swaps | (9,793) | (7,622) | (6,468) | (7,724) | (8,926) | (9,514) | (9,737) | (9,733) | (10,200) | (11,235) |
| Build America bond refund | 10,398 | 10,325 | 10,339 | 10,248 | 10,226 | 10,332 | 10,096 | 10,096 | 10,986 | 10,986 |
| Proceeds from capital grants | 1,914 | 1,786 | 9,373 | 7,183 | 6,386 | 91 | - | - | - | - |
| Proceeds from sale of capital assets | - | - | 15 | 3 | 10 | 614 | - | - | - | - |
| Payments for capital assets | (219,909) | (224,418) | (233,360) | (216,503) | (220,892) | (213,996) | - | - | - | - |
| Proceeds from assessments | 2,465 | 1,169 | 780 | 1,621 | 1,254 | 2,329 | - | - | - | - |
| Assessments extended | - | - | - | - | (2,376) | - | - | - | - | - |
| Capital contributed by governments, property owners & developers | - | - | - | - | - | - | 4,605 | 8,103 | 7,134 | 2,095 |
| Assessments receivable | - | - | - | - | - | - | 2,050 | 1,695 | 1,833 | 1,930 |
| Interest income - assessments | - | - | - | - | - | - | 340 | 687 | 731 | 852 |
| Interest paid on revenue bonds | - | - | - | - | - | - | (87,813) | (91,719) | (98,944) | (94,240) |
| Acquisition and construction of capital assets | - | - | - | - | - | - | (147,842) | (121,237) | (113,144) | (119,988) |
| Acquisition of non-operating property | - | - | - | - | - | - | (247) | (211) | (223) | (213) |
| **Net cash provided (used) by capital and related financing activities** | (211,694) | (231,573) | (245,133) | (147,727) | (197,246) | (139,454) | (194,061) | (129,444) | (256,726) | (263,813) |
| **Cash flows from investing activities:** | | | | | | | | | | |
| Change in investments | (55,205) | 86,661 | 34,428 | (56,798) | 15,990 | (15,047) | 1,052 | (30,642) | 4,064 | 200,229 |
| Investment income | 1,423 | 6,864 | 6,238 | 5,081 | 2,951 | 5,626 | 13,974 | 15,708 | 13,941 | 38,515 |
| **Net cash provided (used) by investing activities** | (53,782) | 93,525 | 40,666 | (51,717) | 18,941 | (9,421) | 15,026 | (14,934) | 18,005 | 238,744 |
| **Net increase (decrease) in cash and cash equivalents** | (40,831) | 76,004 | (14,849) | (17,883) | (4,550) | 6,125 | (26,317) | (4,338) | (110,742) | 92,300 |
| **Cash and cash equivalents, beginning of year** | 142,817 | 66,813 | 81,662 | 99,545 | 104,095 | 97,970 | 124,287 | 128,625 | 239,367 | 147,067 |
| **Cash and cash equivalents, end of year** | $ 101,986 | $ 142,817 | $ 66,813 | $ 81,662 | $ 99,545 | $ 104,095 | $ 97,970 | $ 124,287 | $ 128,625 | $ 239,367 |

Presentation and classification of items in the Cash flows from capital and related financing activities section was changed to provide better clarity beginning with the 2017 CAFR. Prior years were not reclassified and are shown as originally presented.

# LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## COMPARATIVE SUMMARIES OF OPERATING REVENUE
## YEARS ENDED JUNE 30
## DOLLARS IN THOUSANDS

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Service charges:** | | | | | | | | | | |
| **Wastewater service charges:** | | | | | | | | | | |
| Residential | $ 148,091 | $ 140,125 | $ 122,830 | $ 116,458 | $ 108,809 | $ 101,405 | $ 96,563 | $ 89,691 | $ 86,409 | $ 80,779 |
| Commercial | 74,459 | 74,134 | 71,054 | 66,651 | 61,860 | 58,343 | 62,257 | 58,812 | 57,192 | 53,116 |
| Industrial | 23,080 | 21,758 | 23,171 | 24,439 | 21,218 | 19,878 | 17,605 | 19,738 | 19,536 | 18,063 |
| Other - net | 2,588 | 5,997 | 6,803 | 7,517 | 6,853 | 8,186 | 2,806 | 2,611 | 2,267 | 2,219 |
| Free wastewater to Metro Government | (2,416) | (4,207) | (4,391) | (4,429) | (3,775) | (4,220) | (5,336) | (5,253) | (5,613) | (4,551) |
| **Total wastewater service charges** | 245,802 | 237,807 | 219,467 | 210,636 | 194,965 | 183,592 | 173,895 | 165,599 | 159,791 | 149,626 |
| **Drainage service charges:** | | | | | | | | | | |
| Residential | 29,413 | 27,684 | 25,716 | 23,811 | 22,111 | 20,439 | 20,090 | 18,522 | 17,372 | 15,907 |
| Commercial | 45,220 | 41,960 | 38,775 | 35,778 | 35,372 | 32,971 | 28,936 | 27,910 | 26,123 | 23,017 |
| Industrial | 5,239 | 4,815 | 4,373 | 3,864 | 3,445 | 3,219 | 3,030 | 3,112 | 2,956 | 2,575 |
| Other - net | 2,576 | 2,999 | 2,834 | 2,533 | - | - | - | - | - | - |
| Free drainage to Metro Government | (2,533) | (2,406) | (1,992) | (2,118) | (1,950) | (1,741) | (489) | (1,087) | (1,020) | (643) |
| **Total stormwater service charges** | 79,915 | 75,052 | 69,706 | 63,868 | 58,978 | 54,888 | 51,567 | 48,457 | 45,431 | 40,856 |
| **Total service charges** | 325,717 | 312,859 | 289,173 | 274,504 | 253,943 | 238,480 | 225,462 | 214,056 | 205,222 | 190,482 |
| **Other operating income:** | | | | | | | | | | |
| Capacity charges | 2,309 | 4,151 | 3,552 | 3,132 | 3,318 | 2,087 | 2,667 | 1,620 | 1,624 | 335 |
| Connection fees | 135 | 363 | 14 | 76 | (723) | 1,118 | 379 | 133 | 93 | 64 |
| Inflow & infiltration fees | 628 | 1,155 | 1,162 | | | | | | | |
| Regional facilities fees | - | - | - | - | - | 16 | 34 | - | - | - |
| Reserve capacity charges | - | - | - | - | - | - | - | - | 64 | - |
| Wastewater miscellaneous | 629 | 529 | 467 | 1,437 | 3,096 | 1,589 | 1,327 | 823 | 2,984 | 1,299 |
| Drainage miscellaneous | - | - | - | - | - | - | - | - | 58 | 58 |
| **Total other operating income** | 3,701 | 6,198 | 5,195 | 4,645 | 5,691 | 4,810 | 4,407 | 2,576 | 4,823 | 1,756 |
| **Total operating revenue** | $ 329,418 | $ 319,057 | $ 294,368 | $ 279,149 | $ 259,634 | $ 243,290 | $ 229,869 | $ 216,632 | $ 210,045 | $ 192,238 |

# LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## COMPARATIVE SUMMARIES OF SERVICE AND ADMINISTRATIVE COSTS
## YEARS ENDED JUNE 30
## DOLLARS IN THOUSANDS

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Service and administrative costs:** | | | | | | | | | | | |
| Labor | $ 77,789 | $ 73,476 | $ 71,379 | $ 64,718 | $ 59,183 | $ 55,229 | $ 54,378 | $ 57,249 | $ 55,028 | $ 55,010 | $ 56,358 |
| Utilities | 16,265 | 17,923 | 19,520 | 16,640 | 14,427 | 18,256 | 13,817 | 14,563 | 12,821 | 14,555 | 13,853 |
| Materials and supplies | 6,841 | 7,591 | 8,639 | 8,647 | 7,976 | 4,183 | 9,706 | 8,151 | 8,990 | 8,972 | 9,043 |
| Professional services | 2,679 | 3,033 | 2,992 | 3,985 | 4,127 | 4,169 | 2,839 | 1,932 | 3,942 | 2,416 | 2,624 |
| Maintenance and repairs | 5,306 | 5,949 | 4,875 | 7,208 | 9,116 | 10,007 | 7,915 | 9,096 | 10,866 | 11,090 | 10,054 |
| Billing and collections | 6,228 | 5,968 | 5,868 | 5,755 | 5,467 | 4,853 | 4,327 | 4,095 | 4,904 | 4,309 | 4,318 |
| Chemicals and fuel | 6,100 | 5,717 | 6,154 | 5,706 | 6,375 | 5,697 | 5,297 | 5,143 | 5,907 | 5,714 | 5,702 |
| Biosolids disposal | 3,931 | 4,647 | 3,333 | 2,616 | 2,651 | 2,245 | 1,967 | 1,795 | 1,709 | 1,759 | 2,035 |
| All other | 26,387 | 26,781 | 20,435 | 17,665 | 11,142 | 13,960 | 6,520 | 7,238 | 4,369 | 4,901 | 3,694 |
| **Service and administrative costs[1]** | 151,526 | 151,085 | 143,195 | 132,940 | 120,464 | 118,599 | 106,766 | 109,262 | 108,536 | 108,726 | 107,681 |
| **Less: Recovery of cost** | | | | | | | | | | | |
| Capitalized project cost | (41,785) | (39,643) | (38,383) | (38,147) | (31,949) | (30,516) | (30,056) | (33,568) | (33,110) | (33,200) | (30,472) |
| Revenue recoveries | - | (1,140) | (1,113) | (993) | (878) | (928) | (465) | (448) | (495) | (400) | (374) |
| **Recovery of cost** | (41,785) | (40,783) | (39,496) | (39,140) | (32,827) | (31,444) | (30,521) | (34,016) | (33,605) | (33,600) | (30,846) |
| **Net service and administrative costs** | $ 109,741 | $ 110,302 | $ 103,699 | $ 93,800 | $ 87,637 | $ 87,155 | $ 76,245 | $ 75,246 | $ 74,931 | $ 75,126 | $ 76,835 |

[1]Excludes the actuarial portion of changes to GASB 68 pension expense and GASB 75 OPEB for the year

## LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## COMPARATIVE SCHEDULES OF PLANT, LINES AND OTHER FACILITIES
## YEARS ENDED JUNE 30
## DOLLARS IN THOUSANDS

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Completed projects** | | | | | | | | | | | |
| Sewer lines | $ 1,761,425 | $ 1,746,705 | $ 1,648,891 | $ 1,497,090 | $ 1,440,360 | $ 1,379,153 | $ 1,277,745 | $ 1,274,180 | $ 1,265,437 | $ 1,179,685 | $ 1,159,437 |
| Wastewater treatment facilities | 641,414 | 627,903 | 669,041 | 648,503 | 637,166 | 629,083 | 489,292 | 489,289 | 479,998 | 479,226 | 471,190 |
| Drainage facilities | 997,461 | 880,863 | 839,159 | 561,341 | 542,271 | 515,898 | 448,853 | 448,899 | 443,577 | 437,139 | 434,943 |
| Pumping and lift stations | 260,231 | 256,228 | 240,963 | 183,795 | 166,158 | 139,651 | 96,812 | 96,819 | 89,503 | 73,023 | 71,122 |
| Administrative facilities | 52,348 | 52,297 | 51,734 | 50,818 | 50,817 | 49,342 | 49,342 | 49,342 | 49,317 | 46,068 | 46,078 |
| Maintenance facilities | 14,301 | 12,459 | 12,074 | 8,504 | 8,504 | 8,504 | 8,037 | 8,037 | 8,037 | 8,037 | 8,037 |
| Machinery, equipment and other | 121,868 | 121,265 | 118,879 | 97,407 | 98,138 | 90,702 | 85,395 | 85,395 | 83,882 | 77,068 | 71,923 |
| Capitalized interest | 428,968 | 416,921 | 403,878 | 385,296 | 363,437 | 343,363 | 322,312 | 301,800 | 282,697 | 260,157 | 235,624 |
| **Total completed projects** | 4,278,016 | 4,114,641 | 3,984,619 | 3,432,754 | 3,306,851 | 3,155,696 | 2,777,788 | 2,753,761 | 2,702,448 | 2,560,403 | 2,498,354 |
| **Less accumulated depreciation** | (1,444,223) | (1,349,897) | (1,326,461) | (1,218,427) | (1,146,036) | (1,070,108) | (1,008,503) | (946,426) | (884,199) | (825,205) | (768,423) |
| **Total completed projects - net** | 2,833,793 | 2,764,744 | 2,658,158 | 2,214,327 | 2,160,815 | 2,085,588 | 1,769,285 | 1,807,335 | 1,818,249 | 1,735,198 | 1,729,931 |
| **Total construction in progress** | 625,113 | 538,013 | 460,501 | 711,655 | 581,222 | 487,674 | 623,181 | 463,167 | 371,816 | 370,350 | 272,850 |
| **Total net plant, lines and other facilities** | $ 3,458,906 | $ 3,302,757 | $ 3,118,659 | $ 2,925,982 | $ 2,742,037 | $ 2,573,262 | $ 2,392,466 | $ 2,270,502 | $ 2,190,065 | $ 2,105,548 | $ 2,002,781 |

# LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## MISCELLANEOUS OPERATING INDICATORS
## YEARS ENDED JUNE 30

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Miscellaneous Operating Indicators** | | | | | | | | | | | |
| **Jefferson County** | | | | | | | | | | | |
| Miles of sewers | 3,372 | 3,488 | 3,348 | 3,463 | 3,322 | 3,293 | 3,240 | 3,263 | 3,240 | 3,332 | 3,200 |
| Miles of stormwater mains* | 1,160 | - | - | - | - | - | - | - | - | - | - |
| Number of treatment plants | 5 | 5 | 5 | 5 | 5 | 5 | 16 | 19 | 19 | 20 | 20 |
| Number of service connections | 281,544 | 280,309 | 279,408 | 283,936 | 280,489 | 280,063 | 253,462 | 240,174 | 239,334 | 235,136 | 230,240 |
| Daily average treatment (MGD) | 157 | 164 | 173 | 150 | 112 | 139 | 143 | 141 | 131 | 145 | 142 |
| Daily treatment capacity (MGD) | 200 | 200 | 200 | 200 | 170 | 170 | 177 | 177 | 177 | 173 | 173 |
| **Oldham County** | | | | | | | | | | | |
| Miles of sewers | 135 | - | - | - | - | - | - | - | - | - | - |
| Number of treatment plants | 8 | - | - | - | - | - | - | - | - | - | - |
| Number of service connections | 5,388 | - | - | - | - | - | - | - | - | - | - |
| Daily average treatment (MGD) | 2 | - | - | - | - | - | - | - | - | - | - |
| Daily treatment capacity (MGD) | 4 | - | - | - | - | - | - | - | - | - | - |

MGD - millions of gallons per day
*Historical data not available

## LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## WASTEWATER TREATMENT PLANT CAPACITY
## 2021

| Plant | Design Capacity MGD | Avg Daily Flow MGD | Eventual Capacity MGD | Customer Base Residential | Customer Base Commercial | Customer Base Industrial | Customer Base Total | Year Built | Treatment Process |
|---|---|---|---|---|---|---|---|---|---|
| Morris Forman | 120.0 | 91.2 | 120.0 | 120,629 | 13,540 | 304 | 134,473 | 1958 | Secondary added in 1976. |
| Derek R. Guthrie | 60.0 | 44.3 | 60.0 | 64,238 | 3,758 | 38 | 68,034 | 1986 | Secondary |
| Hite Creek | 6.0 | 4.2 | 9.0 | 10,816 | 663 | 9 | 11,488 | 1970 | Tertiary: sand filter |
| Cedar Creek | 7.5 | 5.9 | 11.3 | 18,712 | 1,072 | 12 | 19,796 | 1995 | Tertiary: sand filter |
| Floyd's Fork | 6.5 | 3.2 | 9.8 | 9,987 | 548 | 5 | 10,540 | 2001 | Tertiary: sand filter |
| Oldham County Plants | 4.3 | 1.9 | 4.3 | 6,495 | 93 | - | 6,588 | | |
| **Total treatment system** | 204.3 | 150.7 | 215.1 | 230,877 | 19,674 | 368 | 250,919 | | |

# LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
# GREATER LOUISVILLE, KENTUCKY / INDIANA
# EMPLOYERS OF 1,000 EMPLOYEES OR MORE

| | 2021 | | 2020 | | 2019 | | 2018 | | 2017 | | 2016 | | 2015 | | 2014 | | 2013 | | 2012 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Employers** | **Rank** | **Employees** | **Rank** | **Employees** | **Rank** | **Employees** | **Rank** | **Employees** | **Rank** | **Employees** | **Rank** | **Employees** | **Rank** | **Employees** | **Rank** | **Employees** | **Rank** | **Employees** | **Rank** | **Employees** | **Type of business** |
| United Parcel Service, Inc. | 1 | 24,110 | 1 | 25,090 | 1 | 23,533 | 1 | 21,233 | 1 | 22,354 | 1 | 22,080 | 1 | 22,189 | 1 | 20,931 | 1 | 20,047 | 1 | 20,117 | P Air cargo transport and distribution |
| Jefferson County, KY Public Schools | 2 | 14,484 | 2 | 14,484 | 2 | 14,250 | 2 | 14,476 | 2 | 14,553 | 2 | 14,739 | 2 | 14,719 | 2 | 14,676 | 2 | 14,269 | 2 | 14,366 | G Primary and secondary education |
| Norton Healthcare (formerly Alliant Health) | 3 | 14,403 | 3 | 13,828 | 4 | 12,579 | 4 | 12,247 | 5 | 11,944 | 5 | 11,389 | 4 | 10,739 | 4 | 10,245 | 4 | 9,666 | 4 | 9,658 | N Hospital and health care facilities |
| Ford Motor Company | 4 | 13,020 | 4 | 13,020 | 3 | 13,042 | 3 | 12,600 | 3 | 12,600 | 3 | 12,990 | 5 | 9,028 | 5 | 8,987 | 6 | 8,512 | 5 | 8,696 | P Vehicle manufacturing |
| UofL Health Inc. | 5 | 12,568 | 6 | 12,000 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | N Hospital and health care facilities |
| Humana, Inc. | 6 | 12,526 | 5 | 12,360 | 5 | 12,000 | 5 | 12,000 | 4 | 12,500 | 4 | 12,500 | 3 | 12,900 | 3 | 12,371 | 3 | 11,235 | 3 | 11,000 | P Group health insurance/HMOs |
| Baptist Healthcare System | 7 | 9,666 | 8 | 7,346 | 7 | 8,143 | 9 | 6,159 | 7 | 6,786 | 10 | 4,995 | 9 | 5,116 | 11 | 5,339 | 11 | 4,854 | 11 | 4,219 | N Hospital and health care facilities |
| Walmart Inc. | 8 | 7,500 | 9 | 6,650 | 8 | 6,650 | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | P Grocery Retailer |
| The Kroger Company | 9 | 7,421 | 7 | 9,235 | 6 | 9,235 | 12 | 3,079 | 12 | 3,079 | 11 | 4,626 | 10 | 4,892 | 10 | 5,417 | 10 | 5,152 | - | - | P Grocery Retailer |
| GE Appliances, a Haier company | 10 | 7,100 | 11 | 6,000 | 10 | 6,000 | 10 | 6,000 | 10 | 6,000 | 9 | 6,000 | 7 | 6,000 | 6 | 6,230 | 8 | 6,000 | 9 | 5,000 | P Appliance manufacturing |
| University of Louisville | 11 | 6,574 | 10 | 6,619 | 9 | 6,394 | 6 | 6,933 | 6 | 7,065 | 7 | 6,375 | 6 | 6,264 | 7 | 6,161 | 7 | 6,187 | 6 | 6,273 | G Higher education |
| Amazon.com | 12 | 5,700 | 12 | 5,700 | 13 | 5,700 | 7 | 6,500 | 8 | 6,500 | 6 | 6,500 | 7 | 6,000 | - | - | - | - | - | - | P Logistics & Customer Service |
| Louisville-Jefferson County Metro Government | 13 | 5,628 | 13 | 5,645 | 12 | 5,987 | 8 | 6,226 | 9 | 6,192 | 8 | 6,095 | 8 | 5,584 | 8 | 5,654 | 9 | 5,651 | 8 | 5,689 | G City/County Government |
| Manna Inc | 14 | 2,325 | 15 | 2,300 | 16 | 2,300 | 14 | 2,300 | 14 | 2,600 | 12 | 3,120 | 13 | 2,400 | 16 | 2,250 | - | - | - | - | P Food service provider |
| LG&E and KU Energy (formerly EON) | 15 | 2,209 | 16 | 2,240 | 17 | 2,208 | 16 | 2,162 | 17 | 2,201 | 18 | 2,211 | 18 | 1,993 | 18 | 2,178 | 16 | 2,131 | 16 | 2,066 | P Gas & Electric Utility |
| US Census Bureau | 16 | 2,147 | 18 | 2,113 | 29 | 1,330 | 33 | 1,209 | 38 | 1,185 | 38 | 1,037 | - | - | - | - | - | - | - | - | N Government |
| Roman Catholic Archdiocese of Louisville | 17 | 2,202 | 17 | 2,202 | 18 | 2,202 | 15 | 2,252 | 13 | 2,660 | 17 | 2,263 | 17 | 2,237 | 14 | 2,260 | 14 | 2,345 | 13 | 2,352 | N Religious, educational, social services |
| Robley Rex VA Medical Center | 18 | 2,002 | 19 | 1,922 | 19 | 1,876 | 18 | 1,816 | 21 | 1,800 | 21 | 1,900 | 19 | 1,800 | 20 | 1,703 | 18 | 1,799 | 18 | 1,728 | N Hospital and health care facilities |
| Oldham County Public Schools | 19 | 1,777 | 21 | 1,710 | 15 | 2,325 | 24 | 1,567 | 23 | 1,638 | 24 | 1,604 | 15 | 2,300 | 23 | 1,576 | 22 | 1,602 | 19 | 1,690 | G Primary and secondary education |
| Bullitt County Public Schools | 20 | 1,737 | 20 | 1,753 | 23 | 1,649 | 19 | 1,736 | 22 | 1,718 | 22 | 1,739 | 21 | 1,671 | 22 | 1,633 | 21 | 1,629 | - | - | G Primary and secondary education |
| Samtec Inc. | 21 | 1,575 | 23 | 1,601 | 21 | 1,700 | 26 | 1,500 | 35 | 1,200 | 29 | 1,300 | - | - | - | - | - | - | - | - | P Electronic connectors & microelectronics products |
| Rawlings Group | 22 | 1,495 | 24 | 1,531 | 24 | 1,520 | 29 | 1,440 | 28 | 1,332 | 30 | 1,211 | - | - | - | - | - | - | - | - | P Insurance subrogation |
| New Albany - Floyd County Schools | 23 | 1,475 | 26 | 1,414 | 26 | 1,500 | 21 | 1,652 | 26 | 1,405 | 25 | 1,600 | 22 | 1,622 | 21 | 1,648 | 20 | 1,640 | - | - | G Primary and secondary education |
| Spectrum (formerly Charter Communications) | 25 | 1,200 | 14 | 2,330 | 14 | 2,330 | 13 | 2,400 | 15 | 2,400 | 33 | 1,200 | 35 | 1,131 | 34 | 1,200 | - | - | - | - | P Call Center |
| Texas Roadhouse Inc. | 25 | 1,452 | 25 | 1,452 | 26 | 1,500 | 26 | 1,500 | 29 | 1,320 | 35 | 1,179 | - | - | - | - | - | - | - | - | P Food service provider |
| JBS USA | 26 | 1,165 | 32 | 1,200 | 35 | 1,200 | 34 | 1,200 | 37 | 1,189 | 34 | 1,180 | - | - | - | - | - | - | - | - | P Pork Products |
| Brown-Forman Corp. | 27 | 1,149 | 28 | 1,300 | 31 | 1,300 | 30 | 1,300 | 31 | 1,304 | 29 | 1,300 | 31 | 1,266 | 31 | 1,256 | 32 | 1,244 | 31 | 1,196 | P Distilled spirits manufacturing |
| Greater Clark County, IN School Corp. | 28 | 1,143 | 30 | 1,253 | 33 | 1,251 | 28 | 1,447 | 32 | 1,295 | 32 | 1,247 | 24 | 1,447 | 24 | 1,303 | 30 | 1,357 | 27 | 1,346 | G Primary and secondary education |
| Yum! Brands Inc. (formerly Tricon) | 29 | 1,096 | 0 | - | 0 | - | 0 | - | 30 | 1,314 | 28 | 1,343 | 32 | 1,226 | 30 | 1,270 | 23 | 1,544 | 22 | 1,558 | P Food service provider |
| Kindred Healthcare (formerly Vencor Inc.) | 30 | 1,082 | 35 | 1,185 | 34 | 1,246 | 23 | 1,571 | 16 | 2,216 | 16 | 2,381 | 16 | 2,244 | 17 | 2,249 | 17 | 2,130 | 15 | 2,252 | P Long-term health care, facilities |
| Seven Counties Services | 31 | 1,072 | 0 | - | 32 | 1,266 | 31 | 1,284 | 27 | 1,340 | 36 | 1,165 | 34 | 1,168 | 33 | 1,129 | 36 | 1,111 | 30 | 1,215 | N Health care provider |
| BrightSpring Health Services | 32 | 1,062 | 37 | 1,057 | 20 | 1,800 | 17 | 1,948 | 19 | 1,948 | 14 | 2,435 | 28 | 1,312 | 35 | 1,054 | 0 | - | 0 | - | P Health care provider |
| Malone Workforce Solutions | 33 | 1,020 | 27 | 1,400 | 37 | 1,182 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | P Grocery Retailer |
| Shelby County Public Schools | 34 | 1,000 | 0 | - | 0 | - | 0 | - | 40 | 1,000 | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | G Primary and secondary education |
| ADP Inc. | 34 | 1,000 | 38 | 1,000 | 42 | 1,000 | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | P Grocery Retailer |
| U.S. Postal Service | 0 | - | 22 | 1,691 | 22 | 1,691 | 20 | 1,691 | 20 | 1,896 | 23 | 1,659 | 12 | 2,401 | 13 | 2,546 | 13 | 2,509 | - | - | G Mail distribution |
| Papa John's International | 0 | - | 29 | 1,263 | 28 | 1,485 | 22 | 1,626 | 18 | 2,088 | 19 | 2,088 | 30 | 1,279 | 25 | 1,503 | 35 | 1,143 | - | - | P Quick service restaurant |
| Anthem, Inc. | 0 | - | 31 | 1,245 | 30 | 1,320 | 32 | 1,269 | 34 | 1,238 | 29 | 1,300 | 26 | 1,350 | 32 | 1,139 | 37 | 1,100 | 34 | 1,122 | P Health Insurance sales and services |
| Caesars Southern Indiana | 0 | - | 32 | 1,200 | 38 | 1,135 | 38 | 1,160 | 33 | 1,239 | 31 | 1,252 | 29 | 1,303 | 29 | 1,404 | 26 | 1,418 | 25 | 1,437 | P Gaming and entertainment resort |
| Faurecia | 0 | - | 32 | 1,200 | 35 | 1,200 | 34 | 1,200 | 40 | 1,000 | - | - | - | - | - | - | - | - | - | - | P Exhaust systems, interiors & seat systems |
| Clark Memorial Hospital | 0 | - | 36 | 1,063 | 41 | 1,011 | 39 | 1,060 | 0 | - | 33 | 1,225 | 33 | 1,225 | 30 | 1,270 | 0 | - | 0 | - | P Health care provider |
| Churchill Downs Inc. | 0 | - | 38 | 1,000 | 25 | 1,508 | 25 | 1,515 | 25 | 1,526 | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | P Racing, gaming and online entertainment |
| Martinrea Heavy Stamping | 0 | - | 0 | - | 39 | 1,100 | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | P Grocery Retailer |
| Signature Healthcare | 0 | - | 0 | - | 40 | 1,093 | 0 | - | 24 | 1,558 | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | N Post-acute and long-term care provider |
| LSC Communications (formerly Publisher's Printing) | 0 | - | 0 | - | 0 | - | 34 | 1,200 | 35 | 1,200 | 27 | 1,400 | 25 | 1,413 | 28 | 1,432 | 24 | 1,516 | 24 | 1,450 | P Trade, professional, special printing |
| PNC Bank | 0 | - | 0 | - | 0 | - | 37 | 1,175 | 39 | 1,175 | 26 | 1,500 | 23 | 1,569 | 0 | - | 0 | - | 0 | - | P Financial Services |
| Mortenson Dental Partners | 0 | - | 0 | - | 0 | - | 40 | 1,047 | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | P Dental Services |
| Commonwealth of Kentucky | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 13 | 2,514 | 11 | 3,794 | 12 | 4,042 | 12 | 4,161 | 10 | 4,232 | G General purpose government |
| U.S. Federal Government | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 15 | 2,406 | 14 | 2,397 | 15 | 2,252 | 15 | 2,191 | 12 | 2,676 | G General purpose government |
| Floyd Memorial Hospital & Health Services | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 20 | 1,950 | 20 | 1,756 | 19 | 1,769 | 19 | 1,711 | 20 | 1,612 | P Hospital and health services provider |
| Securitas Security Services USA Inc. | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 27 | 1,328 | 26 | 1,476 | 25 | - | 21 | 1,598 | P Security Services |
| Al J Schneider Co | 0 | - | 0 | - | 0 | - | 0 | - | 40 | 1,000 | 37 | 1,047 | 37 | 1,000 | 36 | 1,050 | 0 | - | 0 | - | P Hotel / Restaurants |
| American Commercial Lines | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - | 36 | 1,100 | 0 | - | 0 | - | 0 | - | P Marine Transportation Service |
| Total employees | | 173,085 | | 177,602 | | 167,741 | | 150,680 | | 156,558 | | 158,045 | | 149,163 | | 138,603 | | 125,854 | | 114,548 | |

P=for-profit organization N=not-for-profit organization G=governmental organization
Source: Business First of Louisville, KY, June 16, 2021

## LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## ROLE OF OUTSTANDING DEBT AND MISCELLANEOUS DEMOGRAPHIC INFORMATION

| Fiscal Year | Debt *(In 000's)* | Population* | Personal Income*** | Percentage of Personal Income | Unemployment Rate** | # of MSD Employees | # of MSD Service Connections | Miles of Sewer Line |
|---|---|---|---|---|---|---|---|---|
| 2012 | $ 1,834,691 | 750,828 | $ 32,592,092 | 5.63% | 8.4% | 666 | 235,136 | 3,232 |
| 2013 | $ 1,790,715 | 756,832 | $ 33,314,513 | 5.38% | 8.2% | 649 | 239,334 | 3,240 |
| 2014 | $ 1,867,089 | 760,026 | $ 34,609,792 | 5.39% | 6.4% | 606 | 240,174 | 3,263 |
| 2015 | $ 1,902,110 | 763,623 | $ 34,575,582 | 5.50% | 4.9% | 591 | 253,462 | 3,288 |
| 2016 | $ 2,050,444 | 764,378 | $ 36,517,217 | 5.62% | 4.6% | 617 | 280,063 | 3,293 |
| 2017 | $ 2,167,901 | 765,352 | $ 37,813,140 | 5.73% | 4.6% | 626 | 280,489 | 3,322 |
| 2018 | $ 2,315,569 | 770,517 | $ 40,017,970 | 5.79% | 4.2% | 632 | 283,936 | 3,463 |
| 2019 | $ 2,386,059 | 766,757 | $ 41,968,275 | 5.69% | 4.2% | 645 | 279,408 | 3,348 |
| 2020 | $ 2,498,264 | 782,969 | N/A | N/A | 6.4% | 675 | 280,309 | 3,488 |
| 2021 | $ 2,602,398 | N/A | N/A | N/A | 5.3% | 679 | 286,932 | 3,507 |

*Source: U.S. Census Bureau (https://www.census.gov/quickfacts/fact/table/jeffersoncountykentucky/POP010220)
**Source: U.S. Bureau of Labor Statistics (https://www.bls.gov/eag/eag.ky_louisville_msa.htm)
***Source: Bureau of Economic Analysis website (www.bea.gov)

## LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT
## TOP 10 WASTEWATER AND DRAINAGE CUSTOMERS

| Rank | Customer Name | | FY 21 Wastewater Billed | Percent Total Wastewater Revenue |
|---|---|---|---|---|
| 1 | Heaven Hill Distilleries | $ | 3,715,684 | 1.51% |
| 2 | Lubrizol Advanced Material | | 2,071,550 | 0.84% |
| 3 | Swift Pork Co. | | 2,053,342 | 0.84% |
| 4 | The Chemours Company FC LLC | | 1,388,385 | 0.56% |
| 5 | Early Times Distillery | | 1,373,275 | 0.56% |
| 6 | Ford Motor Co. | | 1,124,209 | 0.46% |
| 7 | Haier US Appliance Solutions | | 778,537 | 0.32% |
| 8 | Rohm & Haas | | 739,411 | 0.30% |
| 9 | Ford Motor Co. | | 717,704 | 0.29% |
| 10 | Clariant Corporation | | 590,926 | 0.24% |
| | Total | | 14,553,023 | 5.92% |
| | Total FY 21 Wastewater Revenue: | $ | 245,801,703 | |

| Rank | Customer Name | | FY 20 Wastewater Billed | Percent Total Wastewater Revenue |
|---|---|---|---|---|
| 1 | Heaven Hill Distilleries | $ | 3,794,811 | 1.54% |
| 2 | Lubrizol Advanced Material | | 2,484,802 | 1.01% |
| 3 | Swift Pork Co. | | 1,824,854 | 0.74% |
| 4 | The Chemours Company FC LLC | | 1,708,171 | 0.69% |
| 5 | Early Times Distillery | | 1,133,691 | 0.46% |
| 6 | Ford Motor Co. | | 856,205 | 0.35% |
| 7 | Rohm & Haas | | 848,525 | 0.35% |
| 8 | Ford Motor Co. | | 841,538 | 0.34% |
| 9 | Haier US Appliance Solutions | | 791,125 | 0.32% |
| 10 | Clariant Corporation | | 663,981 | 0.27% |
| | Total | | 14,947,703 | 6.29% |
| | Total FY 20 Wastewater Revenue: | $ | 237,807,086 | |

| Rank | Customer Name | | FY 21 Drainage Billed | Percent Total Drainage Revenue |
|---|---|---|---|---|
| 1 | Regional Airport Authority | $ | 1,546,213 | 1.93% |
| 2 | United Parcel Service | | 1,358,550 | 1.70% |
| 3 | Jeff Co Bd of Ed | | 855,119 | 1.07% |
| 4 | Ford Motor Co. | | 428,087 | 0.54% |
| 5 | LIT Industrial Limited Partner | | 320,852 | 0.40% |
| 6 | Regional Airport Authority | | 305,126 | 0.38% |
| 7 | Kentucky State Fair | | 300,720 | 0.38% |
| 8 | Churchill Downs Inc | | 278,017 | 0.35% |
| 9 | The University of Louisville Campus | | 275,408 | 0.34% |
| 10 | Seaboard System RR-00822 | | 260,138 | 0.33% |
| | Total | | 5,928,230 | 7.42% |
| | Total FY 21 Drainage Revenue: | $ | 79,915,505 | |

| Rank | Customer Name | | FY 20 Drainage Billed | Percent Total Drainage Revenue |
|---|---|---|---|---|
| 1 | Regional Airport Authority | $ | 1,456,296 | 1.82% |
| 2 | United Parcel Service | | 891,547 | 1.12% |
| 3 | Jeff Co Bd of Ed | | 801,474 | 1.00% |
| 4 | Ford Motor Co. | | 407,035 | 0.51% |
| 5 | LIT Industrial Limited Partner | | 308,182 | 0.39% |
| 6 | Kentucky State Fair | | 288,484 | 0.36% |
| 7 | Regional Airport Authority | | 286,371 | 0.36% |
| 8 | The University of Louisville Campus | | 264,526 | 0.33% |
| 9 | Seaboard System RR-00822 | | 245,945 | 0.31% |
| 10 | Churchill Downs Inc | | 244,642 | 0.31% |
| | Total | | 5,194,502 | 6.92% |
| | Total FY 20 Drainage Revenue: | $ | 75,051,622 | |

Cover photo: Tributary Floyds Fork

Safe, clean waterways

700 West Liberty Street
Louisville, KY 40203-1911
LouisvilleMSD.org
24/7 Customer Relations
502.540.6000


A publication of MSD Finance Department

## APPENDIX C

## INTERIM AND UNAUDITED FINANCIAL STATEMENTS FOR THE FIVE MONTHS ENDED NOVEMBER 30, 2021

# Louisville & Jefferson County Metropolitan Sewer District
# November 30, 2021 Interim Financial Statements

| Louisville & Jefferson County Metropolitan Sewer District<br>Monthly Comparative Statement of Net Position | | | | |
|---|---|---|---|---|
| | YTD<br>Nov-2021 | YTD<br>Nov-2020 | Variance | Percent |
| **Current Assets** | | | | |
| Unrestricted Cash & Cash Equivalents | $109,220,607 | $107,855,207 | $1,365,400 | 1.27% |
| Sewer & Drainage Receivable | 29,556,349 | 26,469,365 | 3,086,984 | 11.66% |
| Assessment Warrants Receivable | 196,235 | 165,690 | 30,545 | 18.43% |
| Miscellaneous Receivables | (2,135,245) | 1,398,293 | (3,533,538) | -252.70% |
| Inventories | 5,287,121 | 5,052,897 | 234,224 | 4.64% |
| Prepaid Expenses | 6,448,436 | 3,384,644 | 3,063,792 | 90.52% |
| Restricted Funds | 103,549,896 | 105,545,481 | (1,995,584) | -1.89% |
| Accrued Interest Receivable | 231,208 | 186,454 | 44,754 | 24.00% |
| **Total Current Assets** | **252,354,608** | **250,058,031** | **2,296,576** | 0.92% |
| **Non-Current Assets** | | | | |
| Utility Plant in Service | 4,303,956,938 | 4,142,099,242 | 161,857,696 | 3.91% |
| Accumulated Depreciation | (1,506,594,825) | (1,411,430,009) | (95,164,816) | 6.74% |
| Construction in Progress | 674,691,464 | 610,040,552 | 64,650,911 | 10.60% |
| **Net Fixed Assets** | **3,472,053,577** | **3,340,709,785** | **131,343,792** | 3.93% |
| **Non-Current Receivables** | **25,535,547** | **27,874,574** | **(2,339,026)** | -8.39% |
| **Total Assets** | **3,749,943,732** | **3,618,642,390** | **131,301,342** | 3.63% |
| **Total Deferred Outflow of Resources** | **83,395,371** | **89,343,104** | **(5,947,733)** | -6.66% |
| **Total Assets & Deferred Outflow of Resources** | **3,833,339,103** | **3,707,985,494** | **125,353,609** | 3.38% |
| **Current Liabilities** | | | | |
| Miscellaneous Accounts Payable | 9,171,075 | 12,355,984 | (3,184,908) | -25.78% |
| Accounts Payable - Construction | 2,470,564 | 6,175,469 | (3,704,905) | -59.99% |
| Contract Retainage | 11,737,218 | 13,875,101 | (2,137,884) | -15.41% |
| Accrued Interest Payable | 4,998,874 | 5,710,692 | (711,818) | -12.46% |
| Current Maturities of Bonds Payable | 51,230,000 | 44,985,000 | 6,245,000 | 13.88% |
| Current Maturities of Subordinate Debt | 2,375,180 | 2,080,339 | 294,841 | 14.17% |
| Deposits Payable | 2,747,393 | 2,594,972 | 152,421 | 5.87% |
| Accrued Salaries & Wages | 2,140,138 | 1,856,930 | 283,208 | 15.25% |
| Accrued Workers' Comp Insurance | 2,652,990 | 2,536,310 | 116,680 | 4.60% |
| Employee Comp Absences Payable | 3,970,778 | 3,825,870 | 144,908 | 3.79% |
| **Total Current Liabilities** | **93,494,210** | **95,996,666** | **(2,502,457)** | -2.61% |
| **Non-Current Liabilities** | | | | |
| Long-Term Senior Debt Payable | 2,056,535,000 | 2,105,120,000 | (48,585,000) | -2.31% |
| Long-Term Subordinate Debt Payable | 464,924,813 | 338,465,722 | 126,459,090 | 37.36% |
| Other Long-Term Liability | 323,722,956 | 242,864,170 | 80,858,785 | 33.29% |
| **Total Non-Current Liabilities** | **2,845,182,768** | **2,686,449,893** | **158,732,876** | 5.91% |
| **Total Liabilities** | **2,938,676,978** | **2,782,446,559** | **156,230,419** | 5.61% |
| **Total Deferred Inflow of Resources** | **10,080,515** | **16,322,906** | **(6,242,392)** | -38.24% |
| **Total Liabilities & Deferred Inflow of Resources** | **2,948,757,493** | **2,798,769,466** | **149,988,027** | 5.36% |
| **Net Position** | **884,581,610** | **823,421,831** | **61,159,779** | 7.43% |
| **Total Liabilities, Deferred Inflow of Resources and Net Position** | **3,833,339,103** | **3,622,191,297** | **211,147,806** | 5.83% |

**Louisville & Jefferson County Metropolitan Sewer District**
**Monthly Statement of Revenues, Expenses, and Changes in Net Position**

| | YTD Actual | YTD Budget | YTD Variance | % YTD Variance | YTD Prior Year | YTD Variance | % YTD Variance |
|---|---|---|---|---|---|---|---|
| **Wastewater Charges** | | | | | | | |
| Residential | $ 66,164,467 | $ 62,451,069 | $ 3,713,398 | 5.9% | $ 62,118,420 | $ 4,046,047 | 6.5% |
| Commercial | 38,166,759 | 35,807,009 | 2,359,749 | 6.6% | 32,680,216 | 5,486,543 | 16.8% |
| Industrial | 9,663,733 | 10,481,890 | (818,157) | -7.8% | 9,491,182 | 172,551 | 1.8% |
| Other Wastewater | 4,163,910 | 3,363,230 | 800,679 | 23.8% | 1,331,255 | 2,832,654 | 212.8% |
| Free Wastewater Charges | (2,736,447) | (2,558,308) | (178,139) | 7.0% | (1,334,275) | (1,402,172) | 105.1% |
| **Total Wastewater Charges** | **115,422,421** | **109,544,890** | **5,877,531** | 5.4% | **104,286,798** | **11,135,624** | 10.7% |
| **Drainage** | | | | | | | |
| Residential | 12,903,218 | 12,641,400 | 261,818 | 2.1% | 11,934,976 | 968,242 | 8.1% |
| Commercial | 20,355,043 | 19,603,698 | 751,345 | 3.8% | 18,660,963 | 1,694,080 | 9.1% |
| Industrial | 2,330,074 | 2,256,451 | 73,623 | 3.3% | 2,161,560 | 168,514 | 7.8% |
| Other Stormwater | 1,499,895 | 1,333,494 | 166,401 | 12.5% | 973,213 | 526,682 | 54.1% |
| Free Stormwater Charges | (1,066,777) | (1,055,935) | (10,842) | 1.0% | (977,483) | (89,294) | 9.1% |
| **Total Drainage Charges** | **36,021,453** | **34,779,108** | **1,242,345** | 3.6% | **32,753,228** | **3,268,225** | 10.0% |
| **Total Service Charges** | **151,443,875** | **144,323,998** | **7,119,876** | 4.9% | **137,040,026** | **14,403,849** | 10.5% |
| **Other Operating Income** | **3,479,079** | **2,311,436** | **1,167,643** | 50.5% | **2,079,974** | **1,399,106** | 67.3% |
| **Total Operating Revenue** | **154,922,954** | **146,635,434** | **8,287,520** | 5.7% | **139,120,000** | **15,802,954** | 11.4% |
| **Operating Expenses** | | | | | | | |
| Salaries & Wages | 21,722,072 | 23,298,261 | (1,576,189) | -6.8% | 21,181,079 | 540,993 | 2.6% |
| Labor Related Overhead | 10,682,354 | 11,133,369 | (451,015) | -4.1% | 10,731,921 | (49,567) | -0.5% |
| Utilities | 5,897,791 | 7,175,167 | (1,277,376) | -17.8% | 6,105,272 | (207,481) | -3.4% |
| Materials & Supplies | 2,811,654 | 3,029,377 | (217,724) | -7.2% | 2,651,512 | 160,142 | 6.0% |
| Contractual Services | 14,123,776 | 15,537,709 | (1,413,933) | -9.1% | 13,871,175 | 252,601 | 1.8% |
| Chemicals | 2,497,574 | 2,713,655 | (216,081) | -8.0% | 1,805,821 | 691,753 | 38.3% |
| Fuel | 573,143 | 579,676 | (6,534) | -1.1% | 398,625 | 174,517 | 43.8% |
| Insurance Premiums & Claims | 2,468,358 | 1,577,251 | 891,108 | 56.5% | 1,259,167 | 1,209,192 | 96.0% |
| Bad Debt | 1,928,680 | 1,458,338 | 470,342 | 32.3% | 1,571,375 | 357,305 | 22.7% |
| Other Operating Expense | 596,685 | 1,031,987 | (435,302) | -42.2% | 509,146 | 87,538 | 17.2% |
| Mapping/Insurance Recovery | - | - | - | 0.0% | (546,285) | 546,285 | 0.0% |
| Capitalized Overhead | (15,716,655) | (16,208,349) | 491,694 | -3.0% | (14,542,690) | (1,173,965) | 8.1% |
| Capital Expenses (over)/under applied | | | | | | | |
| **Net Service and Administrative Costs** | **47,585,431** | **51,326,440** | **(3,741,009)** | -7.3% | **44,996,118** | **2,589,313** | 5.8% |
| Depreciation | 40,910,288 | 40,416,665 | 493,623 | 1.2% | 39,501,547 | 1,408,741 | 3.6% |
| Amortization | 464,337 | 0 | 464,337 | 0.0% | 565,010 | (100,673) | -17.8% |
| **Total Depreciation/Amortization** | **41,374,625** | **40,416,665** | **957,960** | 2.4% | **40,066,557** | **1,308,067** | 3.3% |
| **Total Operating Expenses** | **88,960,056** | **91,743,105** | **(2,783,049)** | -3.0% | **85,062,675** | **3,897,381** | 4.6% |
| **Net Operating Income** | **65,962,898** | **54,892,329** | **11,070,569** | 20.2% | **54,057,324** | **11,905,574** | 22.0% |
| **Non-Operating Revenue (Expenses)** | | | | | | | |
| Gain/Loss Disposal of Assets | 74,983 | 500 | 74,483 | 14896.6% | 51,359 | 23,624 | 46.0% |
| Investment Income | 4,912,140 | 4,802,000 | 110,140 | 2.3% | 4,838,557 | 73,583 | 1.5% |
| Interest Expense | (37,662,617) | (43,580,440) | 5,917,823 | -13.6% | 35,822,086 | (73,484,703) | -205.1% |
| **Total Non-Operating Revenue (Expenses)** | **(32,675,493)** | **(38,777,940)** | **6,102,447** | -15.7% | **40,712,002** | **(73,387,496)** | -180.3% |
| Contributions | 51,894.75 | - | 51,895 | 0.0% | 260,979 | 209,085 | -80.1% |
| **Change in Net Position Before Swaps** | **33,339,299** | **16,114,389** | **17,224,910** | 106.9% | **95,030,306** | **61,691,007** | -64.9% |
| **Change in Fair Value of Swaps** | 3,476,692 | - | 3,476,692 | 0.0% | (3,305,487) | (6,782,179) | -205.2% |
| **Change in Net Position After Swaps** | **$ 36,815,992** | **$ 16,114,389** | **$ 20,701,602** | 128.5% | **$ 91,724,819** | **$ 54,908,827** | -59.9% |

**Louisville and Jefferson County Metropolitan Sewer District**
**Monthly Statement of Cash Flows**

| | | YTD FY 2022 |
|---|---|---|
| **Cash Flows from Operating Activities** | | |
| Cash received from customers | $ | 152,018,139 |
| Cash paid to suppliers | | (35,504,776) |
| Cash paid to employees | | (23,739,312) |
| **Net Cash Provided by Operating Activities** | | 92,774,051 |
| | | |
| **Cash Flows from Capital and Related Financing Activities** | | |
| Proceeds from issuance of revenue bonds | | - |
| Proceeds from issuance of bond anticipation note | | 232,924,231 |
| Proceeds from issuance of commercial paper | | 205,000,000 |
| Proceeds from issuance of notes | | - |
| Proceeds from issuance of other subordinated debt | | - |
| Payments for retirement of revenue bonds | | (3,577,297) |
| Payments for retirement of bond anticipation note | | (226,340,000) |
| Payments for retirement of commercial paper | | (160,000,000) |
| Payments for retirement of notes | | - |
| Payments for retirement of other subordinated debt | | (783,905) |
| Payments for interest expense | | (54,309,021) |
| Payments for interest on swaps | | (4,291,092) |
| Build America bond interest subsidy | | 4,329,752 |
| Proceeds from capital grants | | - |
| Proceeds from sale of capital assets | | 74,983 |
| Payments for capital assets | | (85,412,386) |
| Proceeds from assessments | | 514,885 |
| **Net Cash Provided (Used) by Capital and Related Financing** | | (91,869,850) |
| | | |
| **Cash Flows from Investing Activities** | | |
| Purchase of investments | | (56,044,153) |
| Maturity of investments | | 20,003,794 |
| Investment income | | 1,019,561 |
| **Net Cash Provided (Used) by Investing Activities** | | (35,020,798) |
| | | |
| Net Increase (Decrease) in Cash and Cash Equivalents | | (34,116,597) |
| Cash and Cash Equivalents, Beginning of Year | | 101,985,796 |
| **Cash and Cash Equivalents, End of Year** | $ | 67,869,199 |
| | | |
| **Reconciliation of Operating Income to Net Cash provided by Operating Activities** | | |
| Income from operations | $ | 65,962,898 |
| Adjustments to reconcile operating income to net cash provided by operating activities | | |
| Depreciation and amortization | | 41,374,625 |
| Accounts receivable | | (2,895,591) |
| Inventories | | (201,033) |
| Prepaid expense | | (292,909) |
| Accounts payable | | (9,174,346) |
| Customer deposits | | (9,224) |
| Accrued liabilities | | (1,990,369) |
| Pension liability | | 0 |
| OPEB liability | | 0 |
| **Net Cash Provided by Operating Activities** | $ | 92,774,051 |
| | | |
| ***Non-Cash Capital Financing and Investing Activities*** | | |
| Contribution of plant, lines and other facilities by developers and property owners | $ | - |
| Construction costs in accounts payable | | 32,029,067 |
| Change in fair value of investments | | (39,103) |
| Decrease in interest rate swap deferred revenue | | (207,063) |
| Change in fair value - swap agreements | | 3,476,692 |
| Bonds issued for refunding of debt | | 246,555,000 |

**APPENDIX D**

**FORM OF BOND COUNSEL**

February 1, 2022

Louisville and Jefferson County
Metropolitan Sewer District
Louisville, Kentucky 40203

The Bank of New York Mellon
Trust Company, N.A., as Registrar and Paying Agent
Louisville, Kentucky 40202

Re: $225,000,000 Louisville and Jefferson County Metropolitan Sewer District (Commonwealth of Kentucky) Sewer and Drainage System Revenue Bonds, Series 2022A (Green Bonds – Climate Bond Certified)

Ladies and Gentlemen:

As Bond Counsel we have examined a copy of the transcript of proceedings relating to the original issuance by the Louisville and Jefferson County Metropolitan Sewer District (the "District"), a public body corporate and political subdivision of the Commonwealth of Kentucky (the "Commonwealth"), of the District's above-referenced Series 2022A Bonds in the aggregate principal amount of $225,000,000 (the "Bonds").

The Bonds are being issued pursuant to the provisions of [i] Chapter 76 of the Kentucky Revised Statutes, as amended (the "Act"), [ii] a Sewer and Drainage System Revenue Bond Resolution of the District adopted on December 7, 1992, as heretofore amended and supplemented (the "Resolution") and [iii] a Thirty-Second Supplemental Sewer and Drainage System Bond Resolution adopted by the District on November 15, 2021 (the "Supplemental Resolution", and the Resolution as amended and supplemented by the Supplemental Resolution, the "Bond Resolution") for the purpose of paying, redeeming, and refunding Program Notes issued and outstanding as Senior Subordinated Debt under the Resolution and the District's Program Note Resolution, adopted on May 29, 2018.

The Bonds are dated on their original issuance of even date herewith, mature or are subject to redemption through sinking fund installments on May 15 in each of the years and in the amounts, are subject to redemption at the option of the District prior to maturity on or after May 15, 2032, and bear interest payable on May 15 and November 15 of each year, commencing May 15, 2022, at the respective rates per annum, as have been established by the District pursuant to the Supplemental Resolution.

The Bonds and the interest thereon do not constitute a general obligation or indebtedness of the District, Louisville/Jefferson County Metro Government ("Metro Government"), the County of Jefferson, Kentucky (the "County") or the Commonwealth within the meaning of the Constitution and laws of the Commonwealth and are not a charge against the general credit or taxing power of the District, Metro Government, the County, the Commonwealth or any other political subdivision of the Commonwealth, but are a limited obligation of the District secured solely by and payable solely from the gross revenues derived from the collection of rates, rentals and charges for the services rendered by the District's sewer and drainage system. The District has no taxing power.

In our capacity as Bond Counsel we have examined such documents and matters and conducted such research as we have deemed necessary to enable us to express the opinions set forth below. We have also relied on an opinion dated as of even date herewith of Paula M. Purifoy, General Counsel to the District, with respect to the valid creation, organization and existence of the District and the due adoption by the Board of the District of the Bond Resolution. As to certain questions of fact, we have relied on statements and certifications of certain officers, employees and agents of the District and other public officials. Terms which are capitalized and not defined herein are defined in the Bond Resolution.

In rendering our opinions set forth below, we have assumed the authenticity of all documents submitted to us as originals, the legal capacity of natural persons and the conformity to the originals of all documents submitted to us as copies. We have assumed that parties other than the District had the requisite power and authority to enter into and perform all obligations of all documents to which they are parties. We have assumed the due authorization by all requisite action, and the execution and delivery by such other parties of such documents, and the validity and binding effect thereof on such other parties. We have relied for purposes of the opinions set forth below on the representations and warranties made in such documents by all parties thereto.

Based on the foregoing, and in reliance thereon, and on the basis of our examination of such other matters of fact and questions of law as we have deemed relevant in the circumstances, it is our opinion that:

1. The District is a public body corporate and political subdivision of the Commonwealth, validly existing under the provisions of the Constitution and laws of the Commonwealth, including the Act, with the right and power under the Act to adopt the Bond Resolution.

2. The Bond Resolution has been duly and lawfully adopted by the Board of the District.

3. The Bond Resolution is the valid and binding special limited obligation of the District enforceable in accordance with its respective terms.

4. The Bonds have been duly and validly authorized, executed and delivered by the District in accordance with law and the Bond Resolution and are the valid and binding special limited obligations of the District as provided in the Bond Resolution, enforceable in accordance with their terms and entitled to the benefit and security of the Bond Resolution and the Act as amended to the date hereof.

5. Under the laws of the Commonwealth as presently enacted and construed, the Bonds are exempt from ad valorem taxation, and the interest thereon is exempt from income taxation, by the Commonwealth and all of its political subdivisions and taxing authorities.

6. Under the Internal Revenue Code (the "Code") as presently enacted and construed, interest on the Bonds is excluded from gross income for Federal income tax purposes.

7. The Bond Resolution creates the valid pledge which it purports to create of the Pledged Property, subject to the provisions of the Bond Resolution permitting the application thereof for the purposes and on the conditions set forth in the Bond Resolution.

For the purpose of rendering the opinion set forth in paragraph 6 above, we have assumed compliance by the District with the requirements of the Code that must be met subsequent to the issuance of the Bonds in order that the interest thereon be and remain excludable from gross income for federal income tax purposes. Failure to comply with such requirements could cause the interest on the Bonds to be included in gross income retroactive to their date of issuance. The District has covenanted to comply with such requirements.

The foregoing opinions are qualified to the extent that the enforceability of the Bonds and the Bond Resolution, including the rights and remedies thereunder, may be limited by equitable principles and by bankruptcy, insolvency, reorganization, moratorium or similar laws heretofore or hereafter enacted relating to or affecting the enforcement of creditors' rights or remedies. We also express no opinion as to the availability of equitable rights or remedies.

We are not expressing an opinion on the investment quality of the Bonds. We are members of the Bar of the Commonwealth and do not purport to be experts on the laws of any jurisdiction other than the Commonwealth and the United States of America, and we express no opinion as to the laws of any jurisdiction other than those specified. Our opinion relates solely to the questions set out herein and does not consider other questions of law.

Sincerely,

WYATT, TARRANT & COMBS, LLP

# APPENDIX E

## BOOK-ENTRY ONLY SYSTEM

## BOOK ENTRY SYSTEM

**THE INFORMATION PROVIDED BELOW IN THIS APPENDIX E HAS BEEN PROVIDED BY DTC. NO REPRESENTATION IS MADE BY THE BOARD OR THE CORPORATION AS TO THE ACCURACY OR ADEQUACY OF SUCH INFORMATION PROVIDED BY DTC OR AS TO THE ABSENCE OF MATERIAL ADVERSE CHANGES IN SUCH INFORMATION SUBSEQUENT TO THE DATE HEREOF.**

1. The Depository Trust Company ("DTC"), New York, NY, will act as securities depository for the securities (the "Bonds"). The Bonds will be issued as fully-registered securities registered in the name of Cede & Co. (DTC's partnership nominee) or such other name as may be requested by an authorized representative of DTC. One fully-registered Bond certificate will be issued in the aggregate principal amount of each maturity of Bonds and will be deposited with DTC.

2. DTC, the world's largest securities depository, is a limited-purpose trust company organized under the New York Banking Law, a "banking organization" within the meaning of the New York Banking Law, a member of the Federal Reserve System, a "clearing corporation" within the meaning of the New York Uniform Commercial Code, and a "clearing agency" registered pursuant to the provisions of Section 17A of the Securities Exchange Act of 1934. DTC holds and provides asset servicing for over 3.5 million issues of U.S. and non-U.S. equity issues, corporate and municipal debt issues, and money market instruments (from over 100 countries) that DTC's participants ("Direct Participants") deposit with DTC. DTC also facilitates the post-trade settlement among Direct Participants of sales and other securities transactions in deposited securities, through electronic computerized book-entry transfers and pledges between Direct Participants' accounts. This eliminates the need for physical movement of securities certificates. Direct Participants include both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, clearing corporations, and certain other organizations. DTC is a wholly-owned subsidiary of The Depository Trust & Clearing Corporation ("DTCC"). DTCC is the holding company for DTC, National Securities Clearing Corporation and Fixed Income Clearing Corporation, all of which are registered clearing agencies. DTCC is owned by the users of its regulated subsidiaries. Access to the DTC system is also available to others such as both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, and clearing corporations that clear through or maintain a custodial relationship with a Direct Participant, either directly or indirectly ("Indirect Participants"). DTC has a Standard & Poor's rating of [AA+]. The DTC Rules applicable to its Participants are on file with the Securities and Exchange Commission. More information about DTC can be found at www.dtcc.com.

3. Purchases of Bonds under the DTC system must be made by or through Direct Participants, which will receive a credit for the Bonds on DTC's records. The ownership interest of each actual purchaser of each Bond ("Beneficial Owner") is in turn to be recorded on the Direct and Indirect Participants' records. Beneficial Owners will not receive written confirmation from DTC of their purchase. Beneficial Owners are, however, expected to receive written confirmations providing details of the transaction, as well as periodic statements of their holdings, from the Direct or Indirect Participant through which the Beneficial Owner entered into the transaction. Transfers of ownership interests in the Bonds are to be accomplished by entries made on the books of Direct and Indirect Participants acting on behalf of Beneficial Owners. Beneficial Owners will not receive certificates representing their ownership interests in Bonds, except in the event that use of the book-entry system for the Bonds is discontinued.

4. To facilitate subsequent transfers, all Bonds deposited by Direct Participants with DTC are registered in the name of DTC's partnership nominee, Cede & Co., or such other name as may be requested by an authorized representative of DTC. The deposit of Bonds with DTC and their registration in the name of Cede & Co. or such other DTC nominee do not affect any change in beneficial ownership.

DTC has no knowledge of the actual Beneficial Owners of the Bonds; DTC's records reflect only the identity of the Direct Participants to whose accounts such Bonds are credited, which may or may not be the Beneficial Owners. The Direct and Indirect Participants will remain responsible for keeping account of their holdings on behalf of their customers.

5. Conveyance of notices and other communications by DTC to Direct Participants, by Direct Participants to Indirect Participants, and by Direct Participants and Indirect Participants to Beneficial Owners will be governed by arrangements among them, subject to any statutory or regulatory requirements as may be in effect from time to time. Beneficial Owners of Bonds may wish to take certain steps to augment the transmission to them of notices of significant events with respect to the Bonds, such as redemptions, tenders, defaults, and proposed amendments to the Bond documents. For example, Beneficial Owners of Bonds may wish to ascertain that the nominee holding the Bonds for their benefit has agreed to obtain and transmit notices to Beneficial Owners. In the alternative, Beneficial Owners may wish to provide their names and addresses to the Bond Registrar and request that copies of the notices be provided directly to them.

6. Redemption notices shall be sent to DTC. If less than all of the Bonds within an issue are being redeemed, DTC's practice is to determine by lot the amount of the interest of each Direct Participant in such issue to be redeemed.

7. Neither DTC nor Cede & Co. (nor any other DTC nominee) will consent or vote with respect to the Bonds unless authorized by a Direct Participant in accordance with DTC's MMI Procedures. Under its usual procedures, DTC mails an Omnibus Proxy to Issuer as soon as possible after the record date. The Omnibus Proxy assigns Cede & Co.'s consenting or voting rights to those Direct Participants to whose accounts the Bonds are credited on the record date (identified in a listing attached to the Omnibus Proxy).

8. Redemption proceeds, distributions, and dividend payments on the Bonds will be made to Cede & Co., or such other nominee as may be requested by an authorized representative of DTC. DTC's practice is to credit Direct Participants' accounts upon DTC's receipt of funds and corresponding detail information from Issuer or Agent, on payable date in accordance with their respective holdings shown on DTC's records. Payments by Participants to Beneficial Owners will be governed by standing instructions and customary practices, as is the case with securities held for the accounts of customers in bearer form or registered in "street name," and will be the responsibility of such Participant and not of DTC, Agent, or Issuer, subject to any statutory or regulatory requirements as may be in effect from time to time. Payment of redemption proceeds, distributions, and dividend payments to Cede & Co. (or such other nominee as may be requested by an authorized representative of DTC) is the responsibility of Issuer or Agent, disbursement of such payments to Direct Participants will be the responsibility of DTC, and disbursement of such payments to the Beneficial Owners will be the responsibility of Direct and Indirect Participants.

9. DTC may discontinue providing its services as depository with respect to the Bonds at any time by giving reasonable notice to Issuer or Agent. Under such circumstances, in the event that a successor securities depository is not obtained, Bond certificates are required to be printed and delivered to DTC.

10. Issuer may decide to discontinue use of the system of book-entry-only transfers through DTC (or a successor securities depository). In that event, Bond certificates will be printed and delivered to DTC.

11. The information in this section concerning DTC and DTC's book-entry system has been obtained from sources that Issuer believes to be reliable, but Issuer takes no responsibility for the accuracy thereof.

Neither the Issuer nor the Bond Registrar shall have any responsibility or obligation to participants or to any beneficial owner with respect to (i) the accuracy of any records maintained by DTC or any participant; (ii) the payment by DTC or any participant of any amount with respect to the principal of or interest or compound accreted value on the Bonds; (iii) the delivery or timeliness of delivery by any participant or any notice to any beneficial owner which is required or permitted under the terms of the resolution or ordinance to be given to Bondholders; or (iv) any consent given or action taken by DTC or Cede & Co., as bondholder.

# APPENDIX F

# CONSULTING ENGINEER'S REPORT

JACOBS

# 2020 Engineer's Report for Sewer and Drainage System

Louisville and Jefferson County Metropolitan Sewer District

Sewer and Drainage System Revenue Bonds, Series 2020A

June 2020

JACOBS

In preparing this report, Jacobs has relied upon certain historical and projected performance data provided by the Louisville and Jefferson County Metropolitan Sewer District (MSD). Jacobs has not independently verified the detailed accuracy of such data. Additionally, the cost estimates presented for the FY 2021 CIP projects appear to be reasonable for the work to be performed. The proposed FY 2021 CIP and the 5-Year CIP are technically sound and are in accordance with generally accepted engineering practice.

Clay Bostic, P.E.
Professional Engineer No. 27317

Leisha L. Pica
Enterprise Program Manager

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## List of Tables



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# Acronyms & Abbreviations

| | |
|---|---|
| AADF | Annual Average Daily Flow |
| ADF | Average Daily Flow |
| BG | Billions of Gallons |
| BMP | Best Management Practices |
| CAP | Corrective Action Plan |
| cBOD | Chemical Biochemical Oxygen Demand |
| CIP | Capital Improvement Plan |
| CMOM | Capacity, Management, Operation & Maintenance |
| CRRP | Critical Repair and Reinvestment Plan |
| CPE-CCP | Comprehensive Performance Evaluation – Composite Correction Plan |
| CRS | Community Rating System |
| CSO | Combined Sewer Overflow |
| DOJ | U.S Department of Justice |
| DRI | Drainage Response Initiative |
| ESU | Equivalent Service Unit |
| FEMA | Federal Emergency Management Agency |
| FM | Force Main |
| FOG | Fats, Oils and Grease |
| FPS | Flood Pump Station |
| FY | Fiscal Year |
| GI | Green Infrastructure |
| GIS | Geographical Information System |
| ILA | Interlocal Agreement |
| IOAP | Integrated Overflow Abatement Plan |
| IT | Information Technology |
| KDEP | Kentucky Department of Environmental Protection |
| LOJIC | Louisville Jefferson County Information Consortium |
| KPDES | Kentucky Pollution Discharge Elimination System |
| KRS | Kentucky Revised Statutes |
| lb/d | Pounds per Day |
| LF | Linear Feet |
| LTCP | Long Term Control Plan |
| mg/l | Milligram per Liter |
| MG | Millions of Gallons |
| MGD | Millions of Gallons per Day |
| mL | Milliliters |
| MS4 | Municipal Separate Storm Sewer System |
| MSD | Louisville & Jefferson County Metropolitan Sewer District |
| NMC | Nine Minimum Controls |
| NPDES | National Pollution Discharge Elimination System |

| | |
|---|---|
| ORFPS | Ohio River Flood Protection System |
| ORSANCO | Ohio River Valley Water Sanitation Commission |
| RTC | Real Time Control |
| SCADA | Supervisory Control and Data Acquisition |
| SCAP | Sewer Capacity Assurance Plan |
| SORP | Sewer Overflow Response Plan |
| SSDP | Sanitary Sewer Discharge Plan |
| SSO | Sanitary Sewer Overflow |
| THP | Thermal Hydrolysis Process |
| TMDL | Total Maximum Daily Load |
| TSS | Total Suspended Solids |
| USACE | United States Army Corps of Engineers |
| USEPA | United States Environmental Protection Agency |
| USGS | United States Geological Survey |
| UV | Ultraviolet Disinfection |
| WIFIA | Water Infrastructure Finance and Investment Act |
| WQTC | Water Quality Treatment Center |
| WWTF | Wet Weather Treatment Facility |
| WWTP | Wastewater Treatment Plant |

# 1. Introduction

This report was prepared in connection with the issuance by the Louisville and Jefferson County Metropolitan Sewer District (the "District" or "MSD") of its Sewer and Drainage Revenue Bonds, Series 2020A (the "2020A Bonds") being issued in the estimated principal amount of approximately $247,500,000 for the purpose of paying at maturity, redeeming, and refunding MSD's Program Notes issued and outstanding as Senior Subordinated Debt under MSD's General Bond Resolution and under MSD's Program Note Resolution.

MSD utilizes a sewer and drainage system ("System"), which includes the collection, transmission, treatment and effluent disposal of wastewater; processing, management, and disposal of biosolids; the collection, transmission of stormwater within the City and adjacent areas; and operations and maintenance of the Ohio River flood protection system infrastructure. Also included in the sewer and drainage system are the existing properties and assets, real and personal, tangible and intangible, owned or operated by MSD that are used or useful for the aforementioned purposes and all properties and assets constructed or acquired as additions, improvements and betterments to the sewer and drainage system and extensions thereof.

Portions of MSD's sewer and drainage system have been in service since the late 1800's and have/are reaching the end of their useful life. MSD is implementing an industry-standard asset management program to coordinate repair and replacement of existing assets in a timely and cost-effective manner. Current work activities related to MSD's asset management program includes upgrading tools, training staff, determining asset condition, calculating remaining useful life, and developing protocols for prioritizing capital needs. In addition to improving existing assets, MSD is investing in new infrastructure in accordance with a federally mandated Consent Decree to address sewer overflows and unauthorized discharges.

This report (i) provides an overview of MSD's infrastructure, (ii) describes the sewer and drainage system improvements made since the District's last public bond issuance in 2017, and (iii) provides an overview of MSD's 5-year Capital Improvement Plan (CIP).

## 1.1 History of MSD

Beginning at or around 1850, the first sewers were constructed in Louisville and the first combined storm and sanitary sewers were constructed in 1860. MSD was formed in 1946 as a public body corporate and subdivision of the Commonwealth of Kentucky. MSD was created to 1) operate and maintain the existing City of Louisville sewer and drainage system and 2) to expand the system throughout Jefferson County.

In 1986, an Interlocal Agreement (ILA) was executed between MSD, the City of Louisville, and Jefferson County[1] to improve and enhance flood control and stormwater drainage services. The ILA transferred all drainage and flood control facilities and property to the custodianship of MSD and mandated MSD be the responsible agency for providing flood and stormwater drainage services. The communities of Anchorage,

[1] The City of Louisville and Jefferson County subsequently merged to form Louisville Metro.

Jeffersontown, Shively, and St. Matthews own and operate the drainage systems serving their communities. However, MSD continues to provide flood protection services that benefit these communities through the Ohio River flood protection system floodwalls, levees, and flood pump stations. These communities are co-permittees under the stormwater management program that MSD administers.

## 1.2 Background of Capital Priorities

MSD is responsible for the operation of the sewer and drainage system serving most of Louisville Metro, which encompasses the City of Louisville and all of Jefferson County. MSD is authorized by Chapter 76 of the Kentucky Revised Statues (KRS) to construct additions, betterments, and extensions within its service area and to recover the cost of its services in accordance with rate schedules adopted by the MSD Board. Like many utilities throughout the country, MSD is faced with maintaining its existing utility assets in a fit-for-purpose condition while balancing changing environmental conditions that have started to impact its infrastructure.

### 1.2.1 2005 Consent Decree & 2009 Amended Consent Decree

On August 12, 2005, MSD entered into a Consent Decree with the Kentucky Energy and Environment Cabinet, Division of Water of the Kentucky Department of Environmental Protection (KDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Department of Justice (DOJ) (collectively referred to as "the Regulators"). The Consent Decree was in response to an enforcement action taken by USEPA and KDEP alleging violations of the Clean Water Act, primarily related to sewer overflows and unauthorized discharges. The enforcement actions initiated by the USEPA are not unique in the wastewater treatment industry. The Consent Decree created the framework for a long-term capital program to manage and mitigate combined sewer overflows (CSOs) and eliminate sanitary sewer overflows (SSOs) up to a certain storm event.

The Consent Decree called for MSD to submit a final Long-Term Control Plan (LTCP) that included schedules, deadlines, and timetables for projects to be completed by December 31, 2020. In addition, a Sanitary Sewer Discharge Plan (SSDP) was required that included schedules and deadlines for capital projects to be completed by the end of 2024. Both plans (LTCP and SSDP) were subsequently consolidated into the Integrated Overflow Abatement Plan (IOAP). The IOAP is expected to improve water quality in Beargrass Creek and the Ohio River.

On April 10, 2009, the Consent Decree was amended to address recordkeeping and Water Quality Treatment Center (WQTC) bypasses and treatment performance. The amendment called for MSD to implement projects to upgrade the separate sewer system, combined sewer system, and the WQTCs to adequately address SSOs and CSOs from locations identified in the Morris Forman WQTC Kentucky Pollution Discharge Elimination System (KPDES) permit. The first submittal of the IOAP was approved with the Amended Consent Decree.

### 1.2.2 2012 IOAP Modification

MSD's Wet Weather Team, which includes a broad range of community stakeholders, MSD staff, and consultants identified the need for modifications to the IOAP to incorporate through an adaptive management process additional information developed from continued flow monitoring, enhanced hydraulic modeling, and a detailed review of the project types, size, location and schedule. Modifications represented a revision to 28 separate projects set forth in the original IOAP, dated September 30, 2009. The IOAP Modifications were approved on June 19, 2014; and superseded and replaced the 2009 IOAP.

The following highlights the projects incorporated into the IOAP Modification to control CSOs:

- 3 sewer separation projects
- 14 storage basin projects including in-line storage/real-time control and off-line storage (250 MG)
- 1 project to replace and expand the Nightingale Sanitary Pump Station
- 2 conveyance expansion projects
- 1 additional green infrastructure project
- 1 high rate wet weather treatment facility (WWTF)

The following highlights the projects incorporated into the IOAP Modification to control SSOs:

- 19 conveyance capacity upgrades and interceptor relief projects
- 9 storage projects (in-line and off-line)
- 13 pump station upgrades or replacements
- 12 pump station eliminations
- 7 small WQTC eliminations

Over the past 10 years, MSD's CIP has been focused on implementing the projects required to comply with a federally mandated Consent Decree and subsequent IOAP. Since 2005, MSD has focused $1.01 billion of its resources toward mitigating and reducing unauthorized discharges and has made great progress in that effort as highlighted below.

- **Engaged Stakeholders:** In 2006, MSD initiated a Wet Weather Team Stakeholder Group which is still in existence and active today.

- **Mitigated CSOs**: MSD certified completion of 38 CSO LTCP projects to date, 4 remain. Overflows to local waterways have been reduced by approximately 5 billion gallons per typical year.

- **Eliminated SSOs**: MSD certified completion of 48 SSO SSDP projects to date, 18 remain. SSOs have been reduced approximately 61% by location and approximately 70% by volume.

- **Eliminated Facilities**: MSD certified completion of the required Comprehensive Performance Evaluation – Composite Correction Plan (CPE-CCP) projects, which included elimination of 6 WQTCs. Five regional wastewater treatment facilities remain.

- **Improved Ohio River Water Quality**: MSD received ORSANCO sampling data on the Ohio River indicating significant reductions in median fecal coliform levels downstream of Louisville, Kentucky.

- **Verifying Results**: MSD initiated a post construction compliance monitoring program on completed projects to proactively ensure satisfactory achievement of the design level of control as approved.

- **Fulfilled Amended Consent Decree Programmatic Elements**: Early Action Plan projects completed; Nine Minimum Controls (NMC) Program approved and ongoing; Capacity, Management, Operation, and Maintenance (CMOM) Program approved and ongoing; community input, outreach and notification program approved and ongoing; Sewer Overflow Response Protocol (SORP) approved and ongoing; Sewer Capacity Assurance Plan (SCAP) approved and ongoing; and certified completion of the required supplemental environmental projects.

- **Realized Additional Improvements for Our Community**: MSD exceeded the original commitments made to the community by spending 35% more for community benefits including: expanded system monitoring and rain gage networks to improve model calibration and discharge reporting; increased system storage capacity over original commitments by 25%; increased sanitary pump station capacity over original commitments by 50%; and improved community engagement and created neighborhood green spaces.

In order to fund the new infrastructure, MSD had to continue deferring critical existing infrastructure needs for piping, pumps, treatment plants, and flood gates. In 2019, MSD initiated discussions with the Regulators to reprioritize funding for critical infrastructure needs in lieu of some of the remaining SSDP projects included in the 5-year CIP. These discussions were slowed due to the COVID19 pandemic.

### 1.2.3 2017 Critical Repair and Reinvestment Plan

While MSD was implementing the Amended Consent Decree, it conducted a comprehensive assessment of its major infrastructure to assess long-term investment needs. In June 2017, the District published its *20-Year Comprehensive Facility Plan, Critical Repair and Reinvestment Plan* (CRRP)[2]. The CRRP estimated MSD needs to invest approximately $4.3 billion over a 20-year period to address all wastewater ($1.85 billion); stormwater ($2.34 billion) and support systems ($124.5 million) needs.

### 1.2.4 2018 Agreed Order for Morris Forman WQTC

On May 3, 2018, MSD entered into an Agreed Order with KDEP addressing improvements necessary to recover from a mechanical failure due to a lightning strike resulting with a power outage at Morris Forman WQTC that occurred April 8, 2015. Extensive damage was experienced to the primary treatment, secondary treatment, and electrical systems causing the plant to be out of compliance with effluent discharge limits established in Permit KY0022411. MSD is working diligently to restore the Morris Forman WQTC to its full

[2] 20-Year Comprehensive Facility Plan, Critical Repair and Reinvestment Plan, June 2017

operational capacity. MSD invested $37 million in this facility since 2016 and developed a draft Corrective Action Plan (CAP) for additional improvements necessary to:

- Assist with reduction effluent Biochemical Oxygen Demand (BOD)
- Assist with reduction effluent Total Suspended Solids (TSS)
- Allow continued operation of critical systems
- Prevent catastrophic failure at the plant
- Address safety issues/concerns.

The proposed CAP remains under discussion with KDEP.

#### 1.2.5 2019 Reprioritization Discussions

Some deferred infrastructure has continued to deteriorate to the level that immediate investment is required for sustained regulatory compliance and protection of public health and community safety. In 2019, MSD updated its conceptual 30-year CIP forecast inclusive of all capital needs (approximately $4.6 billion) in conjunction with discussions with the Regulators. This forecast includes the projects identified in the CRRP, current regulatory requirements, additional planning evaluations, regionalization discussions, and partial funding for replacement of the Morris Forman WQTC. More information regarding these capital programs is presented throughout this report.

## 1.3 Purpose of the 2020A Bonds

Program Notes were issued by the District to finance on a short-term basis capital additions and improvements to the System pending the permanent refinancing of the Program Notes by the issuance of the District's bonds under its General Bond Resolution. An overview of the additions/improvements financed over the past couple years is provided in Table 1-1. More details regarding specific projects is provided in subsequent sections of this report.

**Table 1-1: Overview of Capital Work Performed Since Last Bond Issue**

| CIP Program | Projects Finishing Design | | Projects Finishing Construction | |
|---|---|---|---|---|
| | Number of Projects | Lifetime Actuals | Number of Projects | Lifetime Actuals |
| Consent Decree | 0 | $ - | 5 | $ 152,466,921 |
| Facilities | 1 | $ 157,209 | 3 | $ 3,769,146 |
| Flood Protection | 5 | $ 1,481,044 | 8 | $ 2,503,644 |
| Stormwater | 1 | $ 18,866 | 7 | $ 7,109,421 |
| Wastewater Collection | 7 | $ 8,167,250 | 7 | $ 20,981,312 |
| Wastewater Treatment | 8 | $ 8,164,405 | 12 | $ 57,343,141 |
| **TOTAL** | **22** | **$ 17,988,774** | **42** | **$ 244,173,584** |

*This report does not discuss financial considerations. All information regarding rates, revenues, debt, and other financial considerations are discussed in the Official Statement.*

# 2. MSD Organization

An eight-member citizen Board appointed by the Louisville Metro Mayor governs MSD's budget, rates, policies and initiatives. These members serve three-year overlapping terms and are eligible for reappointment. Each member represents a different state senatorial district in Louisville Metro. No more than five board members can belong to the same political party. The Board holds one regular meeting on the fourth Monday of each month, and committees meet as necessary. The current MSD Board Members are listed in Figure 2-1.

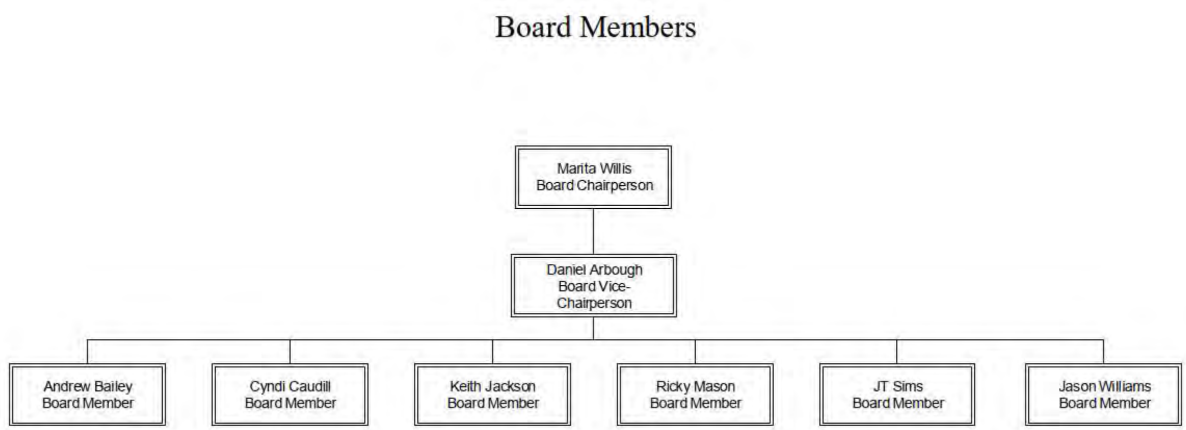


**Figure 2-1: MSD's Board Members**

The Board has delegated and placed the conduct of the day-to-day business affairs of the District under the direction of an Executive Director. The current Executive Director of MSD is James A. "Tony" Parrott. Mr. Parrott has been the full time MSD Executive Director since September 2015. Mr. Parrott leads an executive leadership team comprised of Division heads from eight divisions (refer to Figure 2-2):

- Executive Offices Division
- Supplier Diversity & Economic Inclusion Division
- Legal Division
- Human Resources Division
- Information Technology Division
- Finance Division
- Engineering Division
- Operations Division

MSD currently employs approximately 640 staff throughout the eight divisions. A brief description of each division is provided herein.

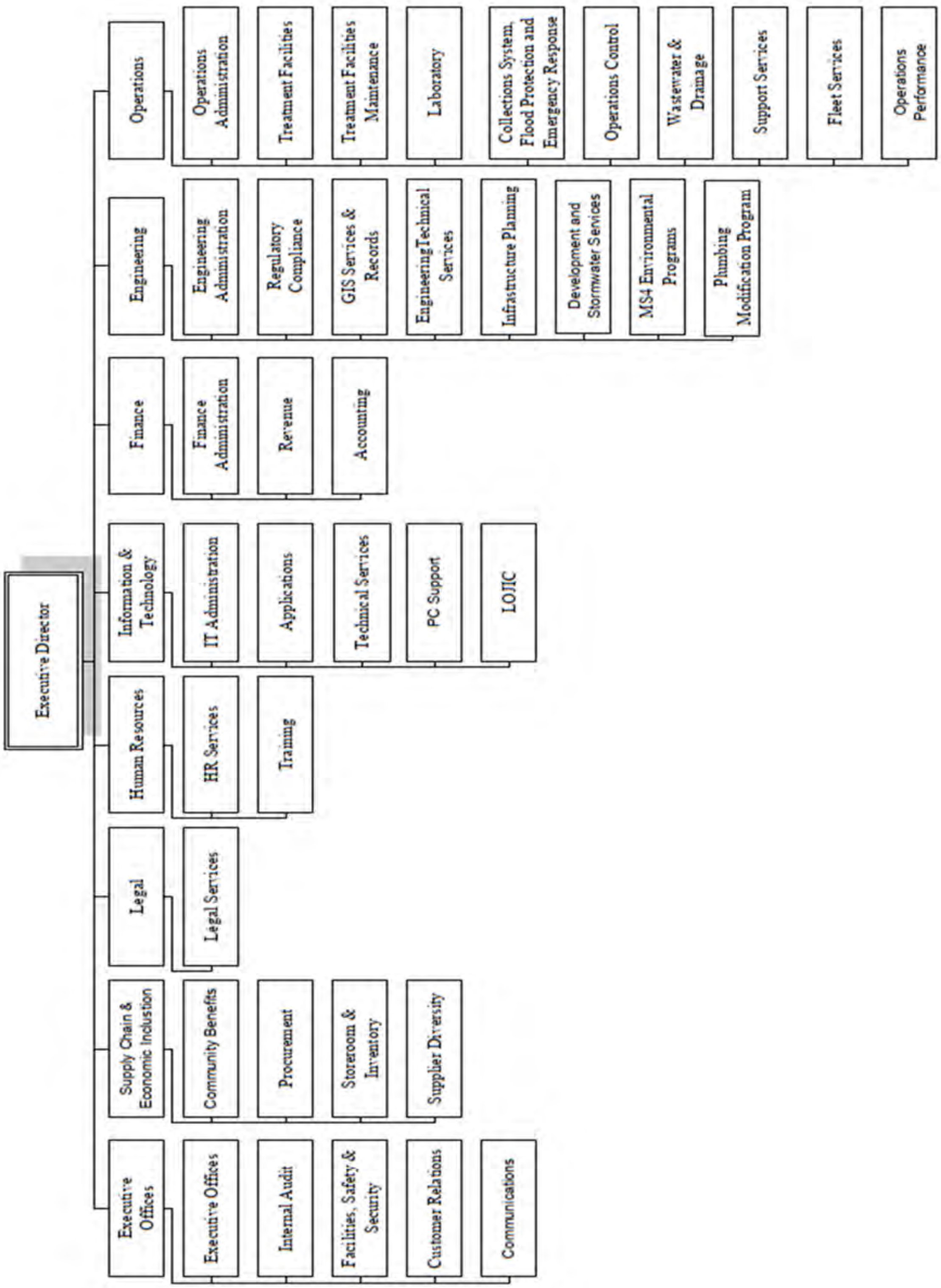


**Figure 2-2: MSD's Organizational Chart**

## 2.1 Executive Offices Division

The Executive Offices Division includes 13 executive positions; 18 customer relations and communications positions; and 21.5 facilities, safety, and security positions. The executive positions are comprised of Chief and Director level staff who provide leadership for the various Divisions. The customer relations and communication staff are part of the One Water Shared Services. One Water is organizational unit that operates in conjunction with the Louisville Water Company. This initiative is designed to provide consistent, high quality support services between the utilities, as well as to lower overall support costs for both MSD and the Water Company. The facilities staff provides support for keeping buildings operational for MSD's staff. The health and safety staff provide training for all MSD staff. Security staff provide on-site security services and investigate events as needed.

## 2.2 Supply Chain and Economic Inclusion Division

This One Water Division has 23 positions and is led by the One Water Chief Procurement Officer. The Division provides procurement buying services; management of the storeroom and materials; management and enforcement of the supplier diversity program; and services focused on community benefits.

## 2.3 Legal Division

The Legal Division includes 10 positions including the General Counsel/MSD Legal Director and Deputy General Counsel. Services provided by the Legal Division include contract reviews; claims and disputes; regulatory agreements; and interpretation of documents and terms of conditions.

## 2.4 Human Resources Division

The Human Resources Division includes 18 positions led by MSD's Human Resources Director. The Division provides organizational development, staff training, performance analytics, benefits and payroll administration, employee relations, and complete human resources support.

## 2.5 Information Technology Division

The Information Technology (IT) Division includes 32 positions led by the One Water Chief Information Officer. The Division manages IT hardware (servers, networks, computers, mobile phones); provides cybersecurity and staff technical support; oversees and supports software applications; and administers and manages the Louisville – Jefferson County Information Consortium (LOJIC) Program.

## 2.6 Finance Division

The Finance Division includes 29 positions led by MSD's Chief Financial Officer. A new Chief Financial Officer was selected in 2020. In May 2020, some job functions and roles within the Division were realigned to better support MSD with advancing regionalization and financial reporting. Services provided by the Finance Division include budget development and management; revenue and collections management; accounting; records management; and information governance.

## 2.7 Engineering Division

The Engineering Division includes 94 positions led by MSD's Chief Engineer. A new Chief Engineer was selected in 2020. Services provided by the Engineering Division include regulatory compliance; geographical information system (GIS) administration; engineering technical services (35.5 positions); and development and stormwater services (44 positions).

- **Regulatory Compliance**: leads the organization in process improvement activities that improve communication, documentation and efficiency required to maintain compliance with permits and regulations and advance the asset management program. Additionally, the team manages and coordinates Consent Decree-mandated activities including sewer overflow response, discharge and overflow reporting activities, and periodic reporting to regulators, and provides support to implement business requirements in information systems like IPS® and Telog®.

- **GIS Services**: supports MSD's mission by building and maintaining an accurate and detailed database model, generate high quality maps, perform spatial analysis, and serve as a support network to all departments within MSD. Additionally, the GIS Team provides support and information not only to MSD, but to outside customers and agencies as well.

- **Engineering Technical Services:** provides planning, design oversight, and construction management of all capital projects related to wastewater, stormwater, drainage, flood protection, and facility improvements. This group also administers the Drainage Response Initiative Program (DRI) to address localized drainage problems ranging from structural flooding to minor standing water problems.

- **Development Services:** responsible for review and permitting of development projects throughout Louisville Metro including proposed land disturbing activities on behalf of the community to advocate for public health, safety and protection in accordance with Louisville MSD's mission and the Louisville and Jefferson County Erosion Prevention and Sediment Control and Floodplain Ordinances. This group also provides construction field inspection services to confirm assets are built in accordance with MSD's standards and administers the plumbing modification program to prevent rain-related sewer backups into basements.

- **Stormwater Services:** manages and administers the Municipal Separate Storm Sewer System (MS4) and Floodplain Management Programs. The MS4 Program addresses drainage related issues related to pollution, erosion, water quality monitoring, and construction site management. The Floodplain Management Program coordinates grants from the Federal Emergency Management Agency (FEMA) to purchase homes located in flood prone areas.

## 2.8 Operations Division

The Operations Division includes 342 positions led by MSD's Chief of Operations. Operations staff are spread across five working groups including: treatment facilities (130 positions); collections, flood protection, and emergency response (77 positions); wastewater and drainage; (194 positions); operations support services (36 positions); and the One Water Fleet Services (19 positions).

- **Treatment Facilities Services**: responsible for operation and maintenance of the five water quality treatment centers 24 hours per day, 7 days per week including all electrical and mechanical components; performance analytics; and laboratory services. This group actively participates in the Operator-in-Training program to grow the next generation of staff.

- **Collections, Flood Protection, & Emergency Response Services**: responsible for operation and maintenance of all sanitary pump stations, sanitary and combined sewer systems; real time control facilities; SCADA system; and flood protection system (floodwall, levee, gates, and flood pump stations). This group provides emergency response for sewer force main breaks and pump station overflows and updates the Emergency Preparedness Plan required for the Flood Protection System per the U.S. Army Corps of Engineers (USACE).

- **Wastewater & Drainage Services**: responsible for operation and maintenance of the stormwater drainage network including field inspection of customer complaints. Wastewater services provided by this group include televising sewer systems and performing standard routine maintenance related to root control, cleaning, condition assessment, debris removal, and response to cave-ins.

- **Operational Support Services**: responsible for management and administration of industrial programs related to industrial pretreatment, grease management, hazardous materials, and industrial stormwater discharges. This group provides water quality sampling and performance analysis and tracking for all operating groups.

- **One Water Fleet Services**: provides full service maintenance for MSD's fleet vehicles and heavy equipment

# 3. Stormwater Drainage and Management

MSD is responsible for the operation, maintenance, replacement, improvements and additions to the public stormwater facilities. Runoff during rain events is collected and either stored, retained, and/or conveyed to sewers, rivers, streams, creeks, channels, and ditches for eventual discharge to the Ohio River, either directly or through one of its tributaries. The drainage system includes the following infrastructure that is operated by MSD (or through a combination of MSD staff and contractors).

- 3,616 miles of channels, ditches, and culverts
- 1,080 miles of storm sewers pipe (including culverts under roads)
- 870 miles of inland streams (both natural and improved)

MSD's combined sewer system provides storage, conveyance, and treatment of both sanitary sewage and stormwater. During dry weather, the system carries only sanitary sewage to the Morris Forman WQTC for treatment and discharge. During wet weather events, the combined sewers also convey urban runoff in the same pipe system. The boundaries of the combined sewer system are shown in Figure 3-1.

In April 2017, MSD published the *Louisville MSD Watershed Mater Plan* to help effectively manage present and future regional stormwater drainage in Louisville Metro. The basis of this Plan was MSD's original Watershed Master Plan, which was created in 1988 as part of the *Stormwater Drainage Master Plan*, and the *2010 Stormwater Management Master Plan*, which was the most recent update of that plan.

MSD is working on a comprehensive update to the *Stormwater Drainage Master Plan* which, after public participation and approvals by local governments, will be used by the District for implementing improvements and extensions to the existing drainage facilities. It is currently anticipated the first working draft of the *Stormwater Drainage Master Plan* will be published in 2025. Over the next few years, a significant effort will continue to inventory and document the condition of existing drainage system assets.

## 3.1 Stormwater Service Area

Louisville Metro is a river city located along the Ohio River. The area is drained by two major drainage systems: the Ohio River and the Salt River[3]. The Ohio River receives discharges from Mill Creek, Beargrass Creek, Goose Creek, Harrods Creek, and the combined sewer system. Cedar Creek and Pennsylvania Run discharge into Floyds Fork, which in turn, discharges in the Salt River. The Salt River also receives discharge from Pond Creek near its confluence with the Ohio River.

The challenges still facing MSD with regard to stormwater are exacerbated by the County's geography. Some areas are previous swampland with little slope, while other areas are very hilly. As such, if not properly

[3] April 2017 Louisville MSD Watershed Master Plan

controlled, development could lead to excessive streamflow and erosion. Much of the area within the old Louisville city limits is in the combined sewer system. When the system reaches capacity, many places in this highly developed urban area flood despite not being next to an open stream. This occurs because the combined sewer system took the place of the original streams and ditches.

The District through ILAs with the City of Louisville and Jefferson County assumed responsibility for stormwater management in 1987 for all of Jefferson County, except for the Cities of Anchorage, Jeffersontown, Shively, and St. Matthews. Those cities provide most of those services within their borders, and partner with MSD on other aspects including review of new development plans and water quality reporting.

The District serves a population of approximately 650,000 and bills for stormwater services using equivalent service units (ESUs). The District currently has approximately 6,956,000 ESUs, in total, from residential, commercial, industrial, and city-owned properties.

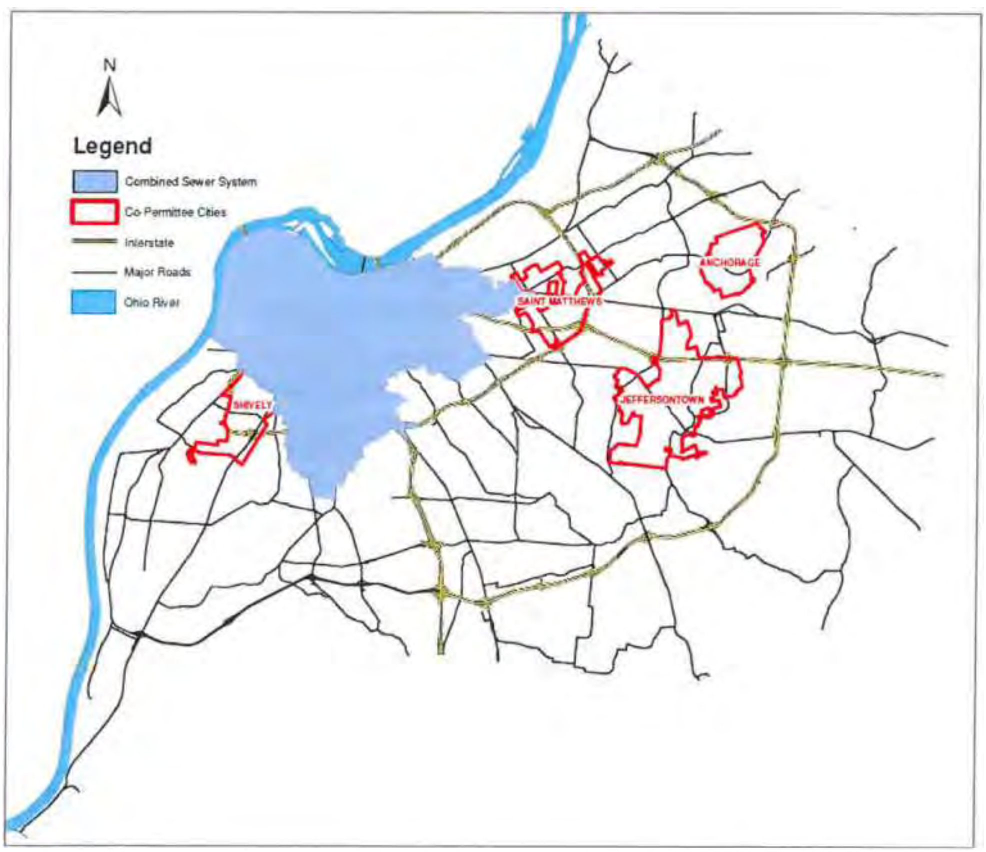


**Figure 3-1: Stormwater and MS4 Service Areas**

## 3.2 Stormwater & Drainage Regulatory Requirements

MSD is required to comply with the Federal and State Regulations related to stormwater management listed in Table 3-1.

**Table 3-1: Federal and State Stormwater Management Regulations**

| Reference | Title | Description |
|---|---|---|
| **401 KAR 5:060 Section 12** | Municipal Separate Storm Sewer Systems | Establishes procedures for permitting Phase I and II municipal separate storm sewer systems (MS4s). |
| **401 KAR 4:200; 33 US Code, Title 33, Chapter 26, Section 1341** | Section 401 Application for Water Quality Certification | Establishes the requirements for permitting discharges to streams in the KDEP jurisdiction. |
| **33 US Code, Title 33, Chapter 26, Section 1342** | National Pollutant Discharge Elimination System (NPDES) | Establishes procedures for permitting discharges that may affect floodplains or navigable waters. |
| **33 US Code, Title 33, Chapter 26, Section 1344** | Section 404 Nationwide Permit | Establishes the requirements for permitting discharges of soil, sand, gravel, or dredged material into streams under USACE jurisdiction. |
| **401 KAR 5:005** | KPDES for the Morris Forman WQTC | Establishes procedures and permits for operation of the combined sewer system and its associated storage and treatment facilities |

### 3.2.1 Metro Government Local Ordinances Related to Stormwater

MSD is required to comply with the following local regulations related to the stormwater system.

- **Drainage Master Plan**. Louisville Metro Government Code of Ordinances, Title V, Chapter 50.67
- **Comprehensive Storm Water Drainage Authority.** Louisville Metro Government Code of Ordinances, Title V, Chapter 50.55-99.
- **Floodplain Management**. Louisville Metro Government Code of Ordinances, Title XV, Chapter 157.
- **Erosion Prevention and Sediment Control**. Louisville Metro Government Code of Ordinances, Title XV, Chapter 159.
- **Engineering Standards**. Louisville and Jefferson County MSD Design Manual

#### 3.2.2 Municipal Separate Storm Sewer System (MS4) Program

The permit to operate a drainage system and discharge stormwater to waterways is administered by the KDEP. Management of stormwater in the District outside the combined sewer area is regulated through a Municipal Separate Storm Sewer System (MS4) permit, which requires periodic reporting on water quality in area streams. The Louisville MS4 Permit includes over 100 activities and is organized into several program elements including:

- Illicit Discharge Detection and Elimination
- Construction Site Runoff Controls (Erosion Prevention and Sediment Control)
- Post Construction Site Runoff Controls (Long-term Water Quality Control)
- Public Involvement and Outreach Programs
- Monitoring
- Reporting and Assessment

## 3.3 Stormwater Drainage Programs

Stormwater management is a vital component of MSD's system, because it directly impacts the health and safety of all Louisville and Jefferson County residents. Inland drainage systems include the infrastructure to collect and convey drainage across the County via pipes, ditches, streams, and channels to the Ohio River. The flood protection system is described in Section 4. The combined sewer system is described in Section 5.

The CRRP included a number of programs related to drainage and floodplain management. A summary of the Stormwater Drainage Programs included in the 5-year CIP forecast is provided below.

- **Community Rating System Program**: The National Flood Insurance Program Community Rating System (CRS) is a voluntary incentive program encouraging community floodplain management activities that exceed the minimum requirements. Communities taking part in this program are awarded points for participating in public information, mapping and regulation, flood damage reduction, and flood preparedness. Through MSD's participation in the program, Louisville Metro is a Class 3 community, granting the community a 35-percent discount on flood insurance premiums. The Class 3 rating saves the Louisville Metro community approximately $2 million each year in flood insurance premiums.

- **Municipal Separate Storm Sewer System Program (MS4):** The MS4 Program is a drainage-related program to improve the quality of surface waters through controls on stormwater runoff quality in Jefferson County and to protect the public health, safety, and welfare by reducing the introduction of harmful materials into the MS4s that discharge into community streams. The CRRP identified several large stormwater retention basins with the potential for conversion of all or part of the basin to provide infiltration of stormwater.

- **Drainage Response Initiative Program (DRI)**: Since 2003, MSD has been implementing an aggressive program to address a wide variety of drainage issues that are pointed out by customers to address problems ranging from structural flooding to alleviating minor standing water problems. MSD has invested nearly $200 million in stormwater improvements through the DRI Program.

- **Floodplain Management Program**: Since 1997, MSD has purchased homes located in flood prone areas through federal grant programs. Following a number of spring flooding events in 2015, the Mayor formed a multiagency Flood Mitigation Workgroup to address impacted residents who were unable, for a variety of reasons, to get back in their homes after the floodwaters receded. The Flood Mitigation Workgroup recommended several mitigation approaches, including establishment of a "quick-buy" program to allow property owners to sell flood-impacted property in a much shorter time than would typically be possible. The Workgroup recommended annual fund be established to provide timely relief to property owners impacted by future extreme storm events. The projects continue to be advanced but are not part of the CIP due to the reimbursement portion of the program.

- **Stormwater Master Plan Implementation Program:** MSD has begun an extensive 5-year stormwater asset inventory project. Following this effort, the *Stormwater Master Plan* will be updated to prioritize stormwater needs throughout the District. The CRRP estimated approximately $600 million would be required to address the stormwater needs. Implementation of the *Stormwater Master Plan* will occur after the 5-year CIP.

## 3.4 Stormwater & Drainage Capital Projects

MSD continues to fund stormwater and drainage projects with its annual CIP. Projects are generally a combination of discrete local improvements and appropriations for District-wide needs/services.

### 3.4.1 Projects Funded from Program Notes

The projects completed since 2017 have primarily been focused on construction of green infrastructure (refer to Table 3-2). The green infrastructure program was included in the Amended Consent Order. MSD has invested more than $40 million in green infrastructure projects over the past 10 years.

Table 3-2: Stormwater Projects Completing Design/Construction Since 2017

| Program | Budget ID | Project | Task Name | Finish | Lifetime Actuals |
|---|---|---|---|---|---|
| **Stormwater & Drainage Improvements** | H20164 | 346 S Peterson Ave Stream Restoration | Design Finish | 4/21/2020 | $18,866 |
| | H19249 | Stormwater Drainage Early Action Planning | Construction Finish | 6/30/2019 | $84,000 |
| **Green Infrastructure Projects** | H20144 | Churchill Downs East Side Improvements GI | Construction Finish | 3/4/2020 | $1,200,000 |
| | H20168 | Louisville FC Stadium Green Infrastructure | Construction Finish | 12/31/2019 | $250,000 |
| | H13099 | Spalding University Green Infrastructure | Construction Finish | 11/22/2019 | $539,826 |
| | H19059 | Churchill Downs Green Infrastructure Ph 2 | Construction Finish | 11/15/2018 | $2,960,819 |
| | H18332 | Botanical Garden Biofilter Upgrades | Construction Finish | 9/28/2018 | $61,509 |
| | H18195 | Churchill Downs Green Infrastructure Ph 1 | Construction Finish | 8/23/2018 | $2,013,267 |
| | | | | **TOTAL STORMWATER PROJECTS** | **$7,128,287** |

In addition to these projects, MSD funds the following appropriations annually in support of activities related to the stormwater and drainage system:

- **Environmental Data Collection**: MSD collects over 3 million individual water quality records each year. This monitoring program provides a detailed picture of the health of streams in Jefferson County. Monitoring results are summarized on an annual basis in the *Stormwater MS4 Annual Report*. The data are provided electronically annually to the Kentucky Division of Water. MSD budgets approximately $875,000 per year to support this effort.

- **Tree Program**: MSD's Urban Reforestation Program plants 1,000 trees annually by working with local businesses, municipal organizations and neighborhood associations. The program replenishes and expands the tree canopy throughout Jefferson County. These trees redirect an average of 1.35 million gallons of stormwater away from the sewer system every year, which decreases sewer overflows into waterways. MSD budgets approximately $150,000 per year to support the program.

- **MS4 Program**: MSD budgets approximately $600,000 per year to manage and administer the MS4 Program. Work performed includes but is not limited to: public education and outreach; pollution prevention program; performance assessment and reporting; recreational monitoring for bacteria levels between May 1st and October 31st; and wet weather monitoring during storm events.

- **USGS Stream Monitoring**: In 1988, MSD and the United States Geological Survey (USGS) began monitoring water quality and stream flow throughout the Jefferson County area. The Long-Term

Monitoring Network has changed over the years and currently includes 27 monitoring sites. The monitoring sites were selected to represent streams in each of eleven watersheds. Each monitoring site is sampled four times per year and is analyzed for a variety of parameters including fertilizers, sediment, and metals. MSD budgets approximately $400,000 per year to support this effort.

### 3.4.2 5-Year CIP for Stormwater & Drainage System

During the 5-year CIP, the following stormwater and drainage projects will be partially or wholly budgeted.

**Table 3-3: Overview of 5-Year Forecasted Spending for Stormwater**

| Stormwater Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Stormwater & Drainage Improvements** | Local Drainage Improvements | **Stormwater $6.9 million** |
| | 3-Forks Beargrass Creek USACE General Investigation | |
| | Stormwater Master Plan | |
| **MS4 Program** | Environmental Data Collection | **MS4 $9.5 million** |
| | MS4 Program Support | |
| | Tree Program | |
| | USGS Stream Monitoring | |
| **Drainage Response Initiative (DRI)** | DRI Projects | **DRI $13 million** |
| | DRI Field Inspections | |
| **Green Infrastructure (GI) Projects** | GI Projects with Signed Agreements | **GI $2.3 million** |
| | Future GI Projects | |
| **Land Use Planning** | Maple Street Land Use Planning | **Land Use $60,000** |
| | Other Future Projects | |
| | **Total 5-Year CIP Forecast for Stormwater & Drainage** | **$31.8 million** |

# 4. Flood Protection System

Louisville's flood problems originate from the Ohio River as it rises above its normal pool depth, as well as contributing creeks, storm sewers, and major drainage systems. After devastating floods on the Ohio River in 1937, the U.S. Army Corps of Engineers (USACE) was given authority by Congress to construct flood damage reduction projects under the Flood Control Act of 1936. Under this authority, the USACE built the Ohio River Flood Protection System (ORFPS) that stretches from Butchertown to the southwestern part of Jefferson County near West Point, Kentucky. The original 13.9 mile section of the floodwall was constructed along the Ohio River between 1946 and 1956 (Louisville Reach) and turned over to MSD as functional pieces were completed in 1953, 1954, and 1957. The USACE constructed the 12.6 mile southwestern Jefferson County floodwall extension (Southwestern Jefferson County Reach) between 1973 and 1989.

When the elevation of the Ohio River rises, MSD's service area is protected from flooding through levees and floodwalls. The 185 street crossings, pipe openings, and gates that allow creeks to pass through are sealed and the river is held back. With the creeks and storm sewer system prevented from discharging into the Ohio River, MSD relies on the 16 flood pump stations to pump drainage over the floodwall and levee to prevent stormwater from backing up and causing flooding within the area. It is important to understand that the operation of the flood pumping stations is intermittent and infrequent, only occurring when both the Ohio River is in flood stage and there is a rain event within the drainage system. Many of the pumping stations operate only once every few years. The existing system is more than 60 years old and most components are original parts. In many cases, the original equipment is no longer available for replacement.

MSD is responsible for ensuring all components of the ORFPS are fully operational when they are needed. Today, the ORFPS protects 240,000 people and $60 billion of property within the levee area and includes the following components (refer to Figure 4-1):

- 22.2 miles of earthen levee
- 3.9 miles of concrete wall
- 16 flood pump stations (total of 73 pumps)
- 152 gates
- 97 closures (21 permanently sealed)

## 4.1 Service Area

A large portion of Jefferson County lies within the broad floodplain of the Ohio River. Approximately 17,600 acres of this floodplain (extending from Beargrass Creek to Pond Creek) are protected by the ORFPS.


**Figure 4-1: Ohio River Flood Protection System**

Several flood pump stations have watersheds and sewersheds that extend across the Metro area and into eastern Jefferson County. Four distinct topographic regions exist throughout MSD's service area as shown in Figure 4-2 and described below[4].


Figure 4-2: MSD's Topographic Regions

- **Flood Plain**: A strip of land bordering one-half to five miles wide along the Ohio River. The Flood Plain extends from the Salt River in the southwest, north to downtown Louisville, and continues northeast to the Oldham County line. The area is best characterized as flat to gently rolling and with very flat sloped stream beds. Mill Creek and the combined sewer system drain the majority of this region.

- **Knobs**: A triangular area in the southwestern portion of the county bounded approximately by Iroquois Park on the north, South Park Hills on this southeast, and the Southern Railroad on the southwest. The hills in this region have been highly dissected by stream erosion. Most streams in this area drain to Pond Creek.

- **Central Basin**: The west central portion of the county, bounded approximately by I-264 on the north, Shepherdsville Road on the east, and the "Knobs" region on the south and west, is the "Central Basin. Various improvements to the Northern and Southern Ditch systems have helped alleviate the lack of natural drainage in the region.

[4] 2016 Louisville Metro Hazard Mitigation Plan

- **Eastern Uplands**: The remainder and largest portion of the county. This region is characterized by gently rolling to hilly plains to moderate to very steep valleys. Goose Creek, Harrods Creek, Floyds Fork, and the Beargrass Creek system drain this region.

## 4.2 Regulatory Requirements

As previously noted, the interior drainage system is regulated by MSD's MS4 permit. The Ohio River flood-protection system is not regulated by a single agency or permit. A series of requirements and standards established by multiple state and federal agencies such as FEMA and USACE regulate the flood protection system.

**Table 4-1: Federal and State Flood Protection Regulations**

| Reference | Title | Description |
|---|---|---|
| **40 CFR, Chapter 1, Part 230, Section 230.30** | Threatened and Endangered Species | Identifies endangered or threatened species likely to become endangered in the foreseeable future. |
| **44 CFR, Chapter 1, Part 73** | National Flood Insurance Program Flood Insurance Manual, Appendix F, Community Rating Systems | The CRS offers NFIP policy premium discounts in communities that develop and execute extra measures beyond minimum floodplain management requirements to provide protection from flooding. |
| **44 CFR Chapter 1, Part 79** | Flood Mitigation Grants | Establishes procedures and requirements for grant programs to mitigate losses from flooding. |
| **44 CFR, Chapter 1, Part 207** | Disaster Mitigation Act of 2000 | Provides information for state and local governments to identify and mitigate natural hazards. |
| **16 US Code, Title 16, Chapter 84, Section 6514** | National Environmental Policy Act Environmental Assessment | Establishes criteria to determine whether an impact significantly affects the quality of the human environment. |
| **33 US Code, Title 33, Chapter 15, Section 701b-12** | Floodplain Management Requirements | Established following construction, the non-federal sponsor (MSD) has full legal responsibility for replacing, repairing, and rehabilitating the flood protection facilities. |
| **33 US Code, Title 33, Chapter 46, Section 3301** | USACE Regulations regarding Operations and Maintenance of flood damage and reduction facilities | Established guidelines for maintenance and operation of levees, floodwalls, drainage structure, closures, pumping stations, channels and floodways. |
| **42 US Code, Title 42, Chapter 68, Section 5165** | Mitigation Planning | Provides information on the policies and procedures for mitigation planning as required by the provisions of section 322 of the Stafford Act, 42 U.S.C. 5165. |

#### 4.2.1 Metro Government Local Ordinances Related to Flood Protection

MSD is required to comply with the following local regulations related to the flood protection system.

- **Engineering Standards**. Louisville and Jefferson County MSD Design Manual

## 4.3 Flood Protection System Evaluation

As noted, the USACE inspect the ORFPS components every two years to ensure it remains fit for purpose. A more comprehensive evaluation was completed in 2019.

#### 4.3.1 2019 USACE ORFPS Reliability Improvements Evaluation

The most recent condition assessment for MSD's ORFPS components was performed by the USACE in 2018-2019. The following conclusions were made[5]:

- The National Flood Insurance Program Levee System Evaluation determined the floodwall and levee features are in an acceptable condition.
- The 2019 Periodic Inspection rated the overall system as "minimally acceptable".
- The 2019 Semi-Quantitative Risk Assessment performed by USACE identified features with a performance issue to lessen likelihood or consequences of failure in accordance with Tolerable Risk Guidelines.
- MSD's CRRP recommended rehabilitation/expansion for 15 of the 16 aging flood pump stations to have sufficient capacity forecasted through 2065.

In 2019, the USACE completed its Feasibility Study and recommended projects needed to ensure flood protection levels meet today's standards. These projects may be eligible for federal dollars through USACE construction appropriation. The improvements are restricted for RELIABLITY purposes and exclude any capacity upgrades. The study indicated the following flood protection system needs:

- **Levee System**: Well maintained and has not had any significant performance issues during high water events, but no event has significantly loaded the levee system.
- **Mechanical/Electrical**: The systems are aging, and mechanical and electrical components are requiring regular and often significant maintenance each year.

[5] USACE Louisville Metro Flood Protection System, Emergency Supplemental Reconstruction Feasibility Study with Integrated Environmental Assessment, Volume 1, 2019.

- **Pumps & Motors**: Approximately 75% of the pumps and motors need rebuilt or replaced. The original pumps, motors, and ancillary systems are still in service and have not had a major rebuild since they were originally installed.

- **Control Systems**: 80% of the controls systems at the flood pump stations are outdated. The control systems are rudimentary by today's standards, requiring the station to be fully staffed at all times during flood pumping operations.

- **Transformers & Motor Control Centers**: 88% of the electrical components need to be replaced. The electrical system is original equipment, which cannot be repaired with currently available components.

- **Gates and Floodwalls**: 25% of the system needs to be replaced or refurbished: 15 new actuators, 13 new gates, and 10 gates to be refurbished. Most of the 152 gates are 65 years old.

The USACE identified $167 million of improvements needed to increase the reliability of the Flood Pump Stations (FPS) along the Ohio River as well as other components, such as gates and flood walls. The USACE will contribute approximately $109 million and MSD will contribute approximately $58 million toward the total cost. MSD does not have any control regarding the timing of projects completed by USACE. Therefore, MSD must be ready with its cost share portion at the USACE's schedule. Preliminary discussions have indicated design for the FPS Reliability Improvements Projects could begin in FY21 with construction advancing FY23 through FY 25.

In addition to these reliability improvements, the CRRP completed multiple evaluations of the 16 flood pump stations and identified additional needs that will not be addressed by the USACE's Reliability Improvements Program. A preliminary breakdown of the projects qualifying for the USACE Reliability Improvements Program and other CRRP projects not covered by USACE are listed in the table below. The 5-Year CIP includes MSD's full share of the USACE Reliability Improvements Program.

**Table 4-2: Summary of Flood Protection System CIP Needs**

| Flood Protection System Project | Estimated USACE Participation for Reliability Improvements | Estimated MSD Participation for Reliability Improvements | CRRP FPS Improvements Not Included in Reliability Program |
|---|---|---|---|
| Paddy's Run FPS Improvements | $12,194,300 | $6,566,000 | $44,260,000 |
| 10th Street FPS Improvements | $2,131,200 | $1,147,600 | $750,000 |
| 17th Street FPS Improvements | $1,368,400 | $736,800 | $4,313,200 |
| 27th Street FPS Improvements | $3,701,300 | $1,993,000 | $10,027,000 |
| 34th Street FPS Improvements | $1,827,700 | $984,200 | $1,020,000 |

| Flood Protection System Project | Estimated USACE Participation for Reliability Improvements | Estimated MSD Participation for Reliability Improvements | CRRP FPS Improvements Not Included in Reliability Program |
|---|---|---|---|
| 4th Street FPS Improvements | $0 | $0 | $12,920,000 |
| 5th Street FPS Improvements | $1,403,800 | $755,900 | $700,000 |
| Beargrass Creek FPS Improvements | $16,009,000 | $8,620,200 | $88,259,800 |
| Bingham Way FPS Improvements | $0 | $0 | $6,590,000 |
| Lower Mill Creek FPS Improvements | $3,481,000 | $1,874,400 | $11,575,700 |
| Pond Creek FPS Improvements | $15,434,200 | $8,310,700 | $9,750,000 |
| Riverport FPS Improvements | $1,358,200 | $731,300 | $5,378,700 |
| Shawnee Park FPS Improvements | $7,832,600 | $4,217,500 | $38,512,500 |
| Starkey FPS Improvements | $3,500,00 | $1,885,100 | $4,360,000 |
| Upper Middle Creek FPS Improvements | $7,647,400 | $4,117,900 | $44,922,200 |
| Western Parkway FPS Improvements | $1,183,300 | $637,200 | $21,832,900 |
| Levees, Floodwalls, Gates & Closures | $19,846,400 | $8,201,500 | $1,049,700 |
| Cultural Mitigation & Engineering | $13,529,200 | $7,885,000 | $0 |
| **TOTAL** | **$108,948,000** | **$58,664,300** | **$306,221,700** |

*Note: The projects and preliminary costs presented in this table are for informational purposes only and are subject to change as discussions continue between MSD and the USACE. They represent a level of capital investment for each location. However, the actual costs are likely to vary from these preliminary values as projects are further planned and vetted.*

## 4.4 Flood Protection Capital Projects

The projects completed since 2017 have primarily been focused on replacing aging assets (refer to Table 4-3). The 5-year CIP includes several projects that will increase the capacity of the flood pump stations and improve the overall system reliability.

### 4.4.1 Projects Funded from Program Notes

Minimal investment has been focused on the flood protection system due to the requirements of the Amended Consent Decree and other MSD priorities. MSD completed repairs for valves, gates, pump, and motors at six of the flood pump stations.

Table 4-3: Flood Protection Projects Completing Design/Construction Since 2017

| Program | Budget ID | Project | Task Name | Finish | Lifetime Actuals |
|---|---|---|---|---|---|
| **Flood Pump Station Improvements** | F20265 | Beargrass Creek Bay Gate 4 Repairs | Construction Finish | 1/10/2020 | $109,652 |
| | F19277 | Beargrass Creek FPS Wetwell Relief Gate | Design Finish | 12/12/2019 | $41,530 |
| | F20013 | Beargrass FPS Pump 8 | Design Finish | 12/3/2019 | $491 |
| | F19276 | FPS Auto Grease Systems Upgrades | Design Finish | 12/3/2019 | $43,997 |
| | F20240 | Shawnee Park FPS Motor No 3 Emergency Repairs | Construction Finish | 10/14/2019 | $112,130 |
| | F18295 | Starkey Check Valve Replacement | Construction Finish | 7/31/2019 | $190,998 |
| | F18302 | Paddy's Run FPS Pumps 1, 2 and 6 Rehab | Design Finish | 4/18/2019 | $1,288,560 |
| | F19269 | Upper Mill Creek Emergency Pump Repairs | Construction Finish | 4/17/2019 | $1,092,856 |
| | F18279 | Paddys Run FPS Access Road | Construction Finish | 11/30/2018 | $293,034 |
| | F18296 | 5th Street FPS Roof Replacement | Construction Finish | 11/9/2018 | $57,517 |
| **Levee, Floodwall, and Gate Improvements** | F19245 | Flood Gate 1 Replacement | Design Finish | 9/24/2019 | $106,466 |
| | F16021 | Gates 136 and 145 Floodwall Actuator Replacement | Construction Finish | 4/11/2019 | $592,816 |
| | F19218 | Flood Gate 110 and 111 Elimination | Construction Finish | 2/21/2019 | $54,641 |
| | | | | **TOTAL FLOOD PROTECTION PROJECTS** | **$3,984,688** |

### 4.4.2 5-Year CIP for Flood Protection System

MSD is forecasting to spend $153 million of the $306 million of flood protection needs during the 5-year CIP. These projects are not part of the USACE Reliability Improvements Program. The ORFPS is a critical component for public protection and as such has become a priority for the capital program. During the 5-year CIP, the following Flood Pump Station Capacity Upgrades projects will be partially or wholly budgeted. These projects were identified and estimated in the CRRP.

**Table 4-4: Summary of 5-Year CIP Forecasted Spending for ORFPS**

| CIP Program | Project | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Capacity or Electrical Improvements** | 10th Street FPS - Generator Improvements | **$99.7 million** |
| | 17th Street FPS - Capacity and Generator Improvements | |
| | 27th Street FPS - Capacity and Generator Improvements | |
| | 34th Street FPS - Generator Improvements | |
| | 4th Street FPS - Capacity and Electrical Service Improvements | |
| | 5th Street FPS - Generator Improvements | |
| | Bingham Way FPS - Capacity and Generator Improvements | |
| | Paddys Run FPS Capacity Upgrade | |
| | Pond Creek FPS - Electrical Service Improvements | |
| | Starkey FPS Transformer Replacement and Generator | |
| | Upper Mill Creek FPS Transformer Replacement | |
| **Asset Management Improvements** | Beargrass Creek FPS Wetwell Relief Gate | **$53.5 million** |
| | Beargrass FPS Pump 8 | |
| | Flood Gate 1 Replacement | |
| | FPS Auto Grease System Upgrades | |
| | Flood Structures & Flood Pump Station Equipment R&R | |
| | Gate 102 Replacement | |
| | Paddy's Run FPS Pumps 1, 2, and 6 Rehab | |
| | Pond Creek Emergency Pump Repairs | |
| | Canal Street Floodwall | |
| | **Total 5-Year CIP Forecast** | **$153.2 million** |

*Note: These projects exclude MSD's $58 million participation in the USACE Reliability Improvements Program*

- **Paddy's Run FPS Capacity Improvements**: The $79 million Paddy's Run Flood Protection Station Capacity Improvements project is MSD's highest ranked capital priority to mitigate flood pump station public health protection risk. MSD completed an Alternatives Analysis for increasing the capacity of the station to 975 mgd. The CRRP recommended two equally important project phases for the Paddy's Run FPS. The first phase will improve the reliability of the existing Paddy's Run FPS (originally constructed in 1953) by removing, inspecting, and rehabilitating or replacing the station's existing pumps and motors to maintain the station's current total pumping capacity of 925 mgd. The reliability improvements will be implemented through the USACE Program. MSD must construct the capacity improvements project independent of the USACE project.

As noted in Table 4-3, MSD funds the following appropriations annually in support of activities related to the flood protection system:

- **Flood Pump Station Equipment Repair & Replacement**:  This annual appropriation is intended to better facilitate key equipment replacements.  Funds are budgeted to replace pumps, motors, electrical switchgear, generators, and other critical equipment.  MSD budgets approximately $1 million per year to support this effort.

- **Flood Structures Repair & Replacement**: MSD maintains a proactive maintenance program to assure the integrity of the levee and floodwall system.  Worked performed using these funds includes:  repair and/or replacement of trusses, sheeting, and closure walkways;  corrugated metal pipe replacement; toe drain access repairs; trail repairs and unwanted vegetation removal; level gate repair or automation; painting; floodwall joint repair; and floodwall concrete sealing and surface crack repairs.  MSD budgets approximately $2 million per year to support the program.

# 5. Wastewater Collection System

Like many cities developing in the 19th century, Louisville's sewers were constructed many decades prior to the construction of the treatment facilities. MSD's first sewers were installed before 1850 and routed directly to the Ohio River. By the end of the 19th century, the collection system had expanded to almost 100 miles of clay, brick, and timber-lined sewers. Today, MSD has over 3,200 miles of sewers, approximately 500 miles being over 100 years old. The oldest sewers in the system are primarily in the combined sewer system built between the 1860s to the 1950s. Beginning in 1955, all of the sewer systems built in the Louisville Metro area have been separate sanitary sewers. MSD's first Sewer Master Plan was developed in 1964.

MSD serves approximately 243,000 customer accounts and 650,000 people. The collection system operated and maintained by MSD includes:

- 256 wastewater pump stations
- ≈79,000 manholes
- ≈2,500 miles of sanitary sewers
- ≈700 miles of combined sewers (24,000 acres)
- ≈160 miles of force mains
- ≈1,400 miles of lateral connections to buildings
- Real Time Control facilities to reduce overflows 48%
- In-Line Storage Systems
- Waterway Protection Tunnel for wet weather management (currently under construction)

A breakdown of the major collection components by sewershed is presented in Table 5-1.

**Table 5-1: Inventory of Wastewater Collection System by Sewershed**

| WQTC SEWERSHED | MANHOLES | GRAVITY SEWERS (FT) | PUMP STATIONS | FORCE MAINS (FT) |
|---|---|---|---|---|
| Morris Forman | 41,315 | 9,055,643 | 94 | 325,109 |
| Derek R. Guthrie | 21,184 | 4,777,509 | 41 | 75,831 |
| Hite Creek | 5,089 | 963,949 | 51 | 190,596 |
| Floyds Fork | 5,256 | 966,863 | 34 | 125,576 |
| Cedar Creek | 5,998 | 1,114,183 | 36 | 136,648 |
| **Total** | **78,842** | **16,878,147** | **256** | **853,760** |

## 5.1 Wet Weather Storage

Under the Amended Consent Decree, MSD constructed the wet weather storage facilities listed in Table 5.2. These systems are consistent with the USEPA's Nine Minimum Controls (NMC) Program that requires utilities to maximize storage within the collection system. Many of MSD's wet weather storage facilities are operated using real-time control (RTC) to optimize available flow and storage capacities within the wastewater collection system.

A summary of MSD's wet weather storage systems is presented in Table 5-2. These systems are preventing billions of gallons of sewer overflows from occurring. In FY19 nearly 2 billion gallons of flow was stored in the system and later treated – in lieu of resulting in unauthorized discharges. In FY20, through March 31st, nearly 1.3 billion gallons have been stored and subsequently treated. These systems are proving to be very effective with managing wet weather flows.

**Table 5-2: Wet Weather Storage Systems**

| Wet Weather Storage and Real Time Control | Capacity (MG) | Date Storage On-line | FY19 Volume Stored (MG) | FY20 Volume Stored* (MG) |
|---|---|---|---|---|
| Southwestern Pump Station Sluice Gates Chamber (SWSG) | 14.25 | 2006 | 484.85 | 267.65 |
| Southwest Outfall Retention Basin #2 (SWOR2) | 4.1 | 12/31/2008 | 151.75 | 67.65 |
| Brady Lake & Executive Inn Storage Basin (Upper Dry Run Trunk System) | 21.5 | 2006 | 278.85 | 221.15 |
| Ashland In-Line Storage Facility | 1.0 | 2008 Upgraded 2019 | 361.45 | 15.8 |
| Southern Outfall In-Line Storage @43rd Street (SOR1) | 14.05 | 11/30/2018 | 29.75 | 272.85 |
| Ohio River Interceptor (MDS) | 1.8 | 2008 | 205.85 | 69.25 |
| Sneads Branch In-Line Storage | 2.5 | 9/30/2006 | 56.85 | 19.65 |
| Logan & Breckinridge Street CSO Basin | 17 | 12/20/2017 | 317.55 | 234.3 |
| Nightingale Pump Station Replacement & Storage (NGPS) | 8.0 | 6/30/2017 | 11.4 | 21.85 |
| Clifton Heights CSO Storage Basin | 6.9 | 12/21/2018 | 13.6 | 44 |
| Southwestern Parkway Storage Basin | 17.5 | 3/29/2019 | 0 | 45 |
| Portland CSO Basin | 6.7 | 8/30/2019 | 0 | 0 |
| **Total** | **115.3** | | **1,911.9** | **1,279.15** |
| Waterway Protection Tunnel | 52.2 | Future | 0 | 0 |
| Idlewood Inline Storage | TBD | Future | 0 | 0 |

**FY20 Volume Stored July 1, 2019 through March 31, 2020.*

## 5.2 Service Area

By Kentucky state statute, MSD is authorized to provide wastewater collection, treatment, and disposal services in Jefferson County. Through interlocal agreements, MSD also provides these services to portions of Oldham County and small parts of Bullitt County (refer to Figure 5-1). This area includes approximately 270 square miles and serves approximately 243,000 customers.

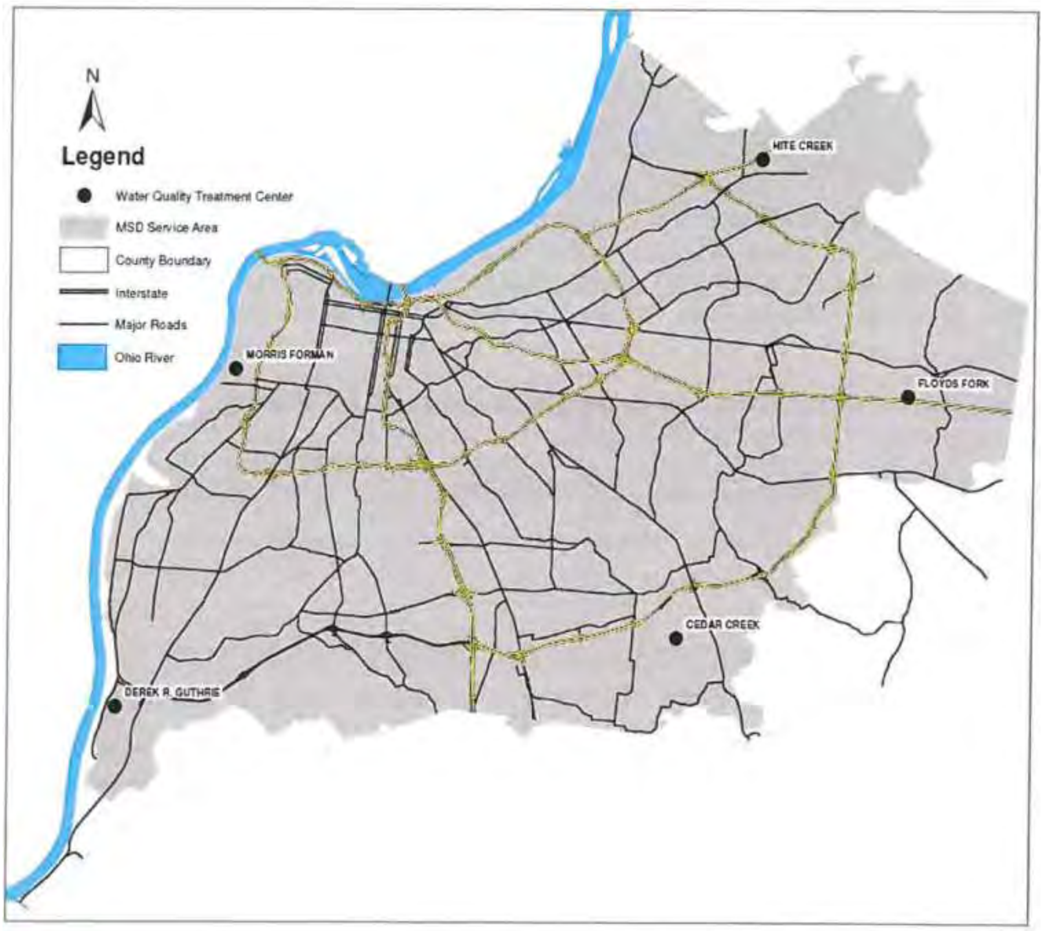


**Figure 5-1: MSD's Wastewater Service Area**

## 5.3 Regulatory Requirements

MSD is required to comply with the regulations listed in Table 5-3 related to wastewater systems as referenced in the Kentucky Revised Statutes (KRS).

Table 5-3: Federal and State Applicable Wastewater Regulations

| Reference | Title | Description |
|---|---|---|
| **401 KAR 5:050, 5:060; 5:065 KRS 224.16-050** | Permits and Planned Changes | Establishes fees and procedures to obtain a permit and criteria for alterations or additions that must obtain a permit. |
| **401 KAR 5:005** | Permits to construct, modify or operate a facility | Establishes when permits are required for construction, of sewer line extensions & defines application submittals and fees. |
| **401 KAR 5:006** | Wastewater Regional Planning Requirements | Defines requirements for Regional Facility Plan to construct new infrastructure to serve 30% more of the population. |
| **401 KAR 5:010 401 KAR 11:030 KRS 224.73-110** | Operation of Wastewater Systems by Certified Operators | Establishes requirements for certification of collection system operations staff. Specifies Operator in Training Program requirements. |
| **401 KAR 5:015** | Releases to be Reported | Establishes reporting requirements for certain releases, spills, and bypasses of pollutants into the environment. |
| **401 KAR 5:065 KRS 224.99-010** | Monitoring & Records | Establishes information retainage requirements for monitoring and performance records. |
| **401 KAR 5:055 KRS 224.70-110 40 CFR Part 403** | Pretreatment Requirements | Establishes pretreatment requirements as part of the Kentucky Pollutant Discharge Elimination System (KPDES). Provides for the protection of domestic wastewater facilities from pass through or interference from pollutants contributed by industrial users of the domestic wastewater facility. |
| **401 KAR 5:320** | Wastewater Laboratory Certification Program | Defines the minimum laboratory quality assurance, methodological and reporting requirements. |
| **KRS 224.73-120** | Monitor/Report Introduction of Incompatible Pollutants | Authorizes application of monitoring, record keeping, and reporting requirements of pollutants which interfere with, pass through, or are otherwise incompatible with WQTC. |

### 5.3.1 Metro Government Local Ordinances Related to Wastewater Collection

MSD is required to comply with the following local regulations related to the wastewater collection system.

- **Sewerage Plan Review and Inspection**. Louisville Metro Government Code of Ordinances, Title V, Chapter 50.06
- **Capacity Charge**. Louisville Metro Government Code of Ordinances, Title V, Chapter 50.45-48.
- **Engineering Standards**. Louisville and Jefferson County MSD Design Manual.

### 5.3.2 IOAP/Consent Decree Work

As has been noted throughout this report, much of MSD's annual capital program has been focused on the Consent Decree Requirements. The following projects were completed since the 2017 bonds were issued. The Waterway Protection Tunnel was under construction and has required significant capital investment to-date.

**Table 5-4: Consent Decree Projects Completing Design/Construction Since 2017**

| Program | Budget ID | Project | Task Name | Finish | Lifetime Actuals |
|---|---|---|---|---|---|
| **Sewer Separation Projects** | H20215 | Camp Taylor 2A SSR - Union St Sewers | Construction Finish | 2/16/2020 | $41,676 |
| **Wet Weather Storage Capacity & Real Time Control Projects** | H09125 | Portland CSO Basin | Construction Finish | 8/9/2019 | $37,829,646 |
| | D17047 | MF Brady Lake and Executive Inn Gate Study | Study Finish | 7/25/2019 | $37,992 |
| | H09132 | Southwestern Parkway Storage Basin | Construction Finish | 5/10/2019 | $80,623,143 |
| | H09123 | Clifton Heights Storage Basin | Construction Finish | 11/15/2018 | $33,934,464 |
| | H09133 | Waterway Protection Tunnel | Construction In-Progress | | $113,500,000 |
| **TOTAL CONSENT DECREE PROJECTS** | | | | | **$265,966,921** |

### 5.3.3 Remaining IOAP/Consent Decree Work

The cost of the capital improvements required to be completed under the Amended Consent Decree is currently estimated to be $1.5 billion of which MSD has spent $1.01 billion as of April 30, 2020.

During the 5-year CIP, construction for the Waterway Protection Tunnel will be completed. The remaining SSDP projects will be phased over time. The specific timing for each remaining project is currently under discussion with the federal and state Regulators. The remaining Consent Decree work to be completed includes the following projects.

- **Waterway Protection Tunnel ($55 million remaining):** The last Long-Term Control Plan project (Waterway Protection Tunnel) remains under construction with an estimated completion date in FY22. The following LTCP projects are nearly completed:
    - I-64 and Grinstead CSO Interceptor
    - Lexington and Payne CSO Interceptor
    - Rowan Pump Station & Downtown CSO Interceptor

- **Sanitary Sewer Discharge Plan (SSDP) Projects ($144 million remaining):** MSD must complete several remaining projects identified in the SSDP. The schedule for completion of these projects is currently under discussion with the Regulators given other urgent needs that have developed over the past few years related to Biosolids Management and the Ohio River Flood Protection System. The following SSDP projects have yet to be completed:
    - ***Sewer Projects***
        - Little Cedar Creek Interceptor Improvements
        - Dell Road and Charlaine Parkway Interceptor Improvements
        - Sutherland Interceptor
    - ***Storage Projects***
        - Idlewood Inline Storage
        - Gunpowder Pump Station In-Line Storage
        - Lucas Lane Pump Station Inline Storage
        - Goose Creek Pump Station Storage
    - ***Pump Station Projects***
        - Raintree Court & Marian Court Pump Station Eliminations Phase 1A
        - Bardstown Road Pump Station Improvements
        - Cinderella Pump Station Elimination
        - Kavanaugh Road Pump Station Improvements
        - Leven Pump Station Elimination
        - Monticello Pump Station Elimination
        - Mellwood System Pump Station Eliminations
        - Upper Middle Fork Pump Station
- **Upper Middle Fork Pump Station ($86 million remaining):** The largest remaining SSDP project is the Upper Middle Fork bundle. This project includes replacement of the existing Upper Middle Fork Pump Station, which has a current capacity of 9 mgd, with a new efficient 30 mgd pump station. A relief interceptor will convey flows in excess of the current interceptor capacity, and a diversion gate will be installed on the existing interceptor to force flows into the pump station. This timing for completing this project is under discussion with the Regulators.
- **IOAP Support Projects (approximately $2 million per year):** Annual support for post construction compliance monitoring and external resources to assist with IOAP modifications is included in this investment.

## 5.4 Wastewater Collection System Programs

MSD administers and manages several programs related to the wastewater collection system. The key programs are summarized herein.

### 5.4.1 Capacity, Management, Operations and Maintenance (CMOM) Program

MSD's Consent Decree requires implementation of a CMOM Program including major renewal and replacement projects at the Hite Creek, Floyds Fork, Cedar Creek, and Derek R. Guthrie WQTCs to ensure MSD can maintain effective wastewater collection, transmission, and treatment. The CMOM Program provides proactive asset management of sewers, pump stations, and major interceptors that make up most of MSD's collection system. CMOM compliance is required as a component in each WQTC's KPDES permit with the following stated comprehensive CMOM Program goals:

- To better manage, operate, and maintain the collection system
- Investigate capacity constrained areas of the collection system
- Proactively prevent or minimize SSOs
- Respond to SSO events
- Proactively prevent or minimize the potential for release of pollutants

### 5.4.2 Industrial Pretreatment Program

MSD is the administering agency for the Metro Louisville Hazardous Materials Ordinance (HMO) and the approval authority for Hazardous Material Spill Prevention and Control (HMPC) Plans mandated by this ordinance. This ordinance was created for the protection of public health and safety in Louisville Metro, through the prevention and control of hazardous materials incidents and releases and the timely reporting of releases. The ordinance has been incorporated into MSD's Industrial Pretreatment Program which has the following objectives:

- Protect the Water Quality Treatment Centers and sewer collection system
- Protect the health and safety of MSD workers and general public
- Protect the waterways
- Prevent violations of permits
- Enhance biosolids reuse and water reclamation

The Industrial Pretreatment Program is subdivided into the following programmatic areas:

- **Fats, Oils and Grease (FOG) Program**: MSD's FOG Management Policy requires Food Service Establishments to use grease traps and/or grease interceptors to prevent FOG clogs. These devices must be certified annually by an MSD approved Certified Grease Waste Hauler or Plumber.

- **Dental Amalgam Program**: designed to reduce the amount of toxic metals entering the sanitary sewer system. MSD requires all dental facilities that discharge into the sanitary sewer system to complete a one-time compliance report for dental dischargers.

- **Unusual Discharge Request (UDR) Program**: Any short-term one-time discharge to the sewer system requires approval through MSD's UDR Program. The program gives MSD control over the type and characteristics of the wastewater being discharged to ensure that contaminants that might cause problems at the treatment plants are not allowed to enter the sewer system.

- **Pretreatment Requirements Review and Modification**: The Nine Minimum Control Program reviews and modifies business and industry wastewater pretreatment requirements in order to minimize the impacts of non-domestic dischargers on CSOs.

### 5.4.3 Nine Minimum Controls Program

MSD's Consent Decree requires compliance with the USEPA NMC Program that was initially developed as part of the Clean Water Act CSO Policy to address combined sewer system best management practices that do not require significant construction. NMC projects tend to be technology based. NMC programmatic compliance is required in the Morris Forman WQTC KPDES Permit. The 20-year CRRP includes projects focused on NMC including 1) real-time control (RTC) of assets in the combined sewer system and 2) capacity upgrades for WQTCs to maximize the flow able to be received and processes at the treatment plants.

The 5-year CIP includes projects for NMC including: annual as-needed appropriations for NMC improvements, CSO inspection cameras, and RTC refinements.

***NMC #3 – Maximize Collection System Storage***

- SGC RTC Enhancements Project
- NMC RTC Support, $2.4 million (as-needed annual appropriations)
- NMC Program Support, $690,000 (as-needed annual appropriations)

***NMC # 4 – Maximize Flow to WQTC***

- CCWQTC Expansion
- HCWQTC Expansion

***NMC # 9 – Monitor CSO Controls***

- NMC CSO Inspection Cameras, $445,000 (as-needed annual appropriations)

### 5.4.4 Sewer Asset Management Program

Asset management programs are required to ensure assets perform as intended and are available when needed. While the Consent Decree focused on constructing new assets to address wet weather and mitigate resulting overflows, asset management focuses on minimizing the risk of failure for existing assets. USEPA recognizes the importance of asset management and requires utilities to comply with programs intended to keep existing infrastructure fit for purpose.

Sewers represent some of the oldest components of the wastewater system. Some of MSD's sewers are 150 years old. MSD utilizes an industry-standard risk scoring system for the sewers. In total MSD estimates $2.2 billion is needed to address all sewer rehabilitation and known structural deficiencies.

MSD is focusing on large diameter interceptors for rehabilitation. Significant major interceptor failure has occurred in the past two years due to severe deterioration of large pipe segments. USEPA noted in its 2019 Inspection Report[6] that MSD had 12 major pipe collapses in a 15-month period. In addition to the Large Diameter Interceptor Rehabilitation Program, MSD continues to improve sewers and pump stations throughout the District.

### 5.4.5 Planning Initiatives

The 5-year CIP includes the following planning initiatives related to the wastewater collection system. These plans will be utilized to implement a comprehensive asset management program, prioritize capital needs, and update the CRRP.

- Odor Management Plan, $250,000
- SCADA Master Plan, $796,000
- Wastewater Pump Stations Facility Asset Management Plan, $750,000

## 5.5 Wastewater Collection System Capital Projects

MSD continues to fund wastewater collection projects with its annual CIP. Projects are generally a combination of discrete local improvements and appropriations for District-wide needs/services.

### 5.5.1 Projects Funded from Program Notes

Projects completed since the 2017 bond issuance have addressed both sewer and pump station needs. The largest project, the Ohio River Interceptor Structural Rehabilitation Project, necessitated expensive sewer repairs and replacement for portions of the major interceptor that failed in downtown Louisville.

[6] United States Environmental Protection Agency, Region 4, Water Protection Division, NPDES Permitting and Enforcement Branch, Compliance Evaluation Inspection Report, Louisville & Jefferson County Metropolitan Sewer District, June 25, 2019.

**Table 5-5: Wastewater Collection Projects Completing Design/Construction Since 2017**

| Program | Budget ID | Project | Task Name | Finish | Lifetime Actuals |
|---|---|---|---|---|---|
| **Real Time Control Facilities** | F16003 | Ashland RTC Facility Upgrades | Construction Finish | 6/25/2019 | $469,839 |
| **Pump Stations** | H20153 | SWPS Flood Repair | Design Finish | 1/14/2020 | $79,852 |
| | E15033 | Shively Pump Station Generator Replacement | Construction Finish | 10/30/2019 | $1,723,284 |
| | D19275 | MDS Downstream Flow Meter | Design Finish | 9/17/2019 | $251,121 |
| | H19288 | Terra Crossing Pump Station Upgrades | Construction Finish | 6/30/2019 | $13,361 |
| | G18326 | Catalpa Farms PS Odor Control Evaluation | Evaluation Finish | 3/8/2019 | $22,009 |
| | F19234 | Breakwater PS Electrical Modifications | Construction Finish | 12/27/2018 | $15,717 |
| | A18324 | Oreland Mill Pump Station Elimination | Construction Finish | 5/2/2019 | $294,952 |
| **Sewers** | D18285 | ORFM Odor and Corrosion Control | Design Finish | 3/3/2020 | $289,231 |
| | H19142 | Upper Floyds Fork Interceptor | Design Finish | 2/4/2020 | $232,887 |
| | H16074 | Nightingale Rehab | Design Finish | 10/8/2019 | $427,268 |
| | A16073 | Mud Lane Interceptor | Design Finish | 8/6/2019 | $1,490,854 |
| | H19247 | I-64 and Grinstead CSO Interceptor | Design Finish | 4/2/2019 | $5,396,037 |
| | A18353 | Ohio River Interceptor Structural Rehabilitation | Construction Finish | 12/15/2018 | $18,442,150 |
| **TOTAL WASTEWATER COLLECTION PROJECTS** | | | | | **$29,148,562** |

### 5.5.2 5-Year CIP for Wastewater Collection System

The following priorities are forecasted in the 5-year CIP to address deficiencies and mitigate risks for the wastewater collection system totaling $182 million. A breakdown of the projects is provided in Figure 5-2 and Table 5-6.

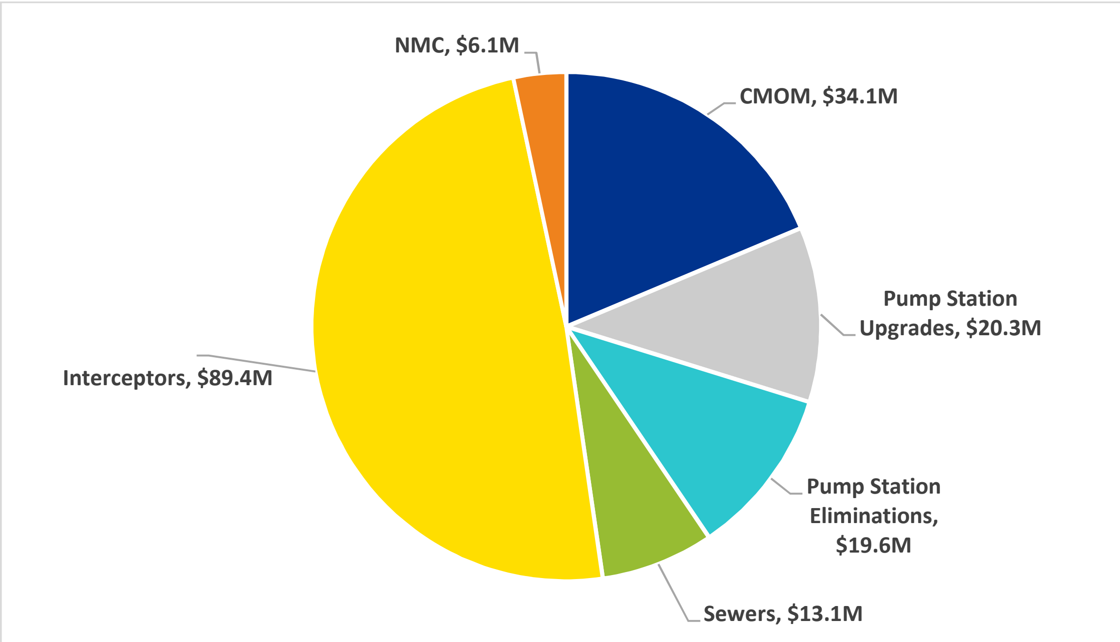


**Figure 5-2: Summary of 5-Year CIP for Wastewater Collection System**

**Table 5-6: Overview of 5-Year Forecasted Spending for Wastewater Collection System**

| Wastewater Collection System Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Pump Station Projects** | Enhanced Odor Control for Pump Stations | **CMOM Program Pump Stations $18.8 million** |
| | Back-Up Power for Critical Pump Stations | |
| | Inventory for Critical Pump Stations | |
| | Upgrade Critical Pump Stations with | |
| | CMOM Collection System Pump R&R | |
| | CMOM Grinder R&R | |
| | CMOM I&C Implementation | |
| | CMOM Pump Station Generator Upgrades | |
| | Asset Management Pump Stations R&R | **Pump Station Improvements $20.3 million** |
| | PS Replacement or Overhaul Projects | |
| | Northern Ditch Pump Station Replacement & Odor Control | |
| | Prospect Phase II PS Rehabilitation | |
| | Shively Area Suite PS Upgrades | |
| | Sneads Branch Pump Replacement | |
| | Southwestern Pump Station Improvements | |

| | Wastewater Collection System Priorities | 5-Year CIP Forecasted Spending |
|---|---|---|
| | Bluegrass Fields PS Renovation | |
| | Admiral Way PS Foundation Repairs | |
| **Sewer Projects** | Gravity Line Cleaning and Inspection | **CMOM Program Sewers $15.3 million** |
| | Program Management Assistance | |
| | CMOM SCAP, AAM, & FOG Programs | |
| | Operations R&R | |
| | Broadfern Pump Station Elimination | **Pump Station Eliminations $19.6 million** |
| | Gorham Way Pump Station Elimination | |
| | Kirby Lane Pump Station Elimination | |
| | Lake Forest Pump Station Eliminations | |
| | Lea Ann Way Pump Station Eliminations | |
| | Modesto Pump Station Elimination | |
| | Pirogue Pump Station Elimination | |
| | Shady Villa Pump Station Elimination | |
| | Shively Area Suite Pump Station Eliminations | |
| | Rehl Road East SSES | **Sewer Projects $13.1 million** |
| | Harrods Creek Force Main Repair | |
| | KTC Greenwood Road Assessment | |
| | Middle Fork Beargrass Creek SSR Phase 1 | |
| | ORFM Odor and Corrosion Control | |
| **Large Diameter Interceptor Projects** | Broadway Interceptor Rehabilitation | **Interceptor Rehabilitation Projects $89.4 million** |
| | Buechel Branch Interceptor Rehabilitation | |
| | I-64 and Grinstead Interceptor Rehabilitation | |
| | Interceptors Rehabilitation and Replacement | |
| | Western Outfall Infrastructure Rehabilitation | |
| | Large Diameter Interceptor Rehabilitation Program | |
| | Nightingale Interceptor Rehabilitation | |
| | Rudd Avenue Sewer Rehabilitation | |
| **Nine Minimum Control Projects** | CSO Inspection Cameras | **NMC Projects $6.2 million** |
| | RTC Support Services | |
| | SGC RTC Enhancements | |
| | **Total 5-Year CIP Forecast for Wastewater Collection System** | **$182.7 million** |

*Note: excludes projects listed in the Consent Decree*

# 6. Wastewater Treatment

MSD was formed in 1946, and the first treatment plant went into operation in 1958. MSD's Southwestern Outfall Pump Station went online in 1959 and pumped wastewater from the system's largest sewer to the first wastewater plant (Morris Forman). Although the 1964 Countywide Sewer Master Plan specified new treatment plants, a lack of financing for large treatment plants and their associated trunk sewers delayed their construction. As such septic systems and package treatment plants were constructed and/or installed by land developers and homeowners through the mid-1970s. By mid-1972, there were more than 300 small treatment plants in Jefferson County. In 2016, MSD decommissioned the final remaining package treatment facility leaving five regional water quality treatment centers (WQTC) to serve all of Louisville and Jefferson County. Elimination of these facilities in conjunction with removing 40,000 septic systems has helped improve the quality of local streams and the Ohio River. A summary of MSD's existing treatment facilities provided below.

- **Cedar Creek WQTC**: The Cedar Creek WQTC was originally constructed in 1995 with a capacity of 2.2 mgd. In 2005, the plant capacity was expanded to 7.5 mgd average daily flow (ADF). Today, approximately 5 mgd of flows are treated and disinfected (UV) before being released into Cedar Creek.

- **Derek R. Guthrie WQTC**: The original facilities at the Derek R. Guthrie WQTC site consisted of a screening chamber and a raw sewage pump station brought online in 1979. The secondary treatment facilities were brought online in 1986 when the WQTC was known as the West County Wastewater Treatment Plant. The WQTC had a capacity of 15 mgd with peak flow of 30 mgd. Plants expansions in 2001 and 2004 increased the ADF capacity to 30 mgd. In 2012 additional facilities enabled the WQTC to treat up to 200 mgd of wet weather flow using a modified contact stabilization process. Further improvements have since been constructed to increase plant capacity to 60 mgd ADF and 300 mgd peak (for short durations). MSD began construction of a new dewatering facility in 2019 to receive biosolids from all the regional WQTCs. Construction is scheduled for completion in FY22. Today approximately 40 mgd of flows are treated and disinfected (sodium hypochlorite) before being released into the Ohio River.

- **Floyds Fork WQTC**: The Floyds Fork WQTC was originally constructed in 2001 at a capacity of 3.25 mgd. In 2012, a major plant expansion increased capacity and added sludge holding tanks. Today approximately 3.5 mgd of flows are treated and disinfected (UV) before being released into Floyds Fork.

- **Hite Creek WQTC**: The Hite Creek WQTC was originally constructed in 1970 with a capacity of 2.2 mgd to serve the Ford truck assembly plant and its surrounding neighborhoods. The capacity of the treatment center was expanded to 6.6 mgd to eliminate sanitary sewer overflows upstream of the treatment center and allow for future growth. The WQTC is under construction to expand its capacity to 9 mgd ADF and 24 mgd peak flow. Construction is scheduled for completion in FY22. Today approximately 4.4 mgd of flows are treated and disinfected (UV) before being released into Hite Creek.

- **Morris Forman WQTC**: The Morris Forman WQTC was originally constructed in 1956 for preliminary and primary treatment and was referred to as the Fort Southworth Plant. It was designed to receive a maximum daily flow of 105 mgd and peak hour flow of 338 mgd. Secondary treatment facilities were installed in the 1970s in accordance with federal regulations. The plant was named after MSD's retired executive director. Plant upgrades in late 1990s and early 2000s improved performance and increased treatment capacity to its current level of 120 mgd with peak flow capacity of 350 mgd. Today approximately 100 mgd of flows are treated before being released into the Ohio River. The Morris Forman WQTC is the largest facility in Kentucky and treats over 70% of the wastewater generated in MSD's service area; including the entire combined sewered area.

- **Bells Lane WWTF**: The Bells Lane WWTF was brought online in 2017. The project converted an existing 105 mgd dry-pit pump station to a 160 mgd submersible pump station and added 1) screening and grit facilities; 2) 50 mgd high rate treatment basin to provide chemically-enhanced primary sedimentation; 3) disinfection/dechlorination; and 4) 25 MG equalization basin.

## 6.1 Service Area

As noted, MSD owns five WQTCs and one WWTF as shown in Figure 6-1.

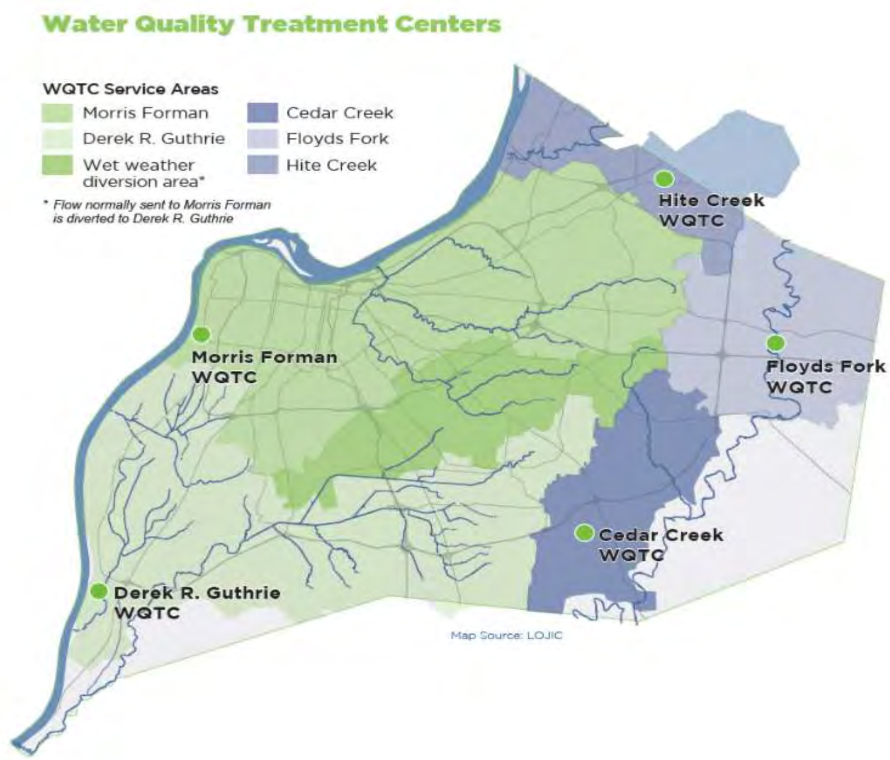


**Figure 6-1: MSD’s Water Quality Treatment Centers Service Areas**

## 6.2 Regulatory Requirements

The District is required to comply with the regulations listed in Table 6-1 related to wastewater treatment systems as referenced in the Kentucky Revised Statutes (KRS).

**Table 6-1: Federal and State Applicable Wastewater Treatment Regulations**

| Reference | Title | Description |
|---|---|---|
| **KRS 224.16-050** | Permits and Planned Changes | Establishes fees and procedures to obtain a permit and criteria for alterations or additions that must obtain a permit. |
| **KRS 224.70-130**<br>**401 KAR 5:080** | Criteria & Standards for KPDES | Establishes criteria and fees for permit to discharge into waters of the Commonwealth. |
| **401 KAR 5:005** | Permits to construct, modify or operate a facility | Establishes when permits are required for construction, of sewer line extensions, WQTC improvements, or new discharges & defines application submittals and fees. |

| Reference | Title | Description |
|---|---|---|
| **401 KAR 5:006** | Wastewater Regional Planning Requirements | Defines requirements for Regional Facility Plan to construct new WQTC, expand existing WQTC by 30%, or serve 30% more of the population. |
| **401 KAR 5:010<br>401 KAR 11:030<br>KRS 224.73-110** | Operation of Wastewater Systems by Certified Operators | Establishes requirements for certification of domestic wastewater treatment plant and collection system operations staff. Specifies Operator in Training Program requirements. |
| **401 KAR 5:015** | Releases to be Reported | Establishes reporting requirements for certain releases, spills, and bypasses of pollutants into the environment. |
| **401 KAR 5:026** | Designated Uses of Surface Waters | Establishes surface water designations of creeks and rivers and the associated water quality criteria. |
| **401 KAR 5:029<br>401 KAR 5:031<br>401 KAR 10:030** | Antidegradation Policy Surface Water Standards | Establishes water quality criteria. |
| **401 KAR 5:035<br>401 KAR 5:045<br>401 KAR 5:060** | Treatment Requirements and Compliance | Establishes minimum treatment requirements for domestic wastewater facilities and associated water quality sampling frequency. |
| **401 KAR 5:065<br>KRS 224.99-010** | Monitoring & Records | Establishes information retainage requirements for monitoring and performance records. |
| **401 KAR 5:055<br>KRS 224.70-110<br>40 CFR Part 403** | Pretreatment Requirements | Establishes pretreatment requirements as part of the Kentucky Pollutant Discharge Elimination System (KPDES). Provides for the protection of domestic wastewater facilities from pass through or interference from pollutants contributed by industrial users of the domestic wastewater facility. |
| **401 KAR 5:320** | Wastewater Laboratory Certification Program | Defines the minimum laboratory quality assurance, methodological and reporting requirements. |
| **KRS 224.73-120** | Monitor/Report Introduction of Incompatible Pollutants | Authorizes application of monitoring, record keeping, and reporting requirements of pollutants which interfere with, pass through, or are otherwise incompatible with WQTC. |
| **401 KAR 45<br>40 CFR 503** | Sludge Disposal | Establishes procedures and requirements for disposal of biosolids. |
| **401 KAR 52:020** | Title V Air Permits | Establishes requirements for air contaminant sources located in Kentucky that are required to obtain a Title V permit. |

### 6.2.1 Metro Government Local Ordinances Related to Wastewater Treatment

MSD is required to comply with the following local regulations related to the wastewater treatment:

- **Engineering Standards**. Louisville and Jefferson County MSD Design Manual.

### 6.2.2 Morris Forman WQTC Agreed Order

The Morris Forman WQTC experienced multiple non-compliance events due in part to 1)a lightning strike and 2) accelerated deterioration of the biosolids system. MSD is working with the KDEP to develop/execute a Corrective Action Plan (CAP) to address the deficiencies at the plant that are contributing or have the potential to contribute to permit exceedances. The projects included in the 5-Year CIP that have been suggested as candidates for the CAP are listed in Table 6-2.

**Table 6-2: MFWQTC Projects Under Agreed Order CAP Consideration**

| MFWQTC Treatment Process | Morris Forman Agreed Order Projects | Estimated Completion Date |
|---|---|---|
| Primary Treatment | D17042 \| MFWQTC Sedimentation Basin Rehabilitation | June 30, 2024 |
| | D19227 \| MFWQTC Primary Sludge Line Replacement | July 31, 2020 |
| | New_BD096 \| MFWQTC Primary Sludge Line Replacement Phase 2 | June 30, 2022 |
| Secondary Treatment | D18160 \| MFWQTC Secondary Clarifiers Structural Repairs | June 30, 2024 |
| | D20229 \| MFWQTC Clarifier Floor Repairs | January 31, 2021 |
| Disinfection | D18159 \| MFWQTC HPO Tanks Structural Repairs | June 30, 2024 |
| | D18161 \| MFWQTC Chlorine Contact Tanks Structural Repairs | June 30, 2024 |
| Final Effluent Pump Station (FEPS) | D18130 \| MFWQTC FEPS MCC Replacement | June 30, 2021 |
| | D18162 \| MFWQTC FEPS Structural Repairs | June 30, 2024 |
| | D19307 \| MFWQTC FEPS VFD Replacement | Sept 30, 2020 |
| | Multiple \| MFWQTC FEPS Pump and Motor Repair | June 30, 2024 |
| Biosolids | D18158 \| MFWQTC Digester Control Building Structural Repairs | June 30, 2024 |
| | D19045 \| MFWQTC Sodium Hypochlorite Building Relocation | Dec 31, 2022 |
| | D20228 \| MFWQTC Centrifuge Replacement/Rehabilitation | August 31, 2020 |
| | D20285 \| MFWQTC LG Dryer Replacements | November 5, 2021 |
| | D20284 \| DRGWQTC Dewatering | October 5, 2021 |
| | D20249 \| District-Wide Biosolids Master Plan | Completed |
| | H14126 \| HCWQTC Dewatering Improvements | January 21, 2022 |
| | D20291 \| DRGWQTC Phase 1 Dewatering | January 4, 2021 |
| Other | New_BD106 \| MFWQTC Asset Management Plan | Dec 31, 2021 |
| Electrical | D18156 \| MFWQTC Service & Blower Building Structural Repairs | June 30, 2022 |
| | D20167 \| MFWQTC East Headworks HVAC | October 29, 2020 |

## 6.3 WQTC Performance

The primary driver for capital improvements at the WQTCs is having the ability to reliably comply with permitted requirements. The following information summarizes the performance of MSD's WQTCs.

### 6.3.1 WQTC Permitted Capacity

MSD's active WQTC permits are listed in Table 6-3. The Morris Forman WQTC has been operating under the 2004 KPDES permit via an Administrative Order. All other WQTC permits have been updated.

**Table 6-3: Water Quality Treatment Center Capacities**

| WQTC Facility | Average Day Capacity (MGD) | Peak Hour Capacity (MGD) | KPDES Permit Number | Permit Expiration Date | Receiving Water |
|---|---|---|---|---|---|
| Cedar Creek WQTC | 7.5 | N/A | KY0098540 | August 31, 2020* | Cedar Creek |
| Derek R. Guthrie WQTC | 60 | 300 | KY0078956 | April 30, 2023 | Ohio River |
| Floyds Fork WQTC | 6.5 | N/A | KY0102784 | August 31, 2020* | Floyds Fork |
| Hite Creek WQTC | 6 | 16 | KY0022420 | March 31, 2023 | Hite Creek |
| Morris Forman WQTC | 120 | 350 | KY0022411 | September 30, 2004 | Ohio River |
| **Total** | **200** | **666** | | | |

*MSD submitted permit renewal applications for the Cedar Creek WQTC and Floyds Fork WQTC to KDEP on March 31, 2020. Both submittals have been approved as administrative complete by the Division of Water.

### 6.3.2 WQTC Permitted Effluent Quality

All five wastewater plants use similar treatment processes to meet the discharge requirements established for the waterways adjacent to each WQTC. The effluent requirements are presented in Table 6-4.

**Table 6-4: WQTCs Permitted Effluent Limitations**

| Parameter | CCWQTC | | DRGWQTC | | FFWQTC | | HCWQTC | | MFWQTC | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Monthly Average | Max Week Avg | Monthly Average | Max Week Avg | Monthly Average | Max Week Avg | Monthly Average | Max Week Avg | Monthly Average | Max Week Avg |
| $CBOD_5$, mg/L | 10 | 15 | N/A | N/A | 6 | 9 | N/A | N/A | N/A | N/A |
| $BOD_5$, mg/L | N/A | N/A | 30 | 45 | N/A | N/A | 10 | 15 | 30 | 45 |
| TSS, mg/L | 30 | 45 | 30 | 45 | 30 | 45 | 30 | 45 | 30 | 45 |
| Ammonia, mg/L May-Oct | 4 | 6 | 20 | 30 | 1 | 1.5 | 2 | 3 | 20 | 30 |
| Ammonia, mg/L Nov-Apr | 10 | 15 | 20 | 30 | 3 | 4.5 | 5 | 7.5 | 20 | 30 |
| E. Coli, #/100 ml[1] | 130 | 240 | 130 | 240 | 130 | 240 | N/A | N/A | N/A | N/A |
| Total Phos. mg/L, May-Oct | 1.0 | 1.5 | N/A | N/A | 0.5 | 0.75 | 1.0 | 1.5 | N/A | N/A |
| Total Phos. mg/L, Nov-Apr | 2.0 | 3.0 | N/A | N/A | 0.5 | 0.75 | 2.0 | 3.0 | N/A | N/A |
| Total Residual Chlorine, mg/L | N/A | N/A | 0.019 | 0.019 | N/A | N/A | N/A | N/A | N/A | 0.019 |
| Fecal Coliform #/100 | N/A | N/A | N/A | N/A | N/A | N/A | 200 | 400 | 200 | 400 |

1. *Expressed as 30-day geometric mean and 7-day geometric mean*
2. *pH limits are 6.0 minimum and 9.0 maximum*

### 6.3.3 Historical Wastewater Flows

The amount of flow processed at the WQTCs is dependent upon the volume of stormwater entering the combined sewer system. Over the past five years, MSD has processed an average of 150 mgd collectively through all the WQTCs. MSD treated more than 281 billion gallons of flow during 2015-2019.

**Table 6-5: Historical Wastewater Flows**

| WQTC | 2015 Flow | | 2016 Flow | | 2017 Flow | | 2018 Flow | | 2019 Flow | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Monthly Average (mgd) | Total Flow Treated (MG) | Monthly Average (mgd) | Total Flow Treated (MG) | Monthly Average (mgd) | Total Flow Treated (MG) | Monthly Average (mgd) | Total Flow Treated (MG) | Monthly Average (mgd) | Total Flow Treated (MG) |
| CCWQTC | 4.4 | 1,477 | 5.2 | 1,896 | 5.2 | 1,899 | 6.4 | 2,332 | 7.0 | 2,562 |
| DRGWQTC | 42.3 | 15,482 | 35.0 | 12,758 | 35.4 | 13,048 | 49.5 | 17,946 | 46.0 | 16,698 |
| FFWQTC | 2.9 | 1,069 | 3.1 | 1,112 | 3.2 | 1,179 | 4.1 | 1,473 | 4.6 | 1,673 |
| HCWQTC | 4.8 | 1,552 | 4.8 | 1,773 | 4.4 | 1,587 | 4.7 | 1,701 | 4.6 | 1,655 |
| MFWQTC | 99.8 | 36,471 | 90.1 | 32,908 | 87.6 | 31,937 | 113.1 | 40,948 | 106.4 | 38,002 |
| | **154.2** | **56,052** | **138.2** | **50,446** | **135.8** | **49,650** | **177.8** | **64,399** | **168.6** | **60,590** |

*Values represent calendar years (not fiscal years) taken from Discharge Monitoring Reports submitted to KDEP.*

The impact of weather on the collective total WQTC flows is demonstrated in Figure 6-2. Daily maximum flows can be 2.5 times higher than the monthly average flow.

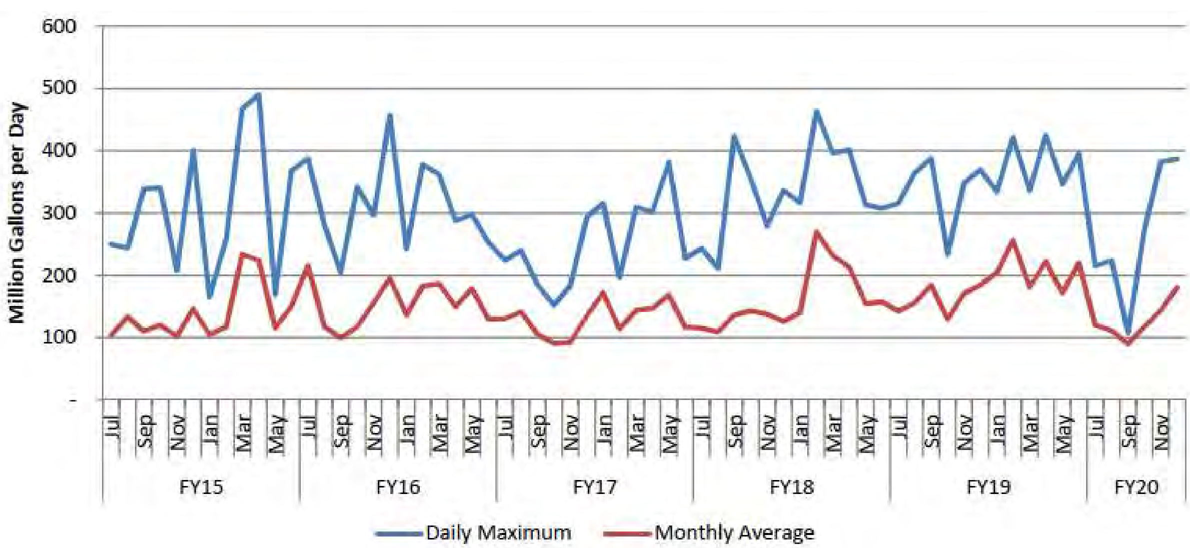


**Figure 6-2: Historical Collective Flows from All WQTCs**

Given the Derek R. Guthrie and Morris Forman WQTCs receive flow from the combined sewer system, they are most susceptible to high peak flows due to wet weather. The "wet season" impact is more clearly demonstrated for the Morris Forman WQTC in Figure 6-3.

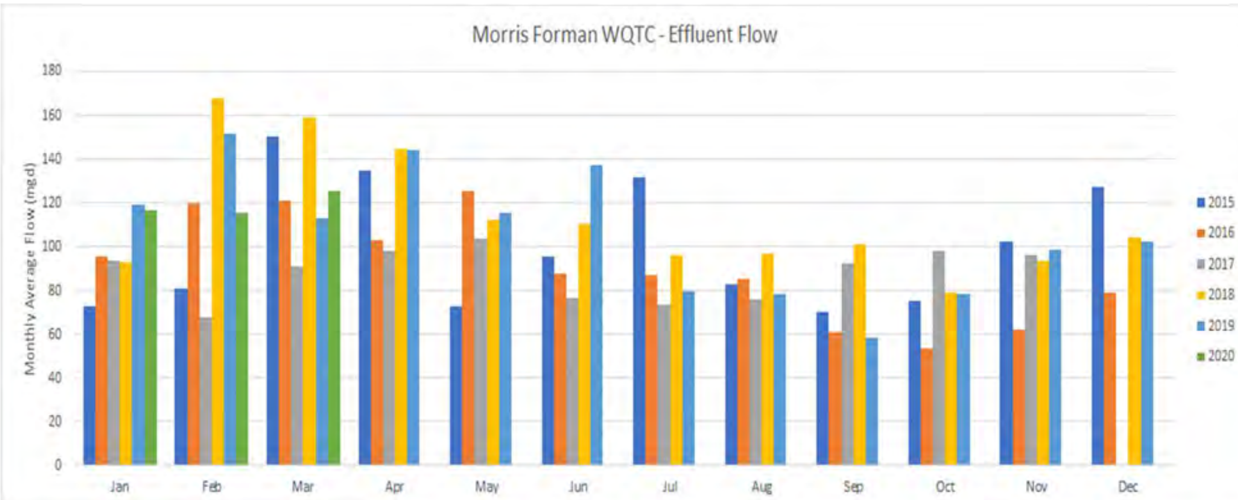


**Figure 6-3: Comparison of Monthly Flow from 2015 – 2020 for Morris Forman WQTC**

### 6.3.4 Historical Wastewater Loads

As shown in Table 6-6, excluding the Morris Forman WQTC, MSD has successfully met permit conditions for its WQTCs. In September 2018, there was an exceedance of the maximum weekly average BOD concentration.

**Table 6-6: Historical Wastewater Loads – Annual Average BOD**

| WQTC | Permit Limits (Monthly Average, Max Weekly Average) | 2015 BOD | | 2016 BOD | | 2017 BOD | | 2018 BOD | | 2019 BOD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Monthly Average (mg/L) | Max Weekly Average (mg/L) | Monthly Average (mg/L) | Max Weekly Average (mg/L) | Monthly Average (mg/L) | Max Weekly Average (mg/L) | Monthly Average (mg/L) | Max Weekly Average (mg/L) | Monthly Average (mg/L) | Max Weekly Average (mg/L) |
| CCWQTC | (10 mg/L, 15 mg/L) | 2.7 | 6 | 2.6 | 5 | 2.8 | 5 | 2.9 | 10 | 3.0 | 6 |
| DRGWQTC | (30 mg/L, 45 mg/L) | 10.3 | 24 | 8.4 | 17 | 11.2 | 23 | 13.0 | 25 | 11.3 | 27 |
| FFWQTC | (6 mg/L, 9 mg/L) | 2.8 | 7 | 2.7 | 5 | 3.6 | 7 | 3.5 | **21** | 3.0 | 7 |
| HCWQTC | (10 mg/L, 15 mg/L) | 3.3 | 6 | 5.3 | 12 | 6.0 | 12 | 6.1 | 15 | 5.8 | 11 |
| MFWQTC | (30 mg/L, 45 mg/L) | **31.3** | **140** | **36** | **126** | **34** | **107** | **54** | **194** | **61** | **201** |
| | | **50.4** | **183** | **54.8** | **165** | **57.4** | **154** | **79.4** | **265** | **84.0** | **252** |

*Exceedances are shown in red.*

As noted in Table 6-6, the Morris Forman WQTC has continued to experience permit exceedances for BOD and TSS since the 2014 lightning strike incident. The primary reason for these exceedances is failure of biosolids equipment (dryers, centrifuges, etc) which limited the plant's ability to reduce these pollutants. A historical perspective of effluent BOD for the Morris Forman WQTC is presented in Figure 6-4.

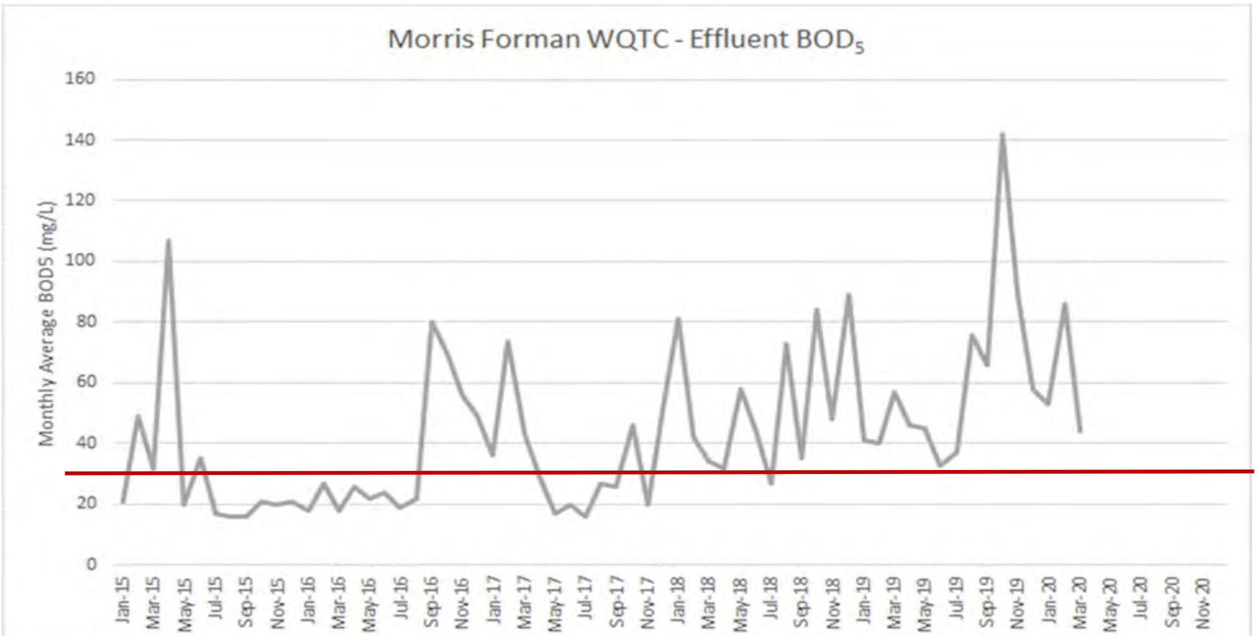


**Figure 6-4: Effluent Quality from Morris Forman WQTC**

## 6.4 Wastewater Treatment Programs

Most of MSD's investment at the wastewater treatment plants has been for asset management needs resulting from aging and deteriorating assets. In addition to asset management needs, MSD is in the process for addressing biosolids facilities and expanding one WQTC.

### 6.4.1 District-Wide Biosolids Management

The Morris Forman Water WQTC processes, markets (Louisville Green), and disposes of biosolids generated from all of MSD 's wastewater treatment facilities. The existing dewatering and drying equipment have reached the end of their useful life. Replacement of the biosolids infrastructure with a modern facility has been reviewed by two independent consulting engineers. MSD is ready to proceed with design-build procurement for the $198M project.

Due to the cost of the project, in 2018 MSD submitted a Letter of Interest to USEPA's Water Infrastructure Finance and Innovation Act Program (WIFIA) to request participation in a low-interest loan program for the

Morris Forman New Biosolids Facility. The project was accepted and the WIFIA loan closing date is scheduled for the summer of 2020.

In the meantime, the biosolids facilities have continued to deteriorate at an escalated rate. This has resulted in a situation in which MSD is able to process only 35% of the biosolids. In turn, the Morris Forman WQTC effluent permit limits for total dissolved solids (TSS) and biochemical oxygen demand ($BOD_5$) are not consistently met. In order to meet effluent permit water quality, MSD needs to process fewer biosolids at the Morris Forman WQTC. This challenge will continue until the new Biosolids Facility is operational in approximately five years.

In 2019, MSD commissioned Black & Veatch to prepare a District-Wide Biosolids Master Plan. The Master Plan confirmed the new Biosolids Facility to be constructed via the WIFIA loan program is the recommended long-term solution. The Master Plan identified short-term improvements that would help MSD achieve permit compliance and support construction of the new facility. The short-term improvements include replacing outdated equipment at Morris Forman (centrifuges and dryers) and offloading regional biosolids. All six centrifuges were sent to the manufacturer for refurbishment in a phased approach. An emergency certification project was issued in 2019 to replace the Morris Forman dryers.

To sufficiently offload regional biosolids from the Morris Forman WQTC, the Biosolids Master Plan recommended MSD construct dewatering facilities for the regional WQTCs. This approach will significantly increase MSD's reliability for processing biosolids. Staff and Black & Veatch confirmed the Derek R. Guthrie WQTC has adequate space to accommodate construction and operation of a regional dewatering facility. An emergency certification project was issued in 2019 to expedite off-loading the regional biosolids from Morris Forman by constructing a dewatering facility at the Derek R. Guthrie WQTC.

Brief descriptions of the major biosolids projects included in the 5-Year CIP are listed below.

- **New Biosolids Facility ($198M)**: This project will construct a modern biosolids processing facility at the Morris Forman WQTC that utilizes a thermal hydrolysis process (THP) to create a useable biogas. Benefits of the new facility include improved effluent quality; production of 4 MW of power; decreased consumption of natural gas; and reduced landfill utilization capacity.

- **Drying of Morris Forman WQTC Biosolids ($48M):** The dryers at the Morris Forman WQTC have been systematically failing over the past few years. In 2019, the last dryer failed and significantly impaired MSD's ability to process biosolids. Under an emergency certification, MSD is demolishing the outdated drying systems and replacing them with two state-of-the art dryers. This investment will ensure continuous biosolids processing during construction of the new Biosolids Facility and will provide added future system reliability. Additionally, the dryers will remain part of the biosolids management strategy going forward. Construction began in 2019 and will be fully completed in 2022.

- **Dewatering of Regional Biosolids ($50M):** Under an emergency certification, MSD is constructing a dewatering facility at the Derek R. Guthrie WQTC to process biosolids from all the regional WQTCs. The project includes an interim and permanent solution so regional biosolids could be immediately off-loaded from the Morris Forman WQTC. The dewatered biosolids are being landfilled in lieu of being pumped/hauled to the Morris Forman WQTC. Construction began in 2019 and will be fully completed in 2022. Regional biosolids were offloaded from the Morris Forman WQTC in February 2020.

#### 6.4.2 WQTC Expansions

The only facility currently undergoing a plant expansion is the Hite Creek WQTC. The Hite Creek WQTC Expansion Project will increase the plant capacity from 6.0 to 9.0 mgd average daily flow. The increase in capacity will reduce sanitary sewer overflows upstream of the facility and allow for future growth demands. Rehabilitation at the facility will include the replacement of bar screens, existing ultraviolet system, and sludge holding tank blowers. The addition of aeration capacity/nutrient removal, aeration tank blower expansion and new tertiary disc filtration will increase treatment capacity. This project will provide the ability to dewater sludge on-site, thus eliminating over 400 truckloads of sludge per month being trucked to the Morris Forman WQTC.

#### 6.4.3 Planning Initiatives

The 5-year CIP includes the following planning initiatives related to the WQTCs. These plans will be utilized to implement a comprehensive asset management program, prioritize capital needs, and update the CRRP.

- Bells Lane Asset Management Plan, $330,000
- CCWQTC Asset Management Plan, $330,000
- Comprehensive Facility Plan – Five Year Update, $450,000
- DRGWQTC Asset Management Plan, $530,000
- FFWQTC Asset Management Plan, $320,000
- Floyds Fork Regional Facilities Plan Update, $300,000
- HCWQTC Asset Management Plan, $500,000
- High Strength Waste Market Evaluation, $260,000
- MFWQTC Asset Management Plan, $1.5 million
- Odor Management Plan, $250,000
- SCADA Master Plan, $796,000

## 6.5 Wastewater Treatment Capital Projects

MSD continues to fund wastewater treatment projects with its annual CIP. Projects are generally a combination of discrete local improvements and appropriations for as-needed asset replacements.

### 6.5.1 Projects Funded from Program Notes

The two largest wastewater treatment projects completed since the last bond issuance are 1) the Bells Lane Wet Weather Treatment Facility and 2) expansion of the Hite Creek WQTC. A list of representative projects is provided in Table 6-7.

**Table 6-7: WQTC Projects Completing Design/Construction Since 2017**

| Facility | Budget ID | Project | Task Name | Finish | Lifetime Actuals |
|---|---|---|---|---|---|
| **Bells Lane WWTF** | D20222 | Bells Lane Grit Classifier Drain Line | Design Finish | 12/5/2019 | $3,871 |
| | H09124 | Bells Lane Wet Weather Treatment Facility | Construction Finish | 7/31/2018 | $51,760,788 |
| | H18333 | Bells Lane WWTF EQ Basin Modifications | Construction Finish | 11/28/2018 | $3,448,992 |
| **Cedar Creek WQTC** | D19038 | CCWQTC Hydraulics Study | Study Finish | 2/22/2019 | $54,590 |
| | D16272 | CCWQTC Influent PS MCC Upgrades | Design Finish | 2/20/2020 | $180,028 |
| | D19268 | CCWQTC Safety Items | Construction Finish | 12/5/2018 | $16,451 |
| | D19248 | CCWQTC Solids Study | Study Finish | 2/28/2019 | $34,711 |
| **Derek R. Guthrie WQTC** | D18292 | DRGWQTC Clarifier Grout Repair and RAS Gate Replacement | Design Finish | 8/14/2019 | $318,113 |
| | F14156 | DRGWQTC RAS 1 and 4 Pump Replacement | Construction Finish | 3/6/2019 | $1,502,673 |
| | D18225 | DRGWQTC WWPS Finite Element Analysis | Study Finish | 7/27/2018 | $40,663 |
| **Floyds Fork** | D20227 | FFWQTC Filter Evaluation | Study Finish | 3/13/2020 | $19,350 |
| **Hite Creek** | H14126 | HCWQTC Expansion | Design Finish | 6/11/2019 | $6,540,474 |
| **Morris Forman WQTC** | D15020 | MFWQTC Cake Pump Phase II | Design Finish | 8/1/2019 | $296,471 |
| | D20167 | MFWQTC East Headworks HVAC | Design Finish | 10/17/2019 | $101,900 |
| | F14182 | MFWQTC FEPS Pump Repair and Motor | Construction Finish | 9/30/2019 | $148,077 |
| | D19046 | MFWQTC Ground Water Well 10 Replacement | Construction Finish | 3/6/2020 | $178,428 |
| | D19227 | MFWQTC Primary Sludge Line Replacement | Design Finish | 4/30/2019 | $663,835 |
| | D19044 | MFWQTC Primary Sludge Pump Compressor | Construction Finish | 5/31/2019 | $83,498 |
| | D18129 | MFWQTC Secondary Electrical MCC Replacement Study | Study Finish | 1/31/2019 | $54,920 |
| | D18118 | MFWQTC Truck Unloading Station Pavement Repair | Design Finish | 10/10/2019 | $59,714 |
| | | | | **TOTAL WQTC PROJECTS** | **$65,507,546** |

### 6.5.2 5-Year CIP for Wastewater Treatment System

MSD will continue spending on the biosolids emergency certification projects started in 2019 and completing in 2022. The majority of the 5-Year CIP related to biosolids is for the New Biosolids Facility to be located at the Morris Forman WQTC. Additional placeholder projects have been added to incorporate dewatering processes at the Cedar Creek and Floyds Fork WQTCs.

Annual capital investments are required to mitigate operator safety risks; maintain reliable system operations; and upgrade to new more energy efficient technologies. During the 5-year CIP, the following WQTC projects totaling $104 million will be partially or wholly budgeted for the regional WQTCs.

**Table 6-8: Overview of 5-Year Forecasted Spending for Regional WQTCs**

| Wastewater Treatment Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Bells Lane Wet Weather Facility** | Bells Lane Grit System Improvements | **Bells Lane $1.4 million** |
| | Bells Lane WWTF Chemical Feed System Improvements | |
| | Bells Lane WWTF General R&R | |
| **Cedar Creek WQTC** | CCWQTC Admin Building Expansion & Painting | **CCWQTC $17.4 million** |
| | CCWQTC Power & MCC Upgrades | |
| | CCWQTC Oxidation Ditch Mods | |
| | CCWQTC Chemical Feed System Improvements | |
| | CCWQTC Effluent Parshall Flume Upgrade | |
| | CCWQTC Tertiary Filtration | |
| | CCWQTC WAS Improvements & Dewatering Facility | |
| | CCWQTC Expansion Project | |
| | CCWQTC General R&R | |
| **Derek R. Guthrie WQTC** | DRGWQTC Artificial Intelligence Pilot | **DRGWQTC $47.5 million** |
| | DRGWQTC Clarifier Replacements & Grout Repair | |
| | DRGWQTC Disinfection Upgrades | |
| | DRGWQTC Substation U-13 Modifications | |
| | DRGWQTC Alternate Outfall | |
| | DRGWQTC Dewatering Facility | |
| | DRGWQTC General R&R | |
| **Floyds Fork WQTC** | FFWQTC Chemical Feed System Improvements | **FFWQTC $3.5 million** |
| | FFWQTC Dewatering Facility | |
| | FFWQTC General R&R | |
| | FFWQTC Enhanced Biological Phosphorous Removal Study | |
| **Hite Creek WQTC** | HCWQTC Chemical Feed System Improvements | **HCWQTC $21.9 million** |
| | HCWQTC General R&R | |

| Wastewater Treatment Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| | HCWQTC Expansion Project | |
| General WQTCs | WQTC Elevator Repairs | $12.6 million |
| | WQTC General R&R/ | |
| | Total 5-Year CIP Forecast for Regional WQTCs | $104.3 million |

The following projects totaling $245 million are forecasted for the Morris Forman WQTC in the 5-Year CIP. The largest project is replacement of the biosolids facility.

Table 6-9: Overview of 5-Year Forecasted Spending for Morris Forman WQTC

| Treatment Process | Morris Forman WQTC Priorities | 5-Year CIP Forecasted Spending |
|---|---|---|
| Primary Treatment | MFWQTC Sedimentation Basin Rehabilitation* | $4.4 million |
| | MFWQTC Primary Sludge Line Replacement* | |
| | MFWQTC Primary Sludge Line Replacement Phase 2* | |
| | MFWQTC Daft Rehab & TWAS Piping Replacement | |
| | MFWQTC Primary Sludge Pump Station Structural Repairs | |
| Secondary Treatment | MFWQTC Secondary Clarifiers Structural Repairs* | $0.3 million |
| | MFWQTC Clarifier Floor Repairs* | |
| Disinfection | MFWQTC HPO Tanks Structural Repairs* | $0.5 million |
| | MFWQTC Chlorine Contact Tanks Structural Repairs* | |
| Final Effluent Pump Station (FEPS) | MFWQTC FEPS MCC Replacement* | $1.7 million |
| | MFWQTC FEPS Structural Repairs* | |
| | MFWQTC FEPS VFD Replacement* | |
| | MFWQTC FEPS Pump and Motor Repair* | |
| Biosolids | MFWQTC Digester Control Building Structural Repairs* | $206.3 million |
| | MFWQTC Sodium Hypochlorite Building Relocation* | |
| | MFWQTC Centrifuge Replacement/Rehabilitation* | |
| | MFWQTC LG Dryer Replacements* | |
| | MFWQTC New Biosolids Facility | |
| | MFWQTC Cake Pump Phase 2 | |
| Other | MFWQTC General R&R | $30.9 million |
| | MFWQTC Radio Repeater | |
| | MFWQTC Sewer and Manhole Rehabilitation | |
| | MFWQTC OGA PTO & Chlorine Rail Car Demolition | |

| Treatment Process | Morris Forman WQTC Priorities | 5-Year CIP Forecasted Spending |
|---|---|---|
| | MFWQTC Process Water Pump & VFD | |
| | MFWQTC Facility Repairs | |
| | MFWQTC Service & Blower Building Structural Repairs* | |
| **Electrical** | MFWQTC Chiller Replacement | **$1.5 million** |
| | MFWQTC Upgrade PLCs | |
| | MFWQTC East Headworks HVAC* | |
| | **Total 5-Year CIP Forecast for Morris Forman WQTC** | **$245.6 million** |

*project under consideration as part of the Agreed Order CAP.

# 7. Support Systems

MSD owns a large inventory of rolling stock, information technology systems, and above-ground facilities that support MSD's operation of wastewater, stormwater, and flood protection systems. This equipment is critical to MSD's ability to complete preventative and corrective maintenance activities required to provide sustainable and reliable wastewater, stormwater, and flood protection services.

MSD maintains an extensive inventory of IT hardware and software that is essential to overall agency operations. This includes the MSD intranet system that is the backbone of electronic communication and digital data generation, communication and storage, and regulatory reporting. This hardware and software are responsible for supplying the internet connection to MSD's Supervisory control and data acquisition (SCADA) system that controls more than 300 pump stations and control gates. This equipment is subject to periodic upgrade and replacement - like other MSD assets. The CRRP included projects and appropriations for upgrading MSD's facilities, fleet, and IT systems.

## 7.1 Support Systems Capital Projects

The CRRP recommended a series of corrective actions following comprehensive condition assessments of more than 200 buildings. MSD continues to address facility needs with each annual CIP. Projects are created as a need become known. MSD also includes as-needed appropriations into the annual CIP that address the following types of needs:

- HVAC Systems
- Roof Inspections, Repairs, and Replacement
- Paving Improvements
- Security Upgrades
- Information Technology (IT) Hardware & Software
- Fleet and Large Equipment

### 7.1.1 Projects Funded from Program Notes

A summary of the facility-type projects completed since the last bond issuance is presented in Table 7-1.

**Table 7-1: Facilities Projects Completing Design/Construction Since 2017**

| Program | Budget ID | Project | Task Name | Finish | Lifetime Actuals |
|---|---|---|---|---|---|
| **Building Improvements** | N16071 | Main Office Data Center Reconfiguration | Construction Finish | 3/18/2020 | $10,191 |
| | G17027 | CMF Roof | Construction Finish | 11/27/2019 | $3,321,990 |
| | G18303 | CMF Cooling Tower | Construction Finish | 5/24/2019 | $436,965 |
| | G09535 | CMF Parking Surface | Design Finish | 12/11/2018 | $157,209 |
| | | | | **Total Facilities Projects** | **$3,926,355** |

### 7.1.2 5-Year CIP for Support Systems

During the 5-year CIP, improvements will continue to be phased for MSD's existing buildings including but not limited to: elevator upgrades, roof replacements, paving, and security enhancements. IT budgets will continue to be requested annually for assets related to system reconfiguration, cable management, network server upgrades, network switch replacements, desktop computers, and software programs needed to better manage MSD's assets and systems. Capital equipment budgets for updating MSD's fleet vehicles, heavy construction equipment, and portable equipment used by multiple working groups will be vetted annually. During the 5-year CIP, the following facilities improvement projects will be partially or wholly budgeted.

**Table 7-2: Overview of 5-Year Forecasted Spending for Facilities**

| Facilities Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Facilities Improvements** | Building Improvements | **$17.1 million** |
| | Paving Improvements | |
| | Security Enhancements | |
| | Roof Inspections, Repairs and Replacements | |
| **Information Technology** | Hardware Related Projects | **$16.7 million** |
| | Software Related Projects | |
| **Equipment** | Fleet Vehicles | **$14.1 million** |
| | Large Equipment | |
| | **Total 5-Year CIP Forecast for Facilities** | **$47.9 million** |

## 7.2 Support Services

Implementing a capital program of this size and complexity requires support services. Support services are generally contracted resources that provide specialized expertise; address program specific deliverables; supplement field staff; or support MSD staff as-needed. The following types capital support appropriations are included in the 5-year CIP.

- CIP Task Assistance
- Construction Inspection
- Emergency Preparedness Plan
- FOG Program Support
- Hydraulic Modeling
- WQTC Engineering Support

# 8. Regionalization & Economic Development

Economic development and expanding the area MSD provides utility services are opportunities for 1) generating additional revenue, 2) optimizing regional resources, and 3) further improving local water quality.

## 8.1 Jefferson County Development

Portions of Jefferson County remain unsewered. Over the past ten years, MSD has extended sewer service to many areas and eliminated hundreds of small package treatment plants and more than 40,000 septic tanks. The primary driver for eliminating these systems is to improve water quality of local rivers, creeks, and streams.

### 8.1.1 5-Year CIP for Development Program

Current development patterns suggest private investment is picking up in the Floyds Fork sewershed. MSD continues to coordinate with developers to streamline how to incorporate new assets and additional flows into its existing sewer network. It is important to coordinate these new developments to ensure consistency of construction and reliable service.

The CRRP recommended projects to ensure adequate conveyance and treatment capacity is available in advance of development and population growth. This program is particularly important for preventing a situation in which community development initiatives face moratoriums due to capacity constraints at the WQTCs. The development program includes a combination of phased WQTC capacity upgrades and under capacity sewers and pump stations. The following development related projects have been partially or fully budgeted in MSD’s 5-year CIP.

- Cedar Creek Collection Systems
- Floyds Fork Collection Systems
- Floyds Fork Interceptor
- Fairmount Road Force Main Pump Station Improvements
- As-Needed Development Coordination

## 8.2 Regionalization to Adjacent Counties

The CRRP also identified potential regionalization corridors where MSD can further extend sewers to improve surface water quality and add new sewer customers. The CRRP recommended projects that included new interceptors, new gravity sewer collection systems, and a new treatment plant for accommodating future regionalization and/or growth.

In 2016, high profile failures of “package” treatment plants led to the passage of Kentucky House Joint Resolution 56, to initiate a study of regionalization opportunities to limit the risk of future failures. As a result of this Joint Resolution, a study was performed in 2017 to provide an inventory of small "package" facilities and emergency risk mitigation.

During the 2018 Legislative Session in Kentucky, Senate Bill 151 (SB151) was filed to enable utility ownership of sewer assets outside of jurisdictional boundaries through inter-local agreements. House Bill 513 (HB513) was filed to require additional insurance, as well as regulatory and financial accountability for small "package" treatment facility operators/builders. These two bills were combined and passed under HB513 and signed by the Governor on April 25, 2018.

This legislation has facilitated extending MSD's programmatic approach for eliminating package treatment plants beyond Jefferson County. During FY21 MSD will complete the Floyds Fork WQTC Regional Facilities Plan Update. This project will assist MSD with addressing how regionalization initiatives with Bullitt and Oldham Counties will interconnect with MSD's assets. Depending on the timing of system improvements needed in these areas for public health protection, capital projects required to interconnect with MSD's wastewater system may need to be accelerated to the 5-year CIP.

- **Bullitt County**: In 2019, Bullitt County Sanitation District and Bullitt County Fiscal Court requested a proposal from MSD for acquisition and regional solutions. This proposal is currently in the due diligence phase.

- **Oldham County**: The City of Crestwood lobbied for enabling legislation, to allow MSD to acquire their system. This was accomplished in early 2019. Subsequent to the Crestwood acquisition, Oldham County Environmental Authority and Oldham County Fiscal Court requested MSD to submit a proposal to acquire this system. This acquisition is scheduled to close on June 30, 2020.

### 8.2.1 Oldham County

MSD has worked with Oldham County staff to develop a preliminary 5-year CIP to address known and immediate system capital needs. The FY21 CIP includes $3.64 million for the following needs:

- Facility Plan Update
- Collection System Inspection, Cleaning, Rehab, Modeling
- Gravity Sewer & Pump Station Rehab/Repair
- Pump Station Eliminations & Interceptor Projects
- WQTC R&R & Eliminations
- SCADA System & Rain Gauge Expansion

During the 5-year CIP, the following Oldham County projects will be partially or wholly budgeted.

Table 8-1: Overview of 5-Year Forecasted Spending for Oldham County

| Oldham County Capital Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Collection System Sewer Improvements** | Sewer Inspection & Cleaning | **$5.9 million** |
| | Gravity Sewer Rehabilitation | |
| | Ash Avenue Interceptor | |
| | Collection System Modeling | |
| **Collection System Pump Station Improvements** | Pump Station R&R | **$4.5 million** |
| | Pump Elimination Project | |
| | SCADA System, Rain Gauge Expansion | |
| **WQTC Improvements** | WWTP Elimination Project | **$1.4 million** |
| | WQTC R&R | |
| **System-Wide** | Unplanned R&R | **$1.5 million** |
| | Facility Plan Update | |
| | **Total 5-Year CIP Forecast for Oldham County** | **$13.3 million** |

# 9. Conclusions

The Engineer provides the following conclusions related to MSD's sewer and drainage system.

#### 9.1.1 Wastewater Systems

- MSD is currently working to comply with mandates from Consent Orders issued by USEPA and KDEP related to unauthorized discharges from its wastewater system. MSD has met all required deadlines to-date and remains on schedule to complete the remaining Amended Consent Order requirements. To-date, MSD has spent $1.01 billion on Consent Decree projects of the total $1.5 billion estimate. MSD, USEPA, and KDEP are discussing a reprioritization schedule to complete the remaining work while addressing other higher system priorities.

- MSD certified completion of 38 CSO LTCP projects to date, 4 remain. Overflows to local waterways have been reduced by approximately 5 billion gallons per typical year. MSD certified completion of 48 SSO SSDP projects to date, 18 remain. SSOs have been reduced approximately 61% by location and approximately 70% by volume. MSD's wet weather storage systems are preventing nearly 2 billion gallons of sewer overflows from occurring by storing flow then sending it to treatment after storm events have passed.

- On May 3, 2018, MSD entered into an Agreed Order with KDEP addressing improvements necessary to recover from a mechanical failure due to a lightning strike resulting with a power outage at Morris Forman WQTC that occurred April 8, 2015. Extensive damage was experienced to the primary treatment, secondary treatment, and electrical systems causing the plant to be out of compliance with effluent discharge limits established in Permit KY0022411. MSD is working diligently to restore the Morris Forman WQTC to its full operational capacity. MSD invested $37 million in this facility since 2016 and developed a draft Corrective Action Plan (CAP) for additional improvement.

- MSD has operated the wastewater system for decades and is sufficiently organized and staffed to continue to operate, maintain, administer, and plan the wastewater infrastructure. In FY21 MSD will conduct a staffing evaluation to confirm sufficient positions and skill sets are in place or developed to operate and maintain the new assets being constructed under the Amended Consent Order.

- MSD is advancing multiple projects to improve District-wide biosolids management including constructing dewatering facilities at the regional WQTCs and building a new biosolids facility at the Morris Forman WQTC. These investments, while costly will enable MSD to meet KPDES permit requirements, improve efficiencies, and generate power.

- MSD is advancing some of the projects identified in the CRRP. Due to the Consent Decree mandates, many projects continue to be deferred. As such, emergencies are increasing in frequency and severity. MSD's annual CIP includes appropriations to address as-needed improvements related to repair, rehabilitation, or replacement of aging assets and emergencies.

### 9.1.2 Stormwater System

- The District through ILAs with the City of Louisville and Jefferson County assumed responsibility for stormwater management in 1987 for all of Jefferson County, except for the Cities of Anchorage, Jeffersontown, Shively, and St. Matthews. Those cities provide most of those services within their borders, and partner with MSD on other aspects including review of new development plans and water quality reporting.

- The District bills for stormwater services using equivalent service units (ESUs). The District currently has approximately 6,956,000 ESUs, in total, from residential, commercial, industrial, and city-owned properties.

- MSD maintains and operates its stormwater collection and transmission system in accordance with industry-standard best management practices. MSD has operated the stormwater system for decades and is sufficiently organized and staffed to continue to operate, maintain, administer, and plan the stormwater infrastructure.

- MSD is working on a comprehensive update to the Stormwater Drainage Master Plan which, after public participation and approvals by local governments, will be used by the District for implementing improvements and extensions to the existing drainage facilities. It is currently anticipated the first working draft of the Stormwater Drainage Master Plan will be published in 2025. Over the next few years, a significant effort will continue to inventory and document the condition of existing drainage system assets.

- MSD collects over 3 million individual water quality records each year. This monitoring program provides a detailed picture of the health of streams in Jefferson County. Monitoring results are summarized on an annual basis in the Stormwater MS4 Annual Report.

- MSD's Urban Reforestation Program plants 1,000 trees annually by working with local businesses, municipal organizations and neighborhood associations. The program replenishes and expands the tree canopy throughout Jefferson County. These trees redirect an average of 1.35 million gallons of stormwater away from the sewer system every year, which decreases sewer overflows into waterways.

- In 1988, MSD and the United States Geological Survey (USGS) began monitoring water quality and stream flow throughout the Jefferson County area. The Long-Term Monitoring Network has changed over the years and currently includes 27 monitoring sites. The monitoring sites were selected to represent streams in each of eleven watersheds. Each monitoring site is sampled four times per year and is analyzed for a variety of parameters including fertilizers, sediment, and metals.

#### 9.1.3 Flood Protection System

- MSD maintains and operates the flood protection system in accordance with industry-standard best management practices. MSD has operated the flood protection system for decades and is sufficiently organized and staffed to continue to operate, maintain, administer, and plan the Ohio River Flood Protection System infrastructure.

- MSD maintains a proactive maintenance program to assure the integrity of the levee and floodwall system. Worked performed using these funds includes: repair and/or replacement of trusses, sheeting, and closure walkways; corrugated metal pipe replacement; toe drain access repairs; trail repairs and unwanted vegetation removal; level gate repair or automation; painting; floodwall joint repair; and floodwall concrete sealing and surface crack repairs.

- MSD is actively engaged with the USACE to advance $167 million of improvements to improve the reliability of the flood protection system. These improvements will replace and update original equipment that was installed in the 1950s and 1970s. These projects were included in the CRRP. This partnership represents a significant investment with improving flood protection.

- The Paddy's Run Flood Protection Station Capacity Improvements Project is MSD's highest ranked capital priority to mitigate flood pump station public health protection risk. MSD completed an Alternatives Analysis for increasing the capacity of the station to 975 mgd. The CRRP recommended two equally important project phases for the Paddy's Run FPS. The first phase will improve the reliability of the existing Paddy's Run FPS (originally constructed in 1953) by removing, inspecting, and rehabilitating or replacing the station's existing pumps and motors to maintain the station's current total pumping capacity of 925 mgd. The reliability improvements will be implemented through the USACE Program. MSD must construct the capacity improvements project independent of the USACE project.

END OF REPORT

# 2021 Supplemental Engineer's Report for Sewer and Drainage System

## Louisville and Jefferson County Metropolitan Sewer District
## Sewer and Drainage Revenue Bonds, Program Notes

May 6, 2021

Project Name

| | |
|---|---|
| Project No: | Project Number |
| Document Title: | 2021 Supplemental Engineer's Report for Sewer and Drainage System |
| Revision: | Final |
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| 1 | 050521 | Client Review of Draft Report | LLP | SLY | DJ, BG | BG |
| 2 | 050621 | Final Report Submitted | LLP | SLY | BG | BG |

In preparing this report, Jacobs has relied upon certain historical and projected performance data provided by the Louisville and Jefferson County Metropolitan Sewer District (MSD). Jacobs has not independently verified the detailed accuracy of such data. Additionally, the cost estimates presented for the FY 2022 CIP projects appear to be reasonable for the work to be performed. The proposed FY 2022 CIP and the 5-Year CIP are technically sound and are in accordance with generally accepted engineering practice.


Leisha L. Pica

Leisha L. Pica
Professional Engineer No. 36104
May 6, 2021

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## Contents

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# Acronyms & Abbreviations

| | |
|---|---|
| AADF | Annual Average Daily Flow |
| ADF | Average Daily Flow |
| BG | Billions of Gallons |
| BMP | Best Management Practices |
| CAP | Corrective Action Plan |
| cBOD | Chemical Biochemical Oxygen Demand |
| CIP | Capital Improvement Plan |
| CMOM | Capacity, Management, Operation & Maintenance |
| CRRP | Critical Repair and Reinvestment Plan |
| CPE-CCP | Comprehensive Performance Evaluation – Composite Correction Plan |
| CRS | Community Rating System |
| CSO | Combined Sewer Overflow |
| DOJ | U.S Department of Justice |
| DRI | Drainage Response Initiative |
| ESU | Equivalent Service Unit |
| FEMA | Federal Emergency Management Agency |
| FM | Force Main |
| FOG | Fats, Oils and Grease |
| FPS | Flood Pump Station |
| FY | Fiscal Year |
| GI | Green Infrastructure |
| GIS | Geographical Information System |
| ILA | Interlocal Agreement |
| IOAP | Integrated Overflow Abatement Plan |
| IT | Information Technology |
| KDEP | Kentucky Department of Environmental Protection |
| LOJIC | Louisville Jefferson County Information Consortium |
| KPDES | Kentucky Pollution Discharge Elimination System |
| KRS | Kentucky Revised Statutes |
| lb/d | Pounds per Day |
| LF | Linear Feet |
| LTCP | Long Term Control Plan |
| mg/l | Milligram per Liter |
| MG | Millions of Gallons |
| MGD | Millions of Gallons per Day |
| mL | Milliliters |
| MS4 | Municipal Separate Storm Sewer System |
| MSD | Louisville & Jefferson County Metropolitan Sewer District |
| NMC | Nine Minimum Controls |

| | |
|---|---|
| NPDES | National Pollution Discharge Elimination System |
| ORFPS | Ohio River Flood Protection System |
| ORSANCO | Ohio River Valley Water Sanitation Commission |
| RTC | Real Time Control |
| SCADA | Supervisory Control and Data Acquisition |
| SCAP | Sewer Capacity Assurance Plan |
| SORP | Sewer Overflow Response Plan |
| SSDP | Sanitary Sewer Discharge Plan |
| SSO | Sanitary Sewer Overflow |
| THP | Thermal Hydrolysis Process |
| TMDL | Total Maximum Daily Load |
| TSS | Total Suspended Solids |
| USACE | United States Army Corps of Engineers |
| USEPA | United States Environmental Protection Agency |
| USGS | United States Geological Survey |
| UV | Ultraviolet Disinfection |
| WIFIA | Water Infrastructure Finance and Investment Act |
| WQTC | Water Quality Treatment Center |
| WWTF | Wet Weather Treatment Facility |
| WWTP | Wastewater Treatment Plant |

# 1. Introduction

This report was prepared in connection with the issuance by the Louisville and Jefferson County Metropolitan Sewer District (the "District" or "MSD") of its Commercial Paper Notes being issued in Subseries 2018A-1 and 2018A-2 with each series allowing for up to $250 million in Notes to be issued. The proceeds of the Commercial Paper Notes will be used to: (i) finance Project Costs of Eligible Projects, (ii) refinance, renew or refund Subordinate Program Notes (both Commercial Paper Notes and Direct Purchase Notes) issued under the Note Resolution and (iii) pay the costs of issuing the Commercial Paper Notes.

MSD utilizes a sewer and drainage system ("System"), which includes the collection, transmission, treatment and effluent disposal of wastewater; processing, management, and disposal of biosolids; the collection, transmission of stormwater within the City and adjacent areas; and operations and maintenance of the Ohio River flood protection system infrastructure. Also included in the sewer and drainage system are the existing properties and assets, real and personal, tangible and intangible, owned or operated by MSD that are used or useful for the aforementioned purposes and all properties and assets constructed or acquired as additions, improvements and betterments to the sewer and drainage system and extensions thereof.

Portions of MSD's sewer and drainage system have been in service since the late 1800's and have/are reaching the end of their useful life. MSD is implementing an industry-standard asset management program to coordinate repair and replacement of existing assets in a timely and cost-effective manner. Current work activities related to MSD's asset management program includes upgrading tools, training staff, determining asset condition, calculating remaining useful life, and developing protocols for prioritizing capital needs. In addition to improving existing assets, MSD is investing in new infrastructure in accordance with a federally mandated Consent Decree to address sewer overflows and unauthorized discharges.

This report (i) provides an overview of MSD's infrastructure, (ii) describes the Second Amendment to the Consent Decree, (iii) lists the projects to be funded by the Program Notes, and (iv) provides an overview of MSD's 5-year Capital Improvement Plan (CIP).

## 1.1 Purpose of the Program Notes

Program Notes were issued by the District to finance on a short-term basis capital additions and improvements to the System pending the permanent refinancing of the Program Notes by the issuance of the District's bonds under its General Bond Resolution. An overview of the additions/improvements financed over the next five years is provided in Table 1-1. More details regarding specific projects is provided in subsequent sections of this report.

Table 1-1: Summary of FY 2022 CIP and 5-Year CIP

| CIP Program | FY 2022 CIP | 5-Year CIP (FY2022-FY2026) |
|---|---|---|
| Consent Decree | $65,934,800 | $426,867,600 |
| Support Systems | $35,391,300 | $82,283,000 |
| Flood Protection | $4,296,700 | $44,543,200 |
| Stormwater | $7,801,400 | $33,339,500 |
| Wastewater Collection | $17,675,700 | $126,746,600 |
| Wastewater Treatment | $45,129,500 | $172,508,000 |
| Development | $13,986,200 | $120,632,800 |
| Management Reserve | $10,500,000 | $10,500,000 |
| **TOTAL** | **$200,715,600** | **$1,017,420,700** |

*This report does not discuss financial considerations. All information regarding rates, revenues, debt, and other financial considerations are discussed in the Official Statement.*

# 2. Consent Decree Projects

MSD has continued to make progress with implementation of all requirements of the Consent Decree. So far MSD has accomplished the following:

- Development of Programs and Plans for the Comprehensive Performance Evaluations, Composite Correction Plans, Sewer Overflow Response Protocol, Interim Sanitary Sewer Discharge Plan, Interim Long-Term Control Plan, and Sanitary Capacity Assessment Plan

- MSD has completed 24 of the 25 Long-Term Control Plan projects required by the Consent Decree. The last remaining project is the Waterway Protection Tunnel – which is currently under construction.

- MSD has completed 41 of the 57 Sanitary Sewer Discharge Plan projects required by the Consent Decree. Sixteen projects remain to be completed.

As MSD was implementing the Consent Decree, a series of unanticipated circumstances occurred beyond MSD's control. These circumstances resulted with significant infrastructure impairments. For example, in 2015 the Morris Forman WQTC experienced a lightning strike that caused $50M in damage and led to accelerated deterioration of the aging biosolids systems. Since that lightning strike, the WQTC has not been able to consistently meet the plant effluent standards for total suspended solids and biological oxygen demand.

The duration of permit non-compliance for TSS and BOD, led the State Regulators to request MSD develop a Corrective Action Plan that was incorporated into an Agreed Order with the State. The Corrective Action Plan included specific projects with deadlines to be completed throughout the facility. MSD has committed to investing $170M for improvements to be constructed under this State Agreed Order. The projects included in the Agreed Order are not associated with the Consent Order; but were referenced to demonstrate the breadth of infrastructure challenges MSD continues to address for the Morris Forman WQTC.

In addition to the challenges at the Morris Forman WQTC, MSD continues to experience high profile breaks in large diameter and critical sewers. In 2014, the Ohio River Force Main failed; in 2018 the Ohio River Interceptor failed; in 2019 the Harrods Creek Force Main failed; and in 2020 after inspection of the Broadway Interceptor rehabilitation work was accelerated to avert a high profile failure.

Finally, beginning in 2018 the United States Army Corps of Engineers (USACE) initiated a preliminary feasibility assessment for the infrastructure associated with the Ohio River Flood Protection System. This critical system was constructed in the 1950's and 1970's and many of the original assets remain; have become outdated; and spare parts are no longer available. The USACE is requesting federal funding for 65% of the estimated total $188M project cost. MSD will be required to pay the USACE for 35% of the project costs totaling approximately $66M. These projects are focused on reliability only. Additional significant investments are needed to increase capacity and provide redundancy (see Section 4).

Given the significant impact these changed conditions had on MSD's infrastructure, MSD proactively approached the Federal and State Regulators to renegotiate the timing for completing the remaining LTCP and SSDP projects. The Regulators clearly understood the nature of MSD's challenge and agreed staggering completion of the remaining work is a reasonable approach to reprioritize limited capital dollars for needs at the Morris Forman WQTC and Paddy's Run Pump Station. However, in exchange for the time extension, the Regulators required MSD to commit to firm project completion dates and penalties for delayed performance. The Regulators also required MSD to incorporate rehabilitation of $70M of critical sewers into its 5-year CIP and to commit to spending $25M per year for additional asset management needs through the 15-year time extension.

MSD negotiated flexibility for determining the asset management priorities each year. The $25M commitment – combined with all the other mandated project spending noted herein – is achievable within the MSD Board's rate increase authority of 6.9% per year.

MSD is confident the requirements included in the Second Amendment to the Consent Decree and the 2021 Integrated Overflow Abatement Plan (IOAP) Modification are reasonable; address the District's greatest asset needs; and continue to keep MSD in well regard with federal, state, and local regulatory agencies.

### 2.1.1 FY 2022 Second Amendment Consent Decree CIP Projects

The projects included in MSD's FY 2022 CIP related to the Second Amendment Consent Decree mandates are listed in Table 2-1.

Table 2-1. Listing of FY 2022 Second Amendment Consent Decree Projects

| Program | Budget ID | Project | FY 2022 Forecasted Spend |
|---|---|---|---|
| **Long-Term Control Plan Projects** | H09133<br>H19247 | Waterway Protection Tunnel | $22,557,300 |
| **Sanitary Sewer Discharge Plan Projects** | H09192 | Cinderella Pump Station Elimination | $184,900 |
| | H09164 | Idlewood Inline Storage | $3,236,800 |
| | H09196 | Leven Pump Station Elimination | $132,900 |
| | H09163 | Little Cedar Creek Interceptor Improvements | $84,600 |
| | H09182 | Monticello Pump Station Elimination | $400,600 |
| | A18354 | Raintree Court and Marian Court Pump Station Elimination - Phase 1A | $59,200 |
| **Specific Remedial Projects** | D18116 | MFWQTC Biosolids Replacement Facility | $3,700,000 |
| | F18515 | Paddy's Run FPS Capacity Upgrade | $2,477,400 |
| **Critical Sewer Projects** | H18503 | I-64 and Grinstead Infrastructure Rehabilitation | $4,245,600 |
| | A20244 | Large Diameter Sewer Rehabilitation - Stage 1 | $2,225,400 |
| | A20244 | Large Diameter Sewer Rehabilitation - Stage 2 | $1,015,400 |
| | H16074 | Nightingale Sewer Rehabilitation | $1,056,900 |
| | H16075 | Prospect Phase II Rehab | $457,800 |
| | H21019 | Rudd Ave Sewer Infrastructure Rehabilitation | $23,100,000 |
| | H20147 | Western Outfall Infrastructure Rehabilitation | $1,000,000 |
| | | **Total Consent Decree Projects in FY 2022 CIP** | **$65,934,800** |

***The Second Amendment to the Consent Decree requires MSD to invest an average of $25 million per year for Asset Management Improvements for the wastewater system. These projects are incorporated into subsequent sections of this report. MSD is required to report on their progress with this annual spending metric in the annual Consent Decree Progress Report. Given the level of investment needed throughout the District, there is no reason to believe MSD will not meet the $25 million per year through FY 2035.*

- **Morris Forman WQTC Biosolids Facility**: The existing biosolids processing system at the Morris Forman WQTC has exceeded its useful life. This project will construct a modern biosolids processing facility at the Morris Forman WQTC that utilizes a thermal hydrolysis pretreatment process (THP) to create a useable biogas. Benefits of the new facility include improved effluent quality; production of 4 MW of power; decreased consumption of natural gas; and reduced landfill utilization capacity.

- **Paddy's Run FPS Capacity Improvements**: The $115 million Paddy's Run Flood Protection Station Capacity Improvements project is MSD's highest ranked capital priority to mitigate flood pump station public health protection risk. MSD completed an Alternatives Analysis for increasing the capacity of the station to 975 mgd. The CRRP recommended two equally important project phases for the Paddy's Run FPS. The first phase will improve the reliability of the existing Paddy's Run FPS (originally constructed in 1953) by removing, inspecting, and rehabilitating or replacing the station's existing pumps and motors to maintain the station's current total pumping capacity of 925 mgd. The reliability improvements will be implemented through the USACE Program. MSD must construct the capacity improvements project independent of the USACE project.

### 2.1.2 5-Year CIP for Second Amendment Consent Decree Projects

The Consent Decree projects to be funded during the 5-year CIP along with the general level of investment is provided in Table 2-2.

Table 2-2: Overview of 5-Year Forecasted Spending for Second Amendment Consent Decree**

| Program | Project | 5-Year CIP FY2022-FY2026 Forecasted Spend |
|---|---|---|
| **Long-Term Control Plan Projects** | Waterway Protection Tunnel | **$40 million** |
| **Sanitary Sewer Discharge Plan Projects** | Bardstown Road PS Improvements | **$31 million** |
| | Cinderella Pump Station Elimination | |
| | Dell Road & Charlane Pkwy Interceptor | |
| | Gunpowder Pump Station | |
| | Idlewood Inline Storage | |
| | Kavanaugh Road Pump Station Improvements | |
| | Leven Pump Station Elimination | |
| | Little Cedar Creek Interceptor Improvements | |
| | Mellwood System Improvements and Pump Station Elimination - Winton And Mockingbird Valley Eliminations | |

| Program | Project | 5-Year CIP FY2022-FY2026 Forecasted Spend |
|---|---|---|
| | Monticello Pump Station Elimination | |
| | Raintree & Marian Ct 2 - Pipe Upgrades | |
| | Raintree Court and Marian Court Pump Station Elim - Phase 1A | |
| | Upper Middle Fork #2 PS Replacements | |
| | Upper Middle Fork Forcemain | |
| **Specific Remedial Projects** | MFWQTC Biosolids Replacement Facility | **$297 million** |
| | Paddy's Run FPS Capacity Upgrade | |
| **Critical Sewer Projects** | Buechel Branch Interceptor Rehab | **$58.9 million** |
| | Large Diameter Sewer Rehabilitation - Stage 1 | |
| | Large Diameter Sewer Rehabilitation - Stage 2 | |
| | Nightingale Rehab | |
| | Prospect Phase II Rehab | |
| | Rudd Ave Sewer Infrastructure Rehabilitation | |
| | Western Outfall Infrastructure Rehabilitation | |
| | I-64 and Grinstead Infrastructure Rehabilitation | |
| | **Total 5-Year CIP for Consent Decree Projects**** | **$426.9 million** |

***The Second Amendment to the Consent Decree requires MSD to invest an average of $25 million per year for Asset Management Improvements for the wastewater system. These projects are incorporated into subsequent sections of this report. MSD is required to report on their progress with this annual spending metric in the annual Consent Decree Progress Report. Given the level of investment needed throughout the District, there is no reason to believe MSD will not meet the $25 million per year through FY 2035.*

# 3. Stormwater Drainage and Management

MSD is responsible for the operation, maintenance, replacement, improvements and additions to the public stormwater facilities. Runoff during rain events is collected and either stored, retained, and/or conveyed to sewers, rivers, streams, creeks, channels, and ditches for eventual discharge to the Ohio River, either directly or through one of its tributaries. The drainage system includes the following infrastructure that is operated by MSD (or through a combination of MSD staff and contractors).

- 3,616 miles of channels, ditches, and culverts
- 1,080 miles of storm sewers pipe (including culverts under roads)
- 870 miles of inland streams (both natural and improved)

In April 2017, MSD published the *Louisville MSD Watershed Mater Plan* to help effectively manage present and future regional stormwater drainage in Louisville Metro. The basis of this Plan was MSD's original Watershed Master Plan, which was created in 1988 as part of the *Stormwater Drainage Master Plan*, and the *2010 Stormwater Management Master Plan*, which was the most recent update of that plan.

MSD is working on a comprehensive update to the *Stormwater Drainage Master Plan* which, after public participation and approvals by local governments, will be used by the District for implementing improvements and extensions to the existing drainage facilities. It is currently anticipated the first working draft of the *Stormwater Drainage Master Plan* will be published in 2025. Over the next few years, a significant effort will continue to inventory and document the condition of existing drainage system assets.

## 3.1 Stormwater & Drainage Regulatory Requirements

MSD is required to comply with the Federal and State regulations related to stormwater management listed in Table 3-1.

Table 3-1: Federal and State Stormwater Management Regulations

| Reference | Title | Description |
|---|---|---|
| **401 KAR 5:060 Section 12** | Municipal Separate Storm Sewer Systems | Establishes procedures for permitting Phase I and II municipal separate storm sewer systems (MS4s). |
| **401 KAR 4:200; 33 US Code, Title 33, Chapter 26, Section 1341** | Section 401 Application for Water Quality Certification | Establishes the requirements for permitting discharges to streams in the KDEP jurisdiction. |
| **33 US Code, Title 33, Chapter 26, Section 1342** | National Pollutant Discharge Elimination System (NPDES) | Establishes procedures for permitting discharges that may affect floodplains or navigable waters. |
| **33 US Code, Title 33, Chapter 26, Section 1344** | Section 404 Nationwide Permit | Establishes the requirements for permitting discharges of soil, sand, gravel, or dredged material into streams under USACE jurisdiction. |

| Reference | Title | Description |
|---|---|---|
| **401 KAR 5:005** | KPDES for the Morris Forman WQTC | Establishes procedures and permits for operation of the combined sewer system and its associated storage and treatment facilities |

### 3.1.1 Metro Government Local Ordinances Related to Stormwater

MSD is required to comply with the following local regulations related to the stormwater system.

- **Drainage Master Plan**. Louisville Metro Government Code of Ordinances, Title V, Chapter 50.67
- **Comprehensive Storm Water Drainage Authority.** Louisville Metro Government Code of Ordinances, Title V, Chapter 50.55-99.
- **Floodplain Management**. Louisville Metro Government Code of Ordinances, Title XV, Chapter 157.
- **Erosion Prevention and Sediment Control**. Louisville Metro Government Code of Ordinances, Title XV, Chapter 159.
- **Engineering Standards**. Louisville and Jefferson County MSD Design Manual

### 3.1.2 FY 2022 Stormwater CIP Projects

The projects included in MSD's FY 2022 CIP related to stormwater are listed in Table 3-2.

Table 3-2. Listing of FY 2022 Stormwater Projects

| Program | Budget ID | Project | FY 2022 Forecasted Spend |
|---|---|---|---|
| **Drainage** | TBD | 2695 Pencook Road Bank Repair | $350,000 |
| | C20191 | 8904 Blossom Lane DIP Phase 2 | $3,097 |
| | TBD | Pencook Drainage Improvements | $1,200,000 |
| | F21061 | Clifton Heights Basin Sump Pump Improvements | $31,700 |
| **Green Infrastructure** | TBD | Brown Foreman Project | $158,000 |
| | TBD | FY22 Green Infrastructure | $500,000 |
| **DRI** | Z00002 | FY22 DRI | $2,800,000 |
| **Programs** | TBD | Floodplain Mapping | $150,000 |
| | H19034 | FY22 Env'L Data Collection – MS4 & IOAP | $875,000 |
| | TBD | FY22 Maple Street Land Use Planning | $90,000 |
| | H18012 | FY22 MS4 Program | $600,000 |
| | Z00005 | FY22 Stormwater Asset Inventory & Analysis | $400,000 |
| | TBD | FY22 Urban Reforestation | $240,000 |
| | H18016 | FY22 USGS Stream Monitoring | $403,600 |
| | | **Total Stormwater CIP FY 2022** | **$7,801,400** |

### 3.1.3 5-Year CIP for Stormwater & Drainage System

During the 5-year CIP, the stormwater and drainage projects noted in Table 3-3 will be partially or wholly budgeted.

Table 3-3: Overview of 5-Year Forecasted Spending for Stormwater

| Stormwater Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Stormwater & Drainage Improvements** | 2695 Pencook Road Bank Repair | **$3.0 million** |
| | 8904 Blossom Lane DIP Phase 2 | |
| | Pencook Drainage Improvements | |
| | Catch Basin Retrofits Phase 2 | |
| | Clifton Heights Basin Sump Pump Improvements | |
| | Melco Basin Regrading & Improvements | |
| **MS4 Program** | Floodplain Mapping | **$15.5 million** |
| | Environmental Data Collection | |
| | MS4 Program Support | |
| | Tree Program | |
| | USGS Stream Monitoring | |
| **Drainage Response Initiative (DRI)** | DRI Projects | **DRI $14 million** |
| | DRI Field Inspections | |
| **Green Infrastructure (GI) Projects** | GI Projects with Signed Agreements | **GI $658,000** |
| | Future GI Projects | |
| **Land Use Planning** | Maple Street Land Use Planning | **Land Use $90,000** |
| | Other Future Projects | |
| | **Total 5-Year CIP Forecast for Stormwater & Drainage** | **$33.3 million** |

# 4. Flood Protection System

Louisville's flood problems originate from the Ohio River as it rises above its normal pool depth, as well as contributing creeks, storm sewers, and major drainage systems. After devastating floods on the Ohio River in 1937, the U.S. Army Corps of Engineers (USACE) was given authority by Congress to construct flood damage reduction projects under the Flood Control Act of 1936. Under this authority, the USACE built the Ohio River Flood Protection System (ORFPS) that stretches from Butchertown to the southwestern part of Jefferson County near West Point, Kentucky. The original 13.9 mile section of the floodwall was constructed along the Ohio River between 1946 and 1956 (Louisville Reach) and turned over to MSD as functional pieces were completed in 1953, 1954, and 1957. The USACE constructed the 12.6 mile southwestern Jefferson County floodwall extension (Southwestern Jefferson County Reach) between 1973 and 1989.

When the elevation of the Ohio River rises, MSD's service area is protected from flooding through levees and floodwalls. The 185 street crossings, pipe openings, and gates that allow creeks to pass through are sealed and the river is held back. With the creeks and storm sewer system prevented from discharging into the Ohio River, MSD relies on the 16 flood pump stations to pump drainage over the floodwall and levee to prevent stormwater from backing up and causing flooding within the area. It is important to understand that the operation of the flood pumping stations is intermittent and infrequent, only occurring when both the Ohio River is in flood stage and there is a rain event within the drainage system. Many of the pumping stations operate only once every few years. The existing system is more than 60 years old and most components are original parts. In many cases, the original equipment is no longer available for replacement.

MSD is responsible for ensuring all components of the ORFPS are fully operational when they are needed. Today, the ORFPS protects 240,000 people and $60 billion of property within the levee area and includes the following components:

- 22.2 miles of earthen levee
- 3.9 miles of concrete wall
- 16 flood pump stations (total of 73 pumps)
- 152 gates
- 97 closures (21 permanently sealed)

## 4.1 Regulatory Requirements

As previously noted, the interior drainage system is regulated by MSD's MS4 permit. The Ohio River flood-protection system is not regulated by a single agency or permit. A series of requirements and standards established by multiple state and federal agencies such as FEMA and USACE regulate the flood protection system (refer to Table 4-1).

Table 4-1: Federal and State Flood Protection Regulations

| Reference | Title | Description |
|---|---|---|
| **40 CFR, Chapter 1, Part 230, Section 230.30** | Threatened and Endangered Species | Identifies endangered or threatened species likely to become endangered in the foreseeable future. |

| Reference | Title | Description |
|---|---|---|
| **44 CFR, Chapter 1, Part 73** | National Flood Insurance Program Flood Insurance Manual, Appendix F, Community Rating Systems | The CRS offers NFIP policy premium discounts in communities that develop and execute extra measures beyond minimum floodplain management requirements to provide protection from flooding. |
| **44 CFR Chapter 1, Part 79** | Flood Mitigation Grants | Establishes procedures and requirements for grant programs to mitigate losses from flooding. |
| **44 CFR, Chapter 1, Part 207** | Disaster Mitigation Act of 2000 | Provides information for state and local governments to identify and mitigate natural hazards. |
| **16 US Code, Title 16, Chapter 84, Section 6514** | National Environmental Policy Act Environmental Assessment | Establishes criteria to determine whether an impact significantly affects the quality of the human environment. |
| **33 US Code, Title 33, Chapter 15, Section 701b-12** | Floodplain Management Requirements | Established following construction, the non-federal sponsor (MSD) has full legal responsibility for replacing, repairing, and rehabilitating the flood protection facilities. |
| **33 US Code, Title 33, Chapter 46, Section 3301** | USACE Regulations regarding Operations and Maintenance of flood damage and reduction facilities | Established guidelines for maintenance and operation of levees, floodwalls, drainage structure, closures, pumping stations, channels and floodways. |
| **42 US Code, Title 42, Chapter 68, Section 5165** | Mitigation Planning | Provides information on the policies and procedures for mitigation planning as required by the provisions of section 322 of the Stafford Act, 42 U.S.C. 5165. |

### 4.1.1 Metro Government Local Ordinances Related to Flood Protection

MSD is required to comply with the following local regulations related to the flood protection system.

- Engineering Standards. Louisville and Jefferson County MSD Design Manual

## 4.2 Flood Protection System Evaluation

As noted, the USACE inspect the ORFPS components every two years to ensure it remains fit for purpose. A more comprehensive evaluation was completed in 2019.

#### 4.2.1 USACE ORFPS Reliability Improvements Evaluation

The most recent condition assessment for MSD's ORFPS components was performed by the USACE in 2018-2019. The following conclusions were made[1]:

- The National Flood Insurance Program Levee System Evaluation determined the floodwall and levee features are in an acceptable condition.
- The 2019 Periodic Inspection rated the overall system as "minimally acceptable".
- The 2019 Semi-Quantitative Risk Assessment performed by USACE identified features with a performance issue to lessen likelihood or consequences of failure in accordance with Tolerable Risk Guidelines.
- MSD's CRRP recommended rehabilitation/expansion for 15 of the 16 aging flood pump stations to have sufficient capacity forecasted through 2065.

In 2019, the USACE completed its Feasibility Study and recommended projects needed to ensure flood protection levels meet today's standards. These projects may be eligible for federal dollars through USACE construction appropriation. The improvements are restricted for RELIABLITY purposes and exclude any capacity upgrades. The study indicated the following flood protection system needs:

- **Levee System**: Well maintained and has not had any significant performance issues during high water events, but no event has significantly loaded the levee system.
- **Mechanical/Electrical**: The systems are aging, and mechanical and electrical components are requiring regular and often significant maintenance each year.
- **Pumps & Motors**: Approximately 75% of the pumps and motors need to be rebuilt or replaced. The original pumps, motors, and ancillary systems are still in service and have not had a major rebuild since they were originally installed.
- **Control Systems**: 80% of the controls systems at the flood pump stations are outdated. The control systems are rudimentary by today's standards, requiring the station to be fully staffed at all times during flood pumping operations.
- **Transformers & Motor Control Centers**: 88% of the electrical components need to be replaced. The electrical system is original equipment, which cannot be repaired with currently available components.
- **Gates and Floodwalls**: 25% of the system needs to be replaced or refurbished: 15 new actuators, 13 new gates, and 10 gates to be refurbished. Most of the 152 gates are 65 years old.

The USACE identified $188 million of improvements needed to increase the reliability of the Flood Pump Stations (FPS) along the Ohio River as well as other components, such as gates and flood walls. The USACE

[1] USACE Louisville Metro Flood Protection System, Emergency Supplemental Reconstruction Feasibility Study with Integrated Environmental Assessment, Volume 1, 2019.

will contribute approximately $122 million and MSD will contribute approximately $66 million toward the total cost. MSD does not have any control regarding the timing of projects completed by USACE. Therefore, MSD must be ready with its cost share portion at the USACE's schedule. Preliminary discussions indicated design for the FPS Reliability Improvements Projects could begin in FY22 with construction advancing FY24 through FY27.

In addition to these reliability improvements, the CRRP completed multiple evaluations of the 16 flood pump stations and identified additional needs that will not be addressed by the USACE's Reliability Improvements Program. A preliminary breakdown of the projects qualifying for the USACE Reliability Improvements Program and other CRRP projects not covered by USACE are listed in the table below. The 5-Year CIP includes MSD's full share of the USACE Reliability Improvements Program.

Table 4-2: Summary of Flood Protection System CIP Needs

| Flood Protection System Project | Estimated USACE Participation for Reliability Improvements | Estimated MSD Participation for Reliability Improvements | CRRP FPS Improvements Not Included in Reliability Program |
|---|---|---|---|
| Paddy's Run FPS Improvements | $15,596,100 | $8,397,900 | $44,260,000 |
| 10th Street FPS Improvements | $2,721,800 | $1,465,600 | $750,000 |
| 17th Street FPS Improvements | $1,751,700 | $943,200 | $4,313,200 |
| 27th Street FPS Improvements | $4,718,600 | $2,540,800 | $10,027,000 |
| 34th Street FPS Improvements | $2,335,800 | $1,257,800 | $1,020,000 |
| 4th Street FPS Improvements | $0 | $0 | $12,920,000 |
| 5th Street FPS Improvements | $1,796,700 | $967,500 | $700,000 |
| Beargrass Creek FPS Improvements | $20,371,800 | $10,969,400 | $88,259,800 |
| Bingham Way FPS Improvements | $0 | $0 | $6,590,000 |
| Lower Mill Creek FPS Improvements | $4,438,400 | $2,389,900 | $11,575,700 |
| Pond Creek FPS Improvements | $19,643,800 | $10,577,400 | $9,750,000 |
| Riverport FPS Improvements | $1,655,900 | $891,700 | $5,378,700 |
| Shawnee Park FPS Improvements | $9,972,600 | $5,369,900 | $38,512,500 |
| Starkey FPS Improvements | $3,987,600 | $2,147,200 | $4,360,000 |
| Upper Middle Creek FPS Improvements | $9,737,200 | $5,243,100 | $44,922,200 |
| Western Parkway FPS Improvements | $1,510,600 | $813,400 | $21,832,900 |
| Levees, Floodwalls, Gates & Closures | $21,831,000 | $11,755,200 | $1,049,700 |
| Cultural Mitigation & Engineering | $186,700 | $100,600 | $0 |
| **TOTAL** | **$122,256,600** | **$65,830,500** | **$306,221,700** |
| *Note: The projects and preliminary costs presented in this table are for informational purposes only. They represent a level of capital investment for each location. However, the actual costs are likely to vary from these preliminary values as projects are further planned and vetted.* | | | |

## 4.3 Flood Protection System Capital Projects

The projects included in MSD's FY 2022 and 5-year CIP are presented in this Section.

#### 4.3.1 FY 2022 Flood Protection CIP Projects

The flood protection projects included in MSD's FY 2022 CIP are listed in Table 4-3.

Table 4-3. Flood Protection Projects in FY 2022 CIP

| Program | Budget ID | Project | FY 2022 Forecasted Spend |
|---|---|---|---|
| **Asset Management** | F16004 | Canal Street Floodwall | $663,100 |
| | TBD | Flood Structure Assessment | $272,700 |
| | F19276 | FPS Auto Grease Systems Upgrades | $12,500 |
| | TBD | FY22 Flood Structures RR | $2,000,000 |
| | K18266 | FY22 FPS Equipment RR | $1,000,000 |
| | F15010 | Gate 102 Replacement | $345,400 |
| | F20342 | Upper Mill Creek FPS Emergency | $3,000 |
| | | **Total Flood Protection CIP FY 2022** | **$4,296,700** |

#### 4.3.2 5-Year CIP for Flood Protection System

MSD is forecasting to spend nearly $45 million of the $306 million of flood protection needs during the 5-year CIP. These projects are not part of the USACE Reliability Improvements Program. The ORFPS is a critical component for public protection and as such has become a priority for the capital program. During the 5-year CIP, the projects noted in Table 4-4 will be partially or wholly budgeted. These projects were identified and estimated in the CRRP.

Table 4-4: Summary of 5-Year CIP Forecasted Spending for ORFPS

| CIP Program | Project | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Flood Pump Station Asset Management** | Annual FPS Equipment RR | **$32.2 million** |
| | FPS Auto Grease Systems Upgrades | |
| | Pond Creek FPS Electrical Service Improvements | |
| | Starkey FPS Transformer Replacement | |
| | Upper Mill Creek FPS Emergency | |
| | Upper Mill Creek FPS Transformer Replacement | |
| | USACE Reliability Improvements Cost Share | |
| **Flood Structures Asset Management** | Canal Street Floodwall | **$12.4 million** |
| | Flood Structure Assessment | |
| | Annual Flood Structures RR | |
| | Gate 102 Replacement | |
| | **Total 5-Year CIP Forecast** | **$44.6 million** |

*Note: These projects exclude MSD's $66 million participation in the USACE Reliability Improvements Program. The project list in this table excludes the Paddy's Run Pump Station Capacity Improvements Project as that is a Specific Remedial Project under the Second Amendment to the Consent Decree.*

As noted in Table 4-4, MSD funds the following appropriations annually in support of activities related to the flood protection system:

- **Flood Pump Station Equipment Repair & Replacement**: This annual appropriation is intended to better facilitate key equipment replacements. Funds are budgeted to replace pumps, motors, electrical switchgear, generators, and other critical equipment. MSD budgets approximately $1 million per year to support this effort.

- **Flood Structures Repair & Replacement**: MSD maintains a proactive maintenance program to assure the integrity of the levee and floodwall system. Worked performed using these funds includes: repair and/or replacement of trusses, sheeting, and closure walkways; corrugated metal pipe replacement; toe drain access repairs; trail repairs and unwanted vegetation removal; level gate repair or automation; painting; floodwall joint repair; and floodwall concrete sealing and surface crack repairs. MSD budgets approximately $2 million per year to support the program.

# 5. Wastewater Collection System

Like many cities developing in the 19th century, Louisville's sewers were constructed many decades prior to the construction of the treatment facilities. MSD's first sewers were installed before 1850 and routed directly to the Ohio River. By the end of the 19th century, the collection system had expanded to almost 100 miles of clay, brick, and timber-lined sewers. Today, MSD has over 3,200 miles of sewers, approximately 500 miles being over 100 years old. The oldest sewers in the system are primarily in the combined sewer system built between the 1860s to the 1950s. Beginning in 1955, all of the sewer systems built in the Louisville Metro area have been separate sanitary sewers. MSD's first Sewer Master Plan was developed in 1964.

MSD serves approximately 243,000 customer accounts and 650,000 people. The collection system operated and maintained by MSD includes:

- 256 wastewater pump stations
- ≈79,000 manholes
- ≈2,500 miles of sanitary sewers
- ≈700 miles of combined sewers (24,000 acres)
- ≈160 miles of force mains
- ≈1,400 miles of lateral connections to buildings
- Real Time Control facilities to reduce overflows 48%
- In-Line Storage Systems
- Waterway Protection Tunnel for wet weather management (currently under construction)

## 5.1 Regulatory Requirements

MSD is required to comply with the regulations listed in Table 5-1 related to wastewater systems as referenced in the Kentucky Revised Statutes (KRS).

Table 5-1: Federal and State Applicable Wastewater Regulations

| Reference | Title | Description |
|---|---|---|
| **401 KAR 5:050, 5:060; 5:065 KRS 224.16-050** | Permits and Planned Changes | Establishes fees and procedures to obtain a permit and criteria for alterations or additions that must obtain a permit. |
| **401 KAR 5:005** | Permits to construct, modify or operate a facility | Establishes when permits are required for construction, of sewer line extensions & defines application submittals and fees. |
| **401 KAR 5:006** | Wastewater Regional Planning Requirements | Defines requirements for Regional Facility Plan to construct new infrastructure to serve 30% more of the population. |
| **401 KAR 5:010 401 KAR 11:030 KRS 224.73-110** | Operation of Wastewater Systems by Certified Operators | Establishes requirements for certification of collection system operations staff. Specifies Operator in Training Program requirements. |

| Reference | Title | Description |
|---|---|---|
| **401 KAR 5:015** | Releases to be Reported | Establishes reporting requirements for certain releases, spills, and bypasses of pollutants into the environment. |
| **401 KAR 5:065**<br>**KRS 224.99-010** | Monitoring & Records | Establishes information retainage requirements for monitoring and performance records. |
| **401 KAR 5:055**<br>**KRS 224.70-110**<br>**40 CFR Part 403** | Pretreatment Requirements | Establishes pretreatment requirements as part of the Kentucky Pollutant Discharge Elimination System (KPDES). Provides for the protection of domestic wastewater facilities from pass through or interference from pollutants contributed by industrial users of the domestic wastewater facility. |
| **401 KAR 5:320** | Wastewater Laboratory Certification Program | Defines the minimum laboratory quality assurance, methodological and reporting requirements. |
| **KRS 224.73-120** | Monitor/Report Introduction of Incompatible Pollutants | Authorizes application of monitoring, record keeping, and reporting requirements of pollutants which interfere with, pass through, or are otherwise incompatible with WQTC. |

### 5.1.1 Metro Government Local Ordinances Related to Wastewater Collection

MSD is required to comply with the following local regulations related to the wastewater collection system.

- **Sewerage Plan Review and Inspection**. Louisville Metro Government Code of Ordinances, Title V, Chapter 50.06
- **Capacity Charge**. Louisville Metro Government Code of Ordinances, Title V, Chapter 50.45-48.
- **Engineering Standards**. Louisville and Jefferson County MSD Design Manual.

## 5.2 Wastewater Collection System Capital Projects

MSD continues to fund wastewater collection projects with its annual CIP. Projects are generally a combination of discrete local improvements and appropriations for District-wide needs/services.

### 5.2.1 FY 2022 CIP for Wastewater Collection System Projects

The specific projects to repair or renew MSD's collection system infrastructure are listed in Table 5-2.

Table 5-2. Wastewater Collection Projects Included in FY 2022 CIP

| Program | Budget ID | Project | FY 2022 Forecasted Spend |
|---|---|---|---:|
| **Pump Station Projects** | F20321 | Bluegrass Fields PS Renovation | $236,200 |
| | E18469 | FY22 CMOM Collection System PS RR | $500,000 |
| | H20057 | FY22 CMOM I&C Implementation | $292,500 |
| | A14129 | Gorham Way Pump Station Elimination | $133,000 |

| Program | Budget ID | Project | FY 2022 Forecasted Spend |
|---|---|---|---|
| | E15035 | Lake Forest Pump Station Eliminations | $1,300,000 |
| | E21070 | Rosa Terrace PS Elimination | $1,407,000 |
| | E21091 | Sanders Lane PS Rehabilitation | $560,800 |
| | H16076 | Sneads Branch Pump Replacement | $384,700 |
| | E21090 | Sonne Avenue PS Elimination | $1,217,800 |
| | D19286 | SWPS Gas Monitoring and SP1 Odor Control | $690,400 |
| | F21153 | SWPS Gate Seal Replacement | $71,800 |
| | E21071 | Wathen Lane PS Rehabilitation | $942,300 |
| **Sewer Projects** | H20063 | FY22 CMOM Gravity Line Cleaning & Inspection | $1,500,000 |
| | H09215 | FY22 CMOM Infrastructure Rehab Program | $2,000,000 |
| | H19106 | FY22 CMOM Program Management Assistance | $150,000 |
| | H19032 | FY22 CMOM SCAP, AAM And FOG | $150,000 |
| | H18009 | FY22 Plumbing Modification Program | $500,000 |
| | G22001 | FY22 Renewal & Replacement | $2,000,000 |
| **Large Diameter Sewer Projects** | D18285 | ORFM Odor and Corrosion Control | $184,900 |
| **Nine Minimum Controls Projects** | H20049 | FY22 NMC CSO Inspection Cameras | $100,000 |
| | H19116 | FY22 NMC RTC | $600,000 |
| | H18013 | FY22 NMC Support | $100,000 |
| | SY-045 | SGC Gate Replacements | $2,000,000 |
| | D20012 | SGC RTC Enhancements | $654,300 |
| | | **Total Wastewater Collection FY 2022 CIP** | **$17,675,700** |

### 5.2.2 5-Year CIP for Wastewater Collection System

The following priorities are forecasted in the 5-year CIP to address deficiencies and mitigate risks for the wastewater collection system totaling $126.7 million (refer to Table 5-3).

Table 5-3: Overview of 5-Year Forecasted Spending for Wastewater Collection System

| Wastewater Collection System Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Pump Station Projects** | CMOM Collection System Pump R&R | **CMOM $4 million** |
| | CMOM I&C Implementation | |
| | Blue Fields PS Renovation | **Pump Station Improvements $27.5 million** |
| | Admiral Pump Station Foundation Repairs | |
| | PS Replacement or Overhaul Projects | |
| | Northern Ditch Pump Station Odor Control | |
| | Northern Ditch Pump Station Replacement | |
| | Sanders Lane PS Rehabilitation | |
| | Sneads Branch Pump Replacement | |
| | SWPS Gas Monitoring and SP1 Odor Control | |
| | SWPS Gate Seal Replacement | |

| Wastewater Collection System Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| | Wathen Lane PS Rehabilitation | |
| **Sewer Projects** | Gravity Line Cleaning & Inspection | **CMOM Program Sewers $19 million** |
| | Infrastructure Rehabilitation Program | |
| | CMOM Program Management Assistance | |
| | CMOM SCAP, AAM And FOG | |
| | Gorham Way Pump Station Elimination | **Pump Station Eliminations $20.4 million** |
| | Kirby Lane Pump Station Elimination | |
| | Lake Forest Pump Station Eliminations | |
| | Lea Ann Way Pump Station Elimination | |
| | Modesto Pump Station Elimination | |
| | Pirogue Pump Station Elimination | |
| | Rosa Terrace PS Elimination | |
| | Sonne Avenue PS Elimination | |
| | Admiral Way/Fishpool Capacity Assurance | **Sewer Projects $18 million** |
| | Floydsburg Road I&I Investigation and Rehabilitation | |
| | Plumbing Modification Program | |
| | Annual Renewal & Replacement | |
| | KTC Greenwood Rd Assmt | |
| | Private Property I/I Program | |
| | Reality Trail Interceptor | |
| **Large Diameter Interceptor Projects** | Beargrass Interceptor Relief Rehab | **Interceptor Rehabilitation Projects $29.8 million** |
| | Cedar Creek Main Interceptor | |
| | Middle Fork Beargrass Creek SSR Ph 1 | |
| | Ohio River Interceptor - High Risk | |
| | ORFM Odor and Corrosion Control | |
| **Nine Minimum Control Projects** | CSO Inspection Cameras | **NMC Projects $8 million** |
| | RTC Support Services | |
| | SGC RTC Enhancements | |
| **Total 5-Year CIP Forecast for Wastewater Collection System** | | **$126.7 million** |

*Note: excludes the Long-Term Control Plan, Sanitary Sewer Discharge Plan, and Critical Sewer projects listed in the Second Amendment to the Consent Decree in Section 2 of this Report. Some projects listed in this table will be accredited towards the Second Amendment to the Consent Decree requirement to invest an average of $25 million per year for improving existing assets.*

# 6. Wastewater Treatment

MSD was formed in 1946, and the first treatment plant went into operation in 1958. MSD's Southwestern Outfall Pump Station went online in 1959 and pumped wastewater from the system's largest sewer to the first wastewater plant (Morris Forman). Although the 1964 Countywide Sewer Master Plan specified new treatment plants, a lack of financing for large treatment plants and their associated trunk sewers delayed their construction. As such septic systems and package treatment plants were constructed and/or installed by land developers and homeowners through the mid-1970s. By mid-1972, there were more than 300 small treatment plants in Jefferson County. In 2016, MSD decommissioned the final remaining package treatment facility leaving five regional water quality treatment centers (WQTC) to serve all of Louisville and Jefferson County. Elimination of these facilities in conjunction with removing 40,000 septic systems has helped improve the quality of local streams and the Ohio River. A summary of MSD's existing treatment facilities provided below.

- **Cedar Creek WQTC**: The Cedar Creek WQTC was originally constructed in 1995 with a capacity of 2.2 mgd. In 2005, the plant capacity was expanded to 7.5 mgd average daily flow (ADF). Today, approximately 5 mgd of flows are treated and disinfected (UV) before being released into Cedar Creek.

- **Derek R. Guthrie WQTC**: The original facilities at the Derek R. Guthrie WQTC site consisted of a screening chamber and a raw sewage pump station brought online in 1979. The secondary treatment facilities were brought online in 1986 when the WQTC was known as the West County Wastewater Treatment Plant. The WQTC had a capacity of 15 mgd with peak flow of 30 mgd. Plants expansions in 2001 and 2004 increased the ADF capacity to 30 mgd. In 2012 additional facilities enabled the WQTC to treat up to 200 mgd of wet weather flow using a modified contact stabilization process. Further improvements have since been constructed to increase plant capacity to 60 mgd ADF and 300 mgd peak (for short durations). MSD began construction of a new dewatering facility in 2019 to receive biosolids from all the regional WQTCs. Construction is scheduled for completion in FY22. Today approximately 40 mgd of flows are treated and disinfected (sodium hypochlorite) before being released into the Ohio River.

- **Floyds Fork WQTC**: The Floyds Fork WQTC was originally constructed in 2001 at a capacity of 3.25 mgd. In 2012, a major plant expansion increased capacity and added sludge holding tanks. Today approximately 3.5 mgd of flows are treated and disinfected (UV) before being released into Floyds Fork.

- **Hite Creek WQTC**: The Hite Creek WQTC was originally constructed in 1970 with a capacity of 2.2 mgd to serve the Ford truck assembly plant and its surrounding neighborhoods. The capacity of the treatment center was expanded to 6.6 mgd to eliminate sanitary sewer overflows upstream of the treatment center and allow for future growth. The WQTC is under construction to expand its capacity to 9 mgd ADF and 24 mgd peak flow. Construction is scheduled for completion in FY22. Today approximately 4.4 mgd of flows are treated and disinfected (UV) before being released into Hite Creek.

- **Morris Forman WQTC**: The Morris Forman WQTC was originally constructed in 1956 for preliminary and primary treatment and was referred to as the Fort Southworth Plant. It was designed to receive a maximum daily flow of 105 mgd and peak hour flow of 338 mgd. Secondary treatment facilities were installed in the 1970s in accordance with federal regulations. The plant was named after MSD's retired executive director. Plant upgrades in late 1990s and early 2000s improved performance and increased treatment capacity to its current level of 120 mgd with peak flow capacity of 350 mgd. Today approximately 100 mgd of flows are treated before being released into the Ohio River. The Morris Forman WQTC is the largest facility in Kentucky and treats over 70% of the wastewater generated in MSD's service area; including the entire combined sewered area.

- **Bells Lane WWTF**: The Bells Lane WWTF was brought online in 2017. The project converted an existing 105 mgd dry-pit pump station to a 160 mgd submersible pump station and added 1) screening and grit facilities; 2) 50 mgd high rate treatment basin to provide chemically-enhanced primary sedimentation; 3) disinfection/dechlorination; and 4) 25 MG equalization basin.

## 6.1 Regulatory Requirements

The District is required to comply with the regulations listed in Table 6-1 related to wastewater treatment systems as referenced in the Kentucky Revised Statutes (KRS).

Table 6-1: Federal and State Applicable Wastewater Treatment Regulations

| Reference | Title | Description |
|---|---|---|
| **KRS 224.16-050** | Permits and Planned Changes | Establishes fees and procedures to obtain a permit and criteria for alterations or additions that must obtain a permit. |
| **KRS 224.70-130**<br>**401 KAR 5:080** | Criteria & Standards for KPDES | Establishes criteria and fees for permit to discharge into waters of the Commonwealth. |
| **401 KAR 5:005** | Permits to construct, modify or operate a facility | Establishes when permits are required for construction, of sewer line extensions, WQTC improvements, or new discharges & defines application submittals and fees. |
| **401 KAR 5:006** | Wastewater Regional Planning Requirements | Defines requirements for Regional Facility Plan to construct new WQTC, expand existing WQTC by 30%, or serve 30% more of the population. |
| **401 KAR 5:010**<br>**401 KAR 11:030**<br>**KRS 224.73-110** | Operation of Wastewater Systems by Certified Operators | Establishes requirements for certification of domestic wastewater treatment plant and collection system operations staff. Specifies Operator in Training Program requirements. |
| **401 KAR 5:015** | Releases to be Reported | Establishes reporting requirements for certain releases, spills, and bypasses of pollutants into the environment. |
| **401 KAR 5:026** | Designated Uses of Surface Waters | Establishes surface water designations of creeks and rivers and the associated water quality criteria. |

| Reference | Title | Description |
|---|---|---|
| **401 KAR 5:029**<br>**401 KAR 5:031**<br>**401 KAR 10:030** | Antidegradation Policy<br>Surface Water Standards | Establishes water quality criteria. |
| **401 KAR 5:035**<br>**401 KAR 5:045**<br>**401 KAR 5:060** | Treatment Requirements and Compliance | Establishes minimum treatment requirements for domestic wastewater facilities and associated water quality sampling frequency. |
| **401 KAR 5:065**<br>**KRS 224.99-010** | Monitoring & Records | Establishes information retainage requirements for monitoring and performance records. |
| **401 KAR 5:055**<br>**KRS 224.70-110**<br>**40 CFR Part 403** | Pretreatment Requirements | Establishes pretreatment requirements as part of the Kentucky Pollutant Discharge Elimination System (KPDES). Provides for the protection of domestic wastewater facilities from pass through or interference from pollutants contributed by industrial users of the domestic wastewater facility. |
| **401 KAR 5:320** | Wastewater Laboratory Certification Program | Defines the minimum laboratory quality assurance, methodological and reporting requirements. |
| **KRS 224.73-120** | Monitor/Report Introduction of Incompatible Pollutants | Authorizes application of monitoring, record keeping, and reporting requirements of pollutants which interfere with, pass through, or are otherwise incompatible with WQTC. |
| **401 KAR 45**<br>**40 CFR 503** | Sludge Disposal | Establishes procedures and requirements for disposal of biosolids. |
| **401 KAR 52:020** | Title V Air Permits | Establishes requirements for air contaminant sources located in Kentucky that are required to obtain a Title V permit. |

### 6.1.1 Metro Government Local Ordinances Related to Wastewater Treatment

MSD is required to comply with the following local regulations related to the wastewater treatment:

- **Engineering Standards**. Louisville and Jefferson County MSD Design Manual.

### 6.1.2 Morris Forman WQTC Agreed Order

The Morris Forman WQTC experienced multiple non-compliance events due in part to 1) a lightning strike and 2) accelerated deterioration of the biosolids system. MSD and the KDEP executed a Corrective Action Plan (CAP) to address the deficiencies at the plant that are contributing or have the potential to contribute to permit exceedances. The projects included the CAP are listed in Table 6-2. As of this report, MSD continues to implement the five remaining CAP projects. There is no reason to believe MSD will not be able to complete each project prior to the mandated deadline included in the State Agreed Order.

Table 6-2: MFWQTC Projects Under Agreed Order CAP Consideration

| MFWQTC Treatment Process | Morris Forman Agreed Order Projects | Estimated Completion Date |
|---|---|---|
| Primary Treatment | D17042 \| MFWQTC Sedimentation Basin Rehabilitation | June 30, 2026 |
| | D19227 \| MFWQTC Primary Sludge Line Replacement | Completed |
| | D19044 \| MFWQTC Primary Sludge Pump Compressor | Completed |
| | F13023 \| MFWQTC Headworks Replacement | Completed |
| Secondary Trt | D19045 \| MFWQTC OGA Plants 1 & 2 Replacement | Completed |
| Disinfection | D19045 \| MFWQTC Sodium Hypochlorite Building Relocation | December 31, 2023 |
| Final Effluent Pump Station (FEPS) | D18130 \| MFWQTC FEPS Load Center & MCC Replacement | June 30, 2024 |
| | D18362 \| MFWQTC FEPS Substation | Completed |
| | D19307 \| MFWQTC FEPS VFD Replacement | Completed |
| | F14183 \| MFWQTC FEPS Generator | Completed |
| | Multiple \| MFWQTC FEPS Pump and Motor Repair | Completed |
| Biosolids | D15017 \| MFWQTC Centrifuge Electrical Controls | Completed |
| | F14179 \| MFWQTC Wet Cake Pump | Completed |
| | D15020 \| MFWQTC Cake Pump Phase 2 | Completed |
| | D20228 \| MFWQTC Centrifuge Replacement/Rehabilitation | Completed |
| | F13010 \| MFWQTC Condenser Upgrades | Completed |
| | D20285 \| MFWQTC LG Dryer Replacements | December 31, 2022 |
| | D20284 \| DRGWQTC Dewatering Facility | December 31, 2022 |
| | D20249 \| District-Wide Biosolids Master Plan | Completed |
| Electrical | D18359 \| MFWQTC Delta Transformer | Completed |
| | D18360 \| MFWQTC Air Dryer | Completed |
| | D19237 \| MFWQTC Arc Flash Update | Completed |
| | D20167 MFWQTC East Headworks HVAC | Completed |
| | F13016 \| MFWQTC High Yard Electrical Modification | Completed |
| Other | D15022 \| MFWQTC Main Equipment Bldg MEB Leak Repair | Completed |
| | D15127 \| MFWQTC Process Water Line Replacement | Completed |
| | H14108 \| MFWQTC Rubbertown Flow Sampling | Completed |

#### 1.1.1.FY 2022 Wastewater Treatment Plant CIP Projects

The projects included in the FY 2022 CIP for the WQTCs are listed in Table 6-3.

Table 6-3. Wastewater Treatment Plant Projects in FY 2022 CIP

| Program | Budget ID | Project | FY 2022 Forecasted Spend |
|---|---|---|---|
| **Morris Forman WQTC** | D18454 | FY22 MFWQTC Equipment RR | $5,000,000 |
| | D18473 | FY22 MFWQTC Other Facilities Repairs | $500,000 |
| | D21208 | MFWQTC Admin Building Environmental Assmt | $133,300 |

| Program | Budget ID | Project | FY 2022 Forecasted Spend |
|---|---|---|---|
| | TBD | MFWQTC Admin. Building Repairs | $1,000,000 |
| | D15024 | MFWQTC Chiller Replacement | $135,700 |
| | D18130 | MFWQTC FEPS Load Center and MCC Replacement | $659,600 |
| | TBD | MFWQTC FEPS North Transformer | $458,500 |
| | TBD | MFWQTC Groundwater Monitoring and Well Repairs | $454,600 |
| | D20304 | MFWQTC Headworks and Dumpster Building Repairs and Primary Blower Building Stair Repairs | $119,000 |
| | D20285 | MFWQTC LG Dryer Replacements | $14,387,200 |
| | D19048 | MFWQTC Radio Repeater | $45,200 |
| | D17042 | MFWQTC Sedimentation Basin Rehabilitation | $2,977,100 |
| | D18156 | MFWQTC Service and Blower Bldg Structural Repairs | $120,000 |
| | D20314 | MFWQTC Sewer and Manhole Condition Assmt & Repair | $201,700 |
| | D21181 | MFWQTC Sodium Bldg Floor Repair | $7,600 |
| | D19045 | MFWQTC Sodium Hypochlorite Bldg Relocation | $3,727,700 |
| **Derrik R. Guthrie WQTC** | D20016 | DRG Admin and RAS Buildings HVAC | $27,300 |
| | TBD | DRGWQTC Bisulfate Bldg. and Control Improvements | $375,000 |
| | D18292 | DRGWQTC Clarifier Grout Repair and RAS Gate | $572,500 |
| | D20284 | DRGWQTC Dewatering Emergency Contract | $2,408,600 |
| | TBD | DRGWQTC Substation Units 3 & 4 Elimination | $150,000 |
| | D19223 | DRGWQTC WWPS Finite Element Analysis Phase 2 | $2,300 |
| | D18132 | DRGWQTC WWPS WW Screen Bldg HVAC | $600,000 |
| **Hite Creek WQTC** | H14126 | HCWQTC Expansion | $1,844,300 |
| | TBD | HCWQTC SA Feed Automation | $125,000 |
| | TBD | HCWQTC Sludge Pad and Piping | $250,000 |
| **Floyds Fork WQTC** | TBD | FFWQTC SA Feed Automation | $125,000 |
| **Cedar Creek WQTC** | D19039 | CCWQTC Effluent Parshall Flume Upgrade | $670,100 |
| | TBD | CCWQTC SA Feed Automation | $125,000 |
| | TBD | CCWQTC Sludge Storage Tank Improvements | $494,600 |
| | D20017 | CCWQTC Sodium Aluminate Building | $276,800 |
| | D17032 | CCWQTC Tertiary Filtration | $1,485,400 |
| **Other WQTC Projects** | E19213 | FY22 Operations Renewal & Replacement | $2,300,000 |
| | TBD | FY22 Regional WQTC Equipment RR | $2,000,000 |
| | TBD | Regional Biosolids Management Study | $250,000 |
| | TBD | WQTC Treatment Plant Notification System | $180,000 |
| | D20224 | Bells Lane PAA System | $690,400 |
| | D20223 | Bells Lane WWTF Polymer Feed System Improvements | $250,000 |
| | | **Total Wastewater Treatment FY 2022 CIP** | **$45,129,500** |

### 6.1.3 5-Year CIP for Wastewater Treatment System

MSD will continue spending on the biosolids emergency certification projects started in 2019 and completing in 2022. The majority of the 5-Year CIP related to biosolids is for the New Biosolids Facility to be located at the Morris Forman WQTC. Additional placeholder projects have been added to incorporate dewatering processes at the Cedar Creek and Floyds Fork WQTCs.

Annual capital investments are required to mitigate operator safety risks; maintain reliable system operations; and upgrade to new more energy efficient technologies. During the 5-year CIP, the WQTC projects listed in Table 6-4 totaling $104 million will be partially or wholly budgeted for the regional WQTCs.

Table 6-4: Overview of 5-Year Forecasted Spending for Regional WQTCs

| Wastewater Treatment Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Bells Lane Wet Weather Facility** | Bells Lane Grit System Improvements | **Bells Lane $1.4 million** |
| | Bells Lane WWTF Chemical Feed System Improvements | |
| | Bells Lane WWTF General R&R | |
| **Cedar Creek WQTC** | CCWQTC Admin Building Expansion & Painting | **CCWQTC $17.4 million** |
| | CCWQTC Power & MCC Upgrades | |
| | CCWQTC Oxidation Ditch Mods | |
| | CCWQTC Chemical Feed System Improvements | |
| | CCWQTC Effluent Parshall Flume Upgrade | |
| | CCWQTC Tertiary Filtration | |
| | CCWQTC WAS Improvements & Dewatering Facility | |
| | CCWQTC Expansion Project | |
| | CCWQTC General R&R | |
| **Derek R. Guthrie WQTC** | DRGWQTC Artificial Intelligence Pilot | **DRGWQTC $47.5 million** |
| | DRGWQTC Clarifier Replacements & Grout Repair | |
| | DRGWQTC Disinfection Upgrades | |
| | DRGWQTC Substation U-13 Modifications | |
| | DRGWQTC Alternate Outfall | |
| | DRGWQTC Dewatering Facility | |
| | DRGWQTC General R&R | |
| **Floyds Fork WQTC** | FFWQTC Chemical Feed System Improvements | **FFWQTC $3.5 million** |
| | FFWQTC Dewatering Facility | |
| | FFWQTC General R&R | |
| | FFWQTC Enhanced Biological Phosphorous Removal Study | |
| **Hite Creek WQTC** | HCWQTC Chemical Feed System Improvements | **HCWQTC $21.9 million** |
| | HCWQTC General R&R | |
| | HCWQTC Expansion Project | |
| **General WQTCs** | WQTC Elevator Repairs | **$12.6 million** |
| | WQTC General R&R | |
| **Total 5-Year CIP Forecast for Regional WQTCs** | | **$104.3 million** |

*Some projects listed in this table will be accredited towards the Second Amendment to the Consent Decree requirement to invest an average of $25 million per year for improving existing assets.*

The projects totaling $74 million forecasted for the Morris Forman WQTC in the 5-Year CIP are noted in Table 6-5.

Table 6-5: Overview of 5-Year Forecasted Spending for Morris Forman WQTC

| Treatment Process | Morris Forman WQTC Priorities | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Primary Treatment** | MFWQTC Headworks and Dumpster Building Repairs and Primary Blower Building Stair Repairs | **$31.1 million** |
| | MFWQTC Heat Polymer Water | |
| | MFWQTC Sedimentation Basin RR* | |
| **Secondary Treatment** | MFWQTC Clarifier B5 Floor Repair | **$2.7 million** |
| | MFWQTC Secondary Clarifiers Structural Repairs | |
| | MFWQTC HPO Tanks (Battery A, B, and C) Structural Repairs | |
| **Disinfection** | MFWQTC Chlorine Contact Tanks Structural Repairs | **$4.6 million** |
| | MFWQTC Sodium Hypochlorite Building Relocation* | |
| **Final Effluent Pump Station (FEPS)** | MFWQTC FEPS Load Center and MCC Replacement* | **$1.2 million** |
| | MFWQTC FEPS North Transformer | |
| | MFWQTC Final Effluent Pump Station (FEPS) Structural Repairs | |
| **Biosolids** | MFWQTC LG Dryer Replacements* | **$14.4 million** |
| **Other** | MFWQTC Equipment RR | **$20.1 million** |
| | MFWQTC Other Facilities Repairs | |
| | MFWQTC Admin Building Environmental Assessment | |
| | MFWQTC Admin. Building Repairs | |
| | MFWQTC Groundwater Monitoring and Well Repair | |
| | MFWQTC Process Water Pump & VFD | |
| | MFWQTC Service and Blower Building Structural Repairs | |
| | MFWQTC Sewer and Manhole Condition Assessment and Repair | |
| | MFWQTC Sodium Building Floor Repair | |
| | MFWQTC Radio Repeater | |
| **Electrical** | MFWQTC Chiller Replacement | **$136,000** |
| | **Total 5-Year CIP Forecast for Morris Forman WQTC** | **$74.2 million** |

**project is included in the Morris Forman State Agreed Order Corrective Action Plan. The project list in this table excludes the Morris Foreman WQTC Biosolids Replacement Facility as that is a Specific Remedial Project under the Second Amendment to the Consent Decree. Some projects listed in this table will be accredited towards the Second Amendment to the Consent Decree requirement to invest an average of $25 million per year for asset management.*

# 7. Support Systems

MSD owns a large inventory of rolling stock, information technology systems, and above-ground facilities that support MSD's operation of wastewater, stormwater, and flood protection systems. This equipment is critical to MSD's ability to complete preventative and corrective maintenance activities required to provide sustainable and reliable wastewater, stormwater, and flood protection services.

MSD maintains an extensive inventory of IT hardware and software that is essential to overall agency operations. This includes the MSD intranet system that is the backbone of electronic communication and digital data generation, communication and storage, and regulatory reporting. This hardware and software are responsible for supplying the internet connection to MSD's Supervisory control and data acquisition (SCADA) system that controls more than 300 pump stations and control gates. This equipment is subject to periodic upgrade and replacement - like other MSD assets. The CRRP included projects and appropriations for upgrading MSD's facilities, fleet, and IT systems.

## 7.1 Support Systems Capital Projects

The CRRP recommended a series of corrective actions following comprehensive condition assessments of more than 200 buildings. MSD continues to address facility needs with each annual CIP. Projects are created as a need become known. MSD also includes as-needed appropriations into the annual CIP that address the following types of needs:

- HVAC Systems
- Roof Inspections, Repairs, and Replacement
- Paving Improvements
- Security Upgrades
- Information Technology (IT) Hardware & Software
- Fleet and Large Equipment

Implementing a capital program of this size and complexity requires support services. Support services are generally contracted resources that provide specialized expertise; address program specific deliverables; supplement field staff; or support MSD staff as-needed. The following types capital support appropriations are included in the FY 2022 CIP.

- CIP Task Assistance
- Construction Inspection
- Emergency Preparedness Plan
- Hydraulic Modeling
- WQTC Engineering Support
- Regional Planning Evaluations
- Asset Management Plans
- SCADA Master Plan
- Odor Management Plan

### 7.1.1 FY 2022 Support Systems CIP Projects

The projects related to support systems in the FY 2022 CIP are listed in Table 7-1.

Table 7-1. Support Systems Projects in FY 2022 CIP

| Program | Budget ID | Project | FY 2022 Forecasted Spend |
|---|---|---|---|
| **Facilities Improvements** | TBD | Barcoding Phase 2 | $150,000 |
| | G21139 | CMF Roof A, C and D Replacement | $1,805,200 |
| | E21225 | CMF & WQTC Facilities Entrance Upgrades | $2,750,000 |
| | D21129 | DRGWQTC Elevator Repairs | $1,437,000 |
| | G20068 | FY22 Facility Security Upgrades | $500,000 |
| | G18459 | FY22 Miscellaneous Facility Repairs | $200,000 |
| | G18486 | FY22 MSD Owned Building Roof Replacements | $1,000,000 |
| | TBD | MFWQTC Computer Room Expansion | $500,000 |
| | G20028 | MFWQTC Elevator Repairs | $774,300 |
| | G20018 | SWPS Site Security - Construction | $969,000 |
| **Information Technology** | TBD | AI Aquasight Software at CCWQTC | $50,000 |
| | TBD | File Storage Refresh | $575,000 |
| | H18174 | FY22 Information Governance Architecture | $300,000 |
| | N20076 | FY22 IT Infrastructure Initiatives | $375,000 |
| | J18099 | FY22 LOJIC Hw Upgrades & Replacements | $100,000 |
| | J20024 | FY22 LOJIC Survey Control Maintenance | $50,000 |
| | TBD | IPS Implementation | $400,000 |
| | TBD | Isolated Ransomware Protection | $490,000 |
| | N20133 | SAP Upgrade To HANA | $1,250,000 |
| | TBD | SD-WAN Deployment | $300,000 |
| **Equipment** | K18021 | FY22 Vehicles & Equipment | $15,000,000 |
| **Support Services** | TBD | Asset Management Plan Development | $972,700 |
| | D20148 | FFWQTC Regional Facilities Plan Update | $300,000 |
| | J17037 | FY21/22 Aerial Imagery & Map Updates | $500,000 |
| | H20042 | FY22 CIP Task Assistance | $2,000,000 |
| | A19109 | FY22 Construction Inspection | $500,000 |
| | H18100 | FY22 Modeling | $1,200,000 |
| | TBD | Lower Floyds Fork Facilities Plan | $400,000 |
| | TBD | Ohio River Area Facilities Plan | $400,000 |
| | N21122 | Rhythm for Civics for IPS | $3,100 |
| | TBD | WQTC Engineering Support Services | $100,000 |
| | TBD | Water Reuse Study | $40,000 |
| | | **Total Support Systems Projects in FY 2022 CIP** | **$35,391,300** |

#### 7.1.2 5-Year CIP for Support Systems

During the 5-year CIP, improvements will continue to be phased for MSD's existing buildings including but not limited to: elevator upgrades, roof replacements, paving, and security enhancements. IT budgets will continue to be requested annually for assets related to system reconfiguration, cable management, network server upgrades, network switch replacements, desktop computers, and software programs needed to better manage MSD's assets and systems. Capital equipment budgets for updating MSD's fleet vehicles, heavy construction equipment, and portable equipment used by multiple working groups will be vetted annually. During the 5-year CIP, the support services projects to be partially or wholly budgeted are noted in Table 7-2.

Table 7-2: Overview of 5-Year Forecasted Spending for Facilities

| Facilities Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Facilities Improvements** | Building Improvements | **$15.2 million** |
| | Security Enhancements | |
| | Roof Inspections, Repairs and Replacements | |
| **Information Technology** | Hardware Related Projects | **$9.5 million** |
| | Software Related Projects | |
| **Equipment** | Fleet Vehicles | **$31 million** |
| | Large Equipment | |
| **Services** | Professional Services | **$26.6 million** |
| | Construction Inspection | |
| | Modeling | |
| | Planning & Analysis | |
| | **Total 5-Year CIP Forecast for Facilities** | **$82.4 million** |

# 8. Regionalization & Economic Development

Economic development and expanding the area MSD provides utility services are opportunities for 1) generating additional revenue, 2) optimizing regional resources, and 3) further improving local water quality.

## 8.1 Regionalization Capital Projects

The projects having forecasted spending in FY 2022 are listed in Table 8.1 for Jefferson, Oldham, and Bullitt Counties.

Table 8-1. Regionalization Projects Included in FY 2022 CIP

| Program | Budget ID | Project | FY 2022 Forecasted Spend |
|---|---|---|---|
| **Jefferson County Projects** | D18489 | Fairmont Road Pump Station Force Main Extension - Phase 1 | $749,300 |
| | D21072 | Fairmont Road Pump Station Force Main Extension - Phase 2 | $1,554,000 |
| | D20351 | Floyds Fork Interceptor - Design | $4,734,800 |
| | H19110 | FY22 Development Infrastructure Excess Cost Reimbursement | $250,000 |
| | H18018 | FY22 Development Infrastructure Support | $85,000 |
| **Oldham County Projects** | TBD | FY22 OC Modeling | $100,000 |
| | W21006 | OC Ash Avenue Interceptor | $4,706,800 |
| | W21126 | OC Ohio River Service Area Rehabilitation | $1,800,000 |
| **Bullitt County Projects** | Y21207 | Bullitt County WQTC HSE Plan | $6,300 |
| | | **Total Regionalization Projects in FY 2022 CIP** | **$13,986,200** |

## 8.2 Jefferson County Development Projects

Portions of Jefferson County remain unsewered. Over the past ten years, MSD has extended sewer service to many areas and eliminated hundreds of small package treatment plants and more than 40,000 septic tanks. The primary driver for eliminating these systems is to improve water quality of local rivers, creeks, and streams.

### 8.2.1 Jefferson County Regionalization 5-Year CIP Projects

The development driven projects are included in the 5-year CIP for Jefferson County are noted in Table 8-2.

Table 8-2. Jefferson County Development Projects Included in 5-Year CIP

| Jefferson County Development Projects | | 5-Year CIP Forecasted Spending |
|---|---|---|
| **Floyd's Fork Service Area** | Floyd's Fork Interceptor | **$71.3 million** |
| | Floyd's Fork Zone B Sewers Phase 1 | |
| | Floyd's Fork Zone B Sewers Phase 2 | |
| | Floyd's Fork Zone C Sewers Phase 1 | |
| **Cedar Creek Service Area** | Cedar Creek Zone F Collection System | **$10.6 million** |
| | Cedar Creek Zone G Collection System | |
| | Fairmount Rd Pump Station Force Main Extension Phase 1 | |
| | Fairmount Rd Pump Station Force Main Extension Phase 2 | |
| **District-Wide Projects** | Development Infrastructure Excess Cost Reimbursement | **$1.1 million** |
| | Development Infrastructure Support | |
| | **Total Jefferson County 5-Year CIP for Development Projects** | **$83 million** |

### 8.2.2 5-Year CIP for Development Program

Current development patterns suggest private investment is picking up in the Floyds Fork sewershed. MSD continues to coordinate with developers to streamline how to incorporate new assets and additional flows into its existing sewer network. It is important to coordinate these new developments to ensure consistency of construction and reliable service.

The CRRP recommended projects to ensure adequate conveyance and treatment capacity is available in advance of development and population growth. This program is particularly important for preventing a situation in which community development initiatives face moratoriums due to capacity constraints at the WQTCs. The development program includes a combination of phased WQTC capacity upgrades and under capacity sewers and pump stations. The following development related projects have been partially or fully budgeted in MSD's 5-year CIP.

## 8.3 Regionalization to Adjacent Counties

The CRRP also identified potential regionalization corridors where MSD can further extend sewers to improve surface water quality and add new sewer customers. The CRRP recommended projects that included new interceptors, new gravity sewer collection systems, and a new treatment plant for accommodating future regionalization and/or growth.

In 2016, high profile failures of "package" treatment plants led to the passage of Kentucky House Joint Resolution 56, to initiate a study of regionalization opportunities to limit the risk of future failures. As a result of this Joint Resolution, a study was performed in 2017 to provide an inventory of small "package" facilities and emergency risk mitigation.

During the 2018 Legislative Session in Kentucky, Senate Bill 151 (SB151) was filed to enable utility ownership of sewer assets outside of jurisdictional boundaries through inter-local agreements. House Bill 513 (HB513) was filed to require additional insurance, as well as regulatory and financial accountability for small "package" treatment facility operators/builders. These two bills were combined and passed under HB513 and signed by the Governor on April 25, 2018.

This legislation has facilitated extending MSD's programmatic approach for eliminating package treatment plants beyond Jefferson County. During FY21 MSD will complete the Floyds Fork WQTC Regional Facilities Plan Update. This project will assist MSD with addressing how regionalization initiatives with Bullitt and Oldham Counties will interconnect with MSD's assets. Depending on the timing of system improvements needed in these areas for public health protection, capital projects required to interconnect with MSD's wastewater system may need to be accelerated to the 5-year CIP.

- **Oldham County**: The City of Crestwood lobbied for enabling legislation, to allow MSD to acquire their system. This was accomplished in early 2019. Subsequent to the Crestwood acquisition, Oldham County Environmental Authority and Oldham County Fiscal Court requested MSD to submit a proposal to acquire this system. This acquisition closed on June 30, 2020. Per the terms of the Interlocal Agreement, all customers of Oldham County Environmental Authority (OCEA) residing in the former OCEA service area will continue to pay the existing average rate of $86.92/month for fiscal years FY20, FY21, and FY22, and during this period MSD will charge new and expanding customers OCEA's existing capacity fees. Upon the expiration of OCEA's existing contract with Veolia Water North America, the average monthly rate for these customers will be adjusted down to $76.92/month on August 1, 2022, and on an after this date MSD will charge its capacity fees to new and expanding customers. These rates are based on an average usage of 5000 gallons per month. For FY23 and years thereafter, MSD will raise existing OCEA customer rates no more than 5% per year until the rates equalize with rates of MSD's other customers. Once residential rates equalize, MSD's Rates, Rentals, and Charges for all customer classes will be applied to Oldham County customers going forward.

- **Bullitt County**: In 2019, Bullitt County Sanitation District and Bullitt County Fiscal Court requested a proposal from MSD for acquisition and regional solutions. The earliest the acquisition could close is September 1, 2021. MSD has continued the due diligence phase over the past year.

### 8.3.1 Oldham County 5-Year CIP

MSD has worked with Oldham County staff to develop a preliminary 5-year CIP to address known and immediate system capital needs. The FY22 CIP includes $6.6 million for capital projects. During the 5-year CIP, the Oldham County projects that will be partially or wholly budgeted are noted in Table 8-3.

Table 8-3: Overview of 5-Year Forecasted Spending for Oldham County

| Oldham County Capital Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| **System Improvements** | OC Ash Avenue Interceptor | **$11.2 million** |
| | OC Force Main to HCWQTC | |
| | OC Ohio River Service Area Rehabilitation | |
| **System Evaluation** | OC Modeling | **$0.5 million** |

| Oldham County Capital Priorities | 5-Year CIP Forecasted Spending |
|---|---|
| **Total 5-Year CIP Forecast for Oldham County** | **$11.7 million** |

### 8.3.2 Bullitt County 5-Year CIP

MSD has worked with Bullitt County staff to develop a preliminary 5-year CIP to address known and immediate system capital needs. During the 5-year CIP, the Bullitt County projects to be partially or wholly budgeted are noted in Table 8-4.

Table 8-4: Overview of 5-Year Forecasted Spending for Bullitt County

| Bullitt County Capital Priorities | | 5-Year CIP Forecasted Spending |
|---|---|---|
| **System-Wide Improvements** | FY 2022 Asset Management | **$27 million** |
| | FY 2023 Asset Management | |
| | FY 2024 Asset Management | |
| | FY 2025 Asset Management | |
| | FY 2026 Asset Management | |
| **Total 5-Year CIP Forecast for Bullitt County** | | **$27 million** |

# 9. Conclusions

The Engineer provides the following conclusions related to MSD's sewer and drainage system.

### 9.1.1 Wastewater Systems

- MSD is currently working to comply with mandates from Consent Orders issued by USEPA and KDEP related to unauthorized discharges from its wastewater system. MSD has met all required deadlines to-date and remains on schedule to complete the remaining Amended Consent Order requirements. To-date, MSD has spent over $1 billion on Consent Decree projects. MSD, USEPA, and KDEP are finalizing a Second Amendment to the Consent Decree to reprioritize the timing for completing the remaining work to allow MSD to accelerate other higher system priorities.

- MSD certified completion of 24 CSO LTCP projects to date. One project, the Waterway Protection Tunnel remains under construction. Overflows to local waterways have been reduced by approximately 5 billion gallons per typical year. MSD certified completion of 41 SSO SSDP projects to date, 16 projects remain to be completed through 2035. SSOs have been reduced approximately 82% for the 2-year storm event. MSD's wet weather storage systems are preventing nearly 2 billion gallons of sewer overflows from occurring by storing flow then sending it to treatment after storm events have passed.

- On May 3, 2018, MSD entered into an Agreed Order with KDEP addressing improvements necessary to recover from a mechanical failure due to a lightning strike resulting with a power outage at Morris Forman WQTC that occurred April 8, 2015. Extensive damage was experienced to the primary treatment, secondary treatment, and electrical systems causing the plant to be out of compliance with effluent discharge limits established in Permit KY0022411. MSD is working diligently to restore the Morris Forman WQTC to its full operational capacity. MSD invested $37 million in this facility since 2016 and developed a draft Corrective Action Plan (CAP) for additional improvement.

- MSD is advancing multiple projects to improve District-wide biosolids management including constructing dewatering facilities at the regional WQTCs and building a new biosolids facility at the Morris Forman WQTC. These investments, while costly will enable MSD to meet KPDES permit requirements, improve efficiencies, and generate power.

- MSD is advancing some of the projects identified in the CRRP. Due to the Consent Decree mandates, many projects continue to be deferred. As such, emergencies are increasing in frequency and severity. MSD's annual CIP includes appropriations to address as-needed improvements related to repair, rehabilitation, or replacement of aging assets and emergencies.

### 9.1.2 Stormwater System

- The District through ILAs with the City of Louisville and Jefferson County assumed responsibility for stormwater management in 1987 for all of Jefferson County, except for the Cities of Anchorage, Jeffersontown, Shively, and St. Matthews. Those cities provide most of those services within their borders, and partner with MSD on other aspects including review of new development plans and water quality reporting.

- The District bills for stormwater services using equivalent service units (ESUs). The District currently has approximately 6,956,000 ESUs, in total, from residential, commercial, industrial, and city-owned properties.

- MSD maintains and operates its stormwater collection and transmission system in accordance with industry-standard best management practices. MSD has operated the stormwater system for decades and is sufficiently organized and staffed to continue to operate, maintain, administer, and plan the stormwater infrastructure.

- MSD is working on a comprehensive update to the Stormwater Drainage Master Plan which, after public participation and approvals by local governments, will be used by the District for implementing improvements and extensions to the existing drainage facilities. It is currently anticipated the first working draft of the Stormwater Drainage Master Plan will be published in 2025. Over the next few years, a significant effort will continue to inventory and document the condition of existing drainage system assets.

- MSD collects over 3 million individual water quality records each year. This monitoring program provides a detailed picture of the health of streams in Jefferson County. Monitoring results are summarized on an annual basis in the Stormwater MS4 Annual Report.

- MSD's Urban Reforestation Program plants 1,000 trees annually by working with local businesses, municipal organizations and neighborhood associations. The program replenishes and expands the tree canopy throughout Jefferson County. These trees redirect an average of 1.35 million gallons of stormwater away from the sewer system every year, which decreases sewer overflows into waterways.

- In 1988, MSD and the United States Geological Survey (USGS) began monitoring water quality and stream flow throughout the Jefferson County area. The Long-Term Monitoring Network has changed over the years and currently includes 27 monitoring sites. The monitoring sites were selected to represent streams in each of eleven watersheds. Each monitoring site is sampled four times per year and is analyzed for a variety of parameters including fertilizers, sediment, and metals.

#### 9.1.3 Flood Protection System

- MSD maintains and operates the flood protection system in accordance with industry-standard best management practices. MSD has operated the flood protection system for decades and is sufficiently organized and staffed to continue to operate, maintain, administer, and plan the Ohio River Flood Protection System infrastructure.

- MSD maintains a proactive maintenance program to assure the integrity of the levee and floodwall system. Worked performed using these funds includes: repair and/or replacement of trusses, sheeting, and closure walkways; corrugated metal pipe replacement; toe drain access repairs; trail repairs and unwanted vegetation removal; level gate repair or automation; painting; floodwall joint repair; and floodwall concrete sealing and surface crack repairs.

- MSD is actively engaged with the USACE to advance $188 million of improvements to improve the reliability of the flood protection system. These improvements will replace and update original equipment that was installed in the 1950s and 1970s. These projects were included in the CRRP. This partnership represents a significant investment with improving flood protection.

- The Paddy's Run Flood Protection Station Capacity Improvements Project is MSD's highest ranked capital priority to mitigate flood pump station public health protection risk. MSD completed an Alternatives Analysis for increasing the capacity of the station to 975 mgd. The CRRP recommended two equally important project phases for the Paddy's Run FPS. The first phase will improve the reliability of the existing Paddy's Run FPS (originally constructed in 1953) by removing, inspecting, and rehabilitating or replacing the station's existing pumps and motors to maintain the station's current total pumping capacity of 925 mgd. The reliability improvements will be implemented through the USACE Program. MSD must construct the capacity improvements project independent of the USACE project. This project has been incorporated into the Second Amendment of the Consent Decree.

## APPENDIX G

## CLIMATE BONDS VERIFIER'S REPORT

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# Verifier's Report
## EXECUTIVE SUMMARY

**ISSUER**
Louisville and Jefferson County Metropolitan Sewer District

**OPINION ON**
Sewer and Drainage System Revenue Bonds, Series 2022A (Green Bonds - Climate Bond Certified)

**STANDARD AND SECTOR CRITERIA**
Climate Bonds Standard Version 3.0

- Water Infrastructure

**PAR**
$225,000,000 (Preliminary, subject to change)

**KEYWORDS**
Integrated water resource management, Ohio River Basin, water quality, green infrastructure, pollution prevention, climate adaptation, Kentucky

**EVALUATION DATE**
December 27, 2021

**SUMMARY OF FINDINGS**
Kestrel Verifiers is of the opinion that the Louisville and Jefferson County Metropolitan Sewer District's (the "District") Sewer and Drainage System Revenue Bonds, Series 2022A ("Series 2022A Bonds") conform with the Climate Bonds Standard (Version 3.0) as follows:

- **Use of Proceeds**
  The Series 2022A Bonds will be used to pay at maturity, redeem, and refund Commercial Paper Notes and Direct Purchase Notes ("Program Notes") previously issued by the District to finance capital improvements to the wastewater, stormwater, and flood protection systems (collectively, "Projects"). The District demonstrates leadership in integrated water resource management by reducing combined sewer overflows and sanitary sewer overflows to meet Consent Decree obligations and by financing upgrades to the flood control, stormwater, and wastewater systems which integrate nature-based solutions. The bonds align with the *Water Infrastructure* eligible Sector Criteria under the Climate Bonds Standard.

- **Process for Evaluation and Selection of Projects & Assets**
  The District's compliance with the federal Consent Decree, internal risk mitigation criteria, value-based environmental benefit assessments, public and stakeholder input, and consideration of climate change adaptation all inform the prioritization of wastewater and stormwater capital projects. The District's primary planning documents are: the Consent Decree planning document, the Integrated Overflow Abatement Program ("IOAP"), and the 20-Year Critical Repair and Reinvestment Plan ("Facility Plan").

- **Management of Proceeds**
  Proceeds from Program Notes and the Series 2022A Bonds are managed by the District within separate accounts which are not comingled with other District funds. The District's Department of Finance is responsible for tracking and allocating proceeds to the outstanding Program Notes (comprised of Commercial Paper Notes and Direct Purchase Notes). Within 60 to 90 days of closing, Series 2022A Bond proceeds will be used to redeem or refund outstanding Program Notes or to pay certain outstanding Program Notes at maturity.

- **Reporting**
  The District commits to posting continuing disclosures to the Municipal Securities Rulemaking Board ("MSRB") annually through the Electronic Municipal Market Access ("EMMA") system. In accordance with the Climate Bonds Standard, Kestrel Verifiers will be engaged to provide one Post-Issuance Report within 24 months of issuance to confirm continued conformance of the Series 2022A Bonds with the

relevant Standards and Criteria. So long as the Series 2022A Bonds are outstanding, the District also expects to provide voluntary annual update reports on EMMA and BondLink. The District is required to report on completion of projects to reduce overflows of untreated wastewater into local waterways, and it also monitors and reports on water quality and stream health.

- **Impact and Alignment with United Nations Sustainable Development Goals**
  By financing projects that improve wastewater, stormwater, flood protection systems, and mitigate overflows with green infrastructure, the Series 2022A Bonds advance Targets 6.3, 9.4, 12.2, 13.1. Funds and planning for water resource activities also support Target 6.5. The Series 2022A Bonds support the following UN Sustainable Development Goals: 6: *Clean Water and Sanitation*, 9. *Industry, Innovation, and Infrastructure*, 12. *Responsible Consumption and Production*, and 13. *Climate Action*.

- **Assurance Conclusion**
  Based on the Reasonable Assurance procedures we have conducted, in our opinion, the Series 2022A Bonds conform, in all material respects, with the Climate Bonds Standard, and the bond-financed activities are aligned with the Climate Bonds Standard *Water Infrastructure* Sector Criteria (Version 3).

# Verifier's Report

| | |
|---|---|
| **Legal Name of Issuer:** | Louisville and Jefferson County Metropolitan Sewer District |
| **Issue Description:** | Sewer and Drainage System Revenue Bonds, Series 2022A (Green Bonds - Climate Bond Certified) |
| **Project:** | Capital Improvement Projects |
| **Standard:** | Climate Bonds Standard (Version 3.0) |
| **Sector Criteria:** | Water Infrastructure |
| **Keywords:** | Integrated water resource management, Ohio River Basin, water quality, green infrastructure, pollution prevention, climate adaptation, Kentucky |
| **Par:** | $225,000,000* |
| **Evaluation Date:** | December 27, 2021 |

*Preliminary, subject to change

## CLIMATE BONDS DESIGNATION

Louisville and Jefferson County Metropolitan Sewer District ("District") will issue Sewer and Drainage System Revenue Bonds, Series 2022A ("Series 2022A Bonds") to finance capital improvements to the wastewater, stormwater, and flood protection systems.

This Verifier's Report reflects Kestrel Verifiers' view of the District's projects and financing, allocation and oversight, and conformance of the Series 2022A Bonds with the Climate Bonds Standard (V3.0) and *Water Infrastructure* Sector Criteria. In our opinion, the Sewer and Drainage System Revenue Bonds, Series 2022A are fully aligned with the internationally accepted Climate Bonds Standard (Version 3.0) and the *Water Infrastructure* Sector Criteria (Version 3).

## ABOUT THE ISSUER

The Louisville and Jefferson County Metropolitan Sewer District ("the District") was created in 1946 by the State of Kentucky Legislature to provide wastewater and stormwater infrastructure. The District serves all of Jefferson County and parts of Oldham County and Bullitt County, Kentucky. Located on the south bank of the Ohio River, the District serves approximately 750,000 people and treats 75 million gallons of wastewater per day ("MGD"). In 1987 the District's mission expanded to include flood control and stormwater management for Jefferson County. Flood control and drainage system infrastructure includes open channels, ditches, streams, ponds, pipes, culverts, conduits, bridges, detention basins, retention basins, pump stations, and other facilities. Infrastructure includes 600 miles of combined sewers; 2,700 miles of sanitary sewers; over 260 pumping stations; and 1,400 miles of lateral connections. The District maintains and operates five wastewater treatment plants with the following treatment capacities: Morris Forman (120 MGD), Derek R. Guthrie (60 MGD), Cedar Creek (7.5 MGD), Floyd's Fork (6.5 MGD), and Hite Creek (6 MGD). The Morris Forman facility provides biosolid processing for all five wastewater treatment plants in the District.

The District locates, builds and promotes green infrastructure projects to reduce stormwater runoff through its Green Infrastructure Program. Additionally, the District is part of the One Water Initiative, a partnership with Louisville Water. The goal of the initiative is to share certain resources and promote efficiencies to deliver clean, safe water services to the community. In addition, the District participated in developing the *Prepare Louisville* Climate Adaptation Plan, a metro-wide plan to reduce greenhouse gas emissions 80% by 2050. Every two years the District releases *State of the Streams*, a water quality report that measures the health of surrounding streams through analysis of: fish, insects, algae, bacteria, suspended solids, water temperature and flow measurements from in-stream meters. Improvements in water quality and environmental progress can be attributed to projects going back to 2005.

In 2005, the District entered into a Consent Decree agreement with the federal government and State of Kentucky. The decree required the District to mitigate and manage combined sewer overflows and end sanitary sewer overflows. Following a 2009 amendment to the Consent Decree, the District created the Integrated Overflow Abatement Program ("IOAP"). Since 2010, the District has been fully compliant with the Consent Decree, completing projects on-time and under budget.[1]

## CONFORMANCE WITH CLIMATE BONDS STANDARD AND SECTOR CRITERIA

The District engaged Kestrel Verifiers to provide an independent verification on alignment of the Series 2022A Bonds with the Climate Bonds Standard (V3.0) and Certification Scheme, and the *Water Infrastructure* Sector Criteria. The Climate Bonds Initiative ("CBI") administers the Standard and Sector Criteria. Additionally, Kestrel Verifiers examined alignment of the Series 2022A Bonds with the United Nations Sustainable Development Goals ("UN SDGs").

Kestrel Verifiers is a Climate Bonds Initiative Approved Verifier. The Kestrel Verification Team included environmental scientists and financial professionals. We performed a Reasonable Assurance engagement to independently verify that the bonds meet relevant criteria, in all material respects.

For this engagement, Kestrel Verifiers reviewed the District's bond disclosure documentation, Green Bond Framework, documentation on the allocation and uses of bond proceeds, as well as relevant planning documents and alignment to the District's overarching climate objectives. We examined public and non-public information and interviewed key staff from the District. Our goal was to understand the planned use of proceeds, procedures for managing proceeds, and plans and practices for reporting in sufficient detail to verify the bonds.

### Relevant Climate Bonds Sector Criteria and Other Standards

The Series 2022A Bonds align with the Climate Bonds Standard (V3.0) and *Water Infrastructure* Criteria (Version 3).

### Assurance Approach

Kestrel Verifiers' responsibility was to conduct a Reasonable Assurance engagement to determine whether the Series 2022A Bonds meet, in all material respects, the requirements of the Climate Bonds Standard. Our Reasonable Assurance was conducted in accordance with the Climate Bonds Standard (V3.0) and the *International Standard on Assurance Engagements (ISAE) 3000: Assurance Engagements Other than Audits or Reviews of Historical Financial Information*. Information relating to this engagement and the Verifier's and Issuer's Responsibilities, and Independence and Quality Control are available in Appendices B and C.

Kestrel Verifiers has relied on information provided by the District. There are inherent limitations in performing assurance, and fraud, error or non-compliance may occur and not be detected. Kestrel Verifiers is not responsible or liable for any opinions, findings or conclusions within the information provided by the District that are incorrect. Our assurance is limited to the District's policies and procedures in place as of December 2021. The distribution and use of this verification report are at the sole discretion of the District. Kestrel Verifiers does not accept or assume any responsibility for distribution to any other person or organization.

[1] The Consent Decree project completion date was originally set at 2024, but priorities shifted when a series of system emergencies required immediate CIP funding. In late 2019, the District began negotiating with the EPA to defer Consent Decree work to focus on other CIP priorities. If approved by all parties, the updated Consent Decree project completion date is 2035.

## Use of Proceeds

Proceeds of the Series 2022A Bonds will be used to pay at maturity, redeem, and refund Commercial Paper Notes and Direct Purchase Notes ("Program Notes") previously issued by the District to finance capital improvements to the wastewater, stormwater, and flood protection systems (collectively, "Projects").

### Consent Decree Projects

A substantial portion of proceeds will refinance Program Notes which financed capital improvements to fulfill federal Consent Decree obligations, and complete construction and modernizations outlined in the Integrated Overflow Abatement Plan ("IOAP"). When a wastewater treatment plant has violated US Environmental Protection Agency ("EPA") testing standards, or exceeded combined sewer overflow or sanitary sewer overflow rules, the permit holder typically enters into a consent decree with the EPA. The consent decree dictates certain improvements which must be made within a given timeframe. Kestrel views projects in response to a consent decree as generally having positive environmental impact, with the understanding that required infrastructure upgrades are an opportunity to improve sustainability and reliability of the system overall.

A significant portion of the District's bond-financed Consent Decree projects relate to combined sewer overflows ("CSO") and sanitary sewer overflows ("SSO"). Under certain conditions, systems that lack capacity can allow untreated sewage to spill, resulting in contamination of waterways. CSO to SSO conversion projects eliminate pollution-prone combined sewer systems by constructing separate stormwater infrastructure. The District's CSO Long-Term Control Plan ("LTCP"), which is part of the IOAP, is expected to result in capture and treatment of approximately 98% of wet-weather combined flows in an average year. As a result, the volume of CSO discharges (spills) would be reduced 89% relative to baseline conditions in 2008. The District's Sanitary Sewer Discharge Plan ("SSDP"), also part of IOAP, intends to eliminate all sanitary sewer overflows to project-specific levels of control. SSDP projects mitigate system capacity issues caused by wet weather inflow and infiltration. SSO projects are expected to eliminate 145 sewage spills per year (290 million gallons of untreated wastewater) relative to 2005 to 2007 data. The SSO projects are also expected to significantly improve water quality.

While a majority of the District's Consent Decree projects are focused on CSOs, other types of wastewater, stormwater and flood protection projects are also required under the Consent Decree. A partial list of bond-financed Consent Decree projects include:

- Various CSO projects
- Ohio River Tunnel Project
- Emergency dewatering projects
- Sewer rehabilitation and repairs
- Interceptor projects
- Odor and corrosion control
- Collection system upgrades
- Green infrastructure upgrades
- Capacity Management Operations and Maintenance Program, Sewer Capacity Assurance Program, and Fats, Oils and Greases projects

### Projects Separate from the Consent Decree

Multiple wastewater, stormwater and flood protection projects that are not part of the Consent Decree will be financed through the Series 2022A Bonds. Projects include upgrades to dewatering equipment, pump repairs, expansion of supervisory control and data acquisition system, stream monitoring and stormwater system data collection, and tree planting. Projects also include emergency preparedness planning, floodplain management, drainage projects for flood mitigation, and Ohio River flood protection system projects which include levees, floodwalls, gates, modernized pumping systems to improve resilience, and expanded capacity of pumping stations.

Table 1. Significant Consent Decree ("CD") and Non-Consent Decree ("Non-CD") projects with positive environmental impact

| Project Description (CD / Non-CD) | Project Category | Environmental Impact | Approximate 2022A Bond Proceeds Allocated to Project[2] |
|---|---|---|---|
| Ohio River Tunnel (CD) | IOAP – Long Term Control Plan | The Ohio River Tunnel, or the Waterway Protection Tunnel, is expected to capture water from 25 CSO locations and prevent release of 439 million gallons of wastewater and rainwater from entering waterways. The project expands greenspace and restoration at the Beargrass Creek Trailhead and includes a rain garden and wetland. The tunnel itself is 20 feet in diameter and four miles long, and is intended to capture and hold overflows until the Morris Forman Water Quality Treatment Center has treatment capacity available. | $39,550,167 |
| Morris Forman Water Quality Treatment Center LG Dryer Replacements FY21 (Non-CD) | Regulatory | Dryer replacements at the Morris Forman Water Quality Treatment Center will improve the efficiency of biosolids processing and replace older inefficient infrastructure. The project meets short-term needs and increases long-term resiliency for biosolids management process. The District will pursue a thermal hydrolysis pretreatment process to create usable biogas to ultimately produce approximately 4 MW of power. | $26,240,758 |
| Broadway INT Infrastructure Rehabilitation (CD) | Critical Sewer | Rehabilitation of the Broadway Interceptor is critical to maintaining reliability and sustainability of the system. Prevention of catastrophic failures significantly reduces the likelihood of resource-intensive and unnecessary comprehensive infrastructure replacements, and reduces public health and ecological risks. | $24,824,283 |
| Derek Guthrie Water Quality Treatment Center Dewatering Emergency Contract (Non-CD) | Regulatory | Dewatering system replacement at the Derek Guthrie Water Quality Treatment Center will increase efficiency of biosolids processing and allow for production of Grade A fertilizer for beneficial reuse. The upgrades are part of the long-term solution for biosolids management. | $20,975,493 |

## Environmental Benefits

The Louisville and Jefferson County Metropolitan Sewer District uses comprehensive planning tools to ensure that projects have significant environmental benefits. By reducing combined sewer overflows and sanitary sewer overflows to meet its obligations under the Consent Decree, and also incorporating green infrastructure in its flood control, stormwater, and wastewater systems, the District is demonstrating leadership in integrated water resource management. Multiple basin-scale assessments outline the significance of the Ohio River for water supply, navigation, hydroelectricity, agriculture, fish and wildlife habitat, and lay out the importance of good stewardship.[3] The Ohio River runs through 15 states and over 25 million people reside in its watersheds, or approximately 10% of the US population. The Series 2022A projects address critical maintenance needs which directly protect water quality.

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[2] Rounded to the nearest dollar. Preliminary budget, subject to change.

[3] "Plan for the Ohio River Basin 2020-2025," US Army Corps of Engineers, accessed December 17, 2021, https://www.lrh.usace.army.mil/Portals/38/docs/orba/Plan%20for%20the%20Ohio%20River%20Basin_FINAL.PDF?ver=s5zhd_NfTAZ7ao0bWhBLpA%3D%3D.

"Ohio River Basin Comprehensive Reconnaissance Report," US Army Corps of Engineers, 2009, https://www.lrh.usace.army.mil/Portals/38/docs/orba/Ohio%20River%20Basin%20Comp%20Recon%20Study%20-%20Dec%202009.pdf.

"Ohio River Basin-Formulating Climate Change Mitigation/Adaptation Strategies through Regional Collaboration with the ORB Alliance," US Army Corps of Engineers and Ohio River Basin Alliance, Institute for Water Resources, Responses to Climate Change Program, 2017, https://www.lrh.usace.army.mil/Portals/38/docs/orba/USACE%20Ohio%20River%20Basin%20CC%20Report_MAY%202017.pdf.

Green Infrastructure

Nature-based solutions, also called "green infrastructure" in the context of stormwater management, harness natural processes to protect habitat and improve water quality and flood protection. The District's Design Manual integrates current science and research on design and best practices for green infrastructure and the District adds green infrastructure into many of its systems. Bioswales, rain gardens, green roofs, and permeable pavement and sidewalks are common features. MSD may directly fund and construct projects, but also provides incentives and education for green installations on private property.

Louisville Climate Adaptation Planning

Many of the bond-financed projects also advance goals set out in *Prepare Louisville,* a plan which outlines necessary actions for the City of Louisville to adapt to climate change. Primary strategies related to Healthy Residents, Natural Capital and Resilient Infrastructure have a strong intersection with Louisville MSD's projects. The District's Design Manual and Critical Repair and Reinvestment Plan are both aligned with the *Prepare Louisville* plan and projected changes in rainfall and other conditions as a result of climate change are accounted for in project planning.[4]

Sector Criteria for Water Infrastructure (Version 3)

The Series 2022A bond-financed activities align with CBI's *Water Infrastructure* Sector Criteria and the associated Mitigation and/or Adaptation and Resilience requirements.

*Mitigation Requirements:* It is Kestrel Verifiers' opinion that there will be no net increase in greenhouse gas (GHG) emissions as a result of financed projects. Financed activities primarily address wastewater and stormwater collection and conveyance which are not expected to have significant impacts on GHG emissions. The list of bond-financed projects includes multiple activities which will significantly increase operational efficiency, including replacement of aging or inefficient infrastructure; installation of variable frequency drive pumps; and real-time control technology, enabled by SCADA, which creates measurable increases in operational and energy efficiency. Stewardship of natural resources, including watershed management and the District's green infrastructure program, will support preservation and enhancement of soil health and ecosystem functions to minimize emissions.

*Adaptation and Resilience Requirements:* A detailed vulnerability assessment including evaluation of Allocation, Governance, Diagnostics, Nature Based Solutions, and Adaptation Plan Assessment shows that the District has sufficient infrastructure and planning processes to meet the requirements of the Adaptation and Resilience component of the *Water Infrastructure* Criteria (Appendix D). In each area, the District achieved a score of at least 60%.

### Process for Evaluation and Selection of Projects and Assets

Compliance with the federal Consent Decree, internal risk mitigation criteria, value-based environmental benefit assessments, public and stakeholder input, and consideration of climate change adaptation all inform the prioritization of wastewater and stormwater capital projects. The District's primary planning documents are the Consent Decree planning document, the Integrated Overflow Abatement Program, and the 20-Year Critical Repair and Reinvestment Plan ("Facility Plan").

Under the Consent Decree, the District is required to eliminate sanitary sewer overflows and unauthorized discharges from its sanitary sewer system, combined sewer system and wastewater treatment plants and address discharges from key locations identified in the Kentucky Pollutant Discharge Elimination System permit for MSD's Morris Forman Water Quality Treatment Center. The District developed a Consent Decree planning document with detailed requirements to help select capital projects. To choose and prioritize capital projects that fulfill Consent Decree obligations, the District also relies on public input[5] and guidance from

[4] The District's Design Manual (referenced in the Facility Plan) accounts for climate change by incorporating the Rainfall Analysis Update and the Atlas 14 update that are performed by the National Oceanic and Atmospheric Administration. Atlas 14 is an ongoing analysis of historical rainfall data which is used to provide projections of expected future rainfall volumes.

[5] The District employs a multi-pronged approach to communicate the effects of capital projects on communities to the public and Metro City Council members. For example, the Waterway Protection Tunnel replaced four offline storage basins to mitigate CSOs. This change significantly reduced construction impacts, removed the need for any above-ground basins, and increased storage capacity. Additionally, structured engagement surveys are used to garner opinion on what is left behind after the project is completed.

the Wet Weather Team Stakeholder Group—a group of elected officials, Metro City Council Members, academic institutions, community groups, emergency services, and public health workers.

The Integrated Overflow Abatement Program ("IOAP") also informs the process for evaluating and selecting capital projects. Essential projects in the IOAP are evaluated with the District's value-based benefits which are: uphold the health and safety of the public, environmental protection, sustainability, economic vitality, and the goal to meet all regulatory standards within the Consent Decree on schedule. The District also uses the IOAP Cost Tool to assess the cost of improvements. The District aims to maintain affordability on behalf of its consumers and selects projects that will keep rates near regional averages.

Additionally, the District uses risk mitigation criteria to evaluate and prioritize projects. The District evaluated the benefits of proposed capital projects alongside the probability and consequence of certain events. Projects that address events with high probability and high consequence are considered "critical" and prioritized. In response to the increased frequency of extreme weather and other emergencies, the District reprioritizes projects as needed to ensure public health and safety and protect property.

The District also integrates climate change adaptation into planning processes. The Facility Plan sets clear goals to improve wastewater, stormwater, and drainage system efficiencies. Within the Facility Plan, the District cites the increased frequency of extreme storms (citing 2035 and 2065 forecasting) and the heightened need for reliable, sustainable stormwater management. Climate change has been considered in all applicable projects financed with the Series 2022A Bonds and this consideration has, for the most part, resulted in increased project size and impact.

### Management of Proceeds

Proceeds from Program Notes are managed by the District within distinct accounts which are not comingled with other funds of the District. Similarly, proceeds of the Series 2022A Bonds will also be tracked separately from District funds. The District's Department of Finance is responsible for tracking proceeds and allocating them to the outstanding Program Notes (comprised of Commercial Paper Notes and Direct Purchase Notes). Upon closing, Series 2022A Bond proceeds will be allocated to redeem or refund outstanding Program Notes within 60 to 90 days or will be used to pay certain outstanding Program Notes at maturity. Proceeds may be temporarily invested in money market accounts prior to spending.

### Reporting

The District will submit annual continuing disclosures to the Municipal Securities Rulemaking Board ("MSRB") through the Electronic Municipal Market Access ("EMMA") system so long as the Series 2022A Bonds are outstanding. In accordance with the Climate Bonds Standard, Kestrel Verifiers will be engaged to provide one Post-Issuance Report within 24 months of issuance to confirm continued conformance of the Series 2022A Bonds with the relevant Standards and Criteria. So long as the Series 2022A Bonds are outstanding, the District also expects to provide voluntary annual update reports on EMMA and the District's BondLink website. The content of these reports may include use of proceeds and impact reporting metrics. The District also has many other ongoing reporting requirements related to CSO compliance, water quality parameters and its NPDES[6] permits.

## IMPACT AND ALIGNMENT WITH UN SDGS

The Projects address UN SDGs 6, 9, 12 and 13. By financing projects with green infrastructure that improve wastewater, stormwater, flood protection systems, and mitigate overflows, the Series 2022A Bonds advance Targets 6.3, 9.4, 12.2, 13.1. Funds and planning for water resource activities also support Target 6.5. Full text of the Targets for Goals 6, 9, 12, and 13 is available in Appendix A, with additional information available on the United Nations website: www.un.org/sustainabledevelopment

[6] National Pollution Discharge Elimination System

**Clean Water and Sanitation (Target 6.3, 6.5)**

Possible Indicators
- Increased storage capacity for influent
- Amount of treated wastewater
- Documentation of integrated water resource management
- Optimized operation of sustainably managed wastewater systems
- Proportion of stormwater captured
- Number of CSO or SSO events in dry or wet weather conditions

**Industry, Innovation and Infrastructure (Target 9.4)**

Possible Indicators
- Proportion of funds financing sustainable wastewater and stormwater infrastructure projects
- Increased resource use efficiency (energy or other)

**Responsible Consumption and Production (Target 12.2)**

Possible Indicators
- Increased energy efficiency
- Improved water quality as a result of financed activities
- Reduction in inflow and infiltration

**Climate Action (Target 13.1)**

Possible Indicators
- Number of flood risk reduction projects

## ASSURANCE STATEMENT AND CONCLUSIONS

Based on the Reasonable Assurance procedures we have conducted, in our opinion, the Sewer and Drainage System Revenue Bonds, Series 2022A conform, in all material respects, with the current Climate Bonds Standard, and the bond-financed activities are completely aligned with the *Water Infrastructure* Sector Criteria. The District is demonstrating leadership in integrated water resource management by reducing CSOs and SSOs to comply with Consent Decree obligations and by integrating green infrastructure while financing upgrades to the flood control, stormwater, and wastewater systems.

Sincerely,

April Strid, Lead Verifier
Kestrel Verifiers
Hood River, Oregon, United States
December 27, 2021



## ABOUT KESTREL VERIFIERS

For over 20 years Kestrel has been a trusted consultant in sustainable finance. Kestrel Verifiers, a division of Kestrel 360, Inc. is a Climate Bonds Initiative Approved Verifier qualified to verify transactions in all asset classes worldwide. Kestrel is a US-based certified Women's Business Enterprise.

For more information, visit www.kestrelverifiers.com

## DISCLAIMER

This Verifier's Report ("Opinion") aims to explain how and why the discussed financing meets the CBI Climate Bonds Standard based on the information which was available to us during the time of this engagement (December 2021) only. By providing this Opinion, Kestrel Verifiers is not certifying the materiality of the projects financed by the Climate Bonds. It was beyond Kestrel Verifiers' scope of work to review for regulatory compliance and no surveys or site visits were conducted. Furthermore, we are not responsible for surveillance on the project or use of proceeds. Kestrel Verifiers relied on information provided by the District and publicly available information. The Opinion delivered by Kestrel Verifiers does not address financial performance of the Climate Bonds or the effectiveness of allocation of its proceeds. This Opinion does not make any assessment of the creditworthiness of the District, or its ability to pay principal and interest when due. This is not a recommendation to buy, sell or hold the Bonds. Kestrel Verifiers is not liable for consequences when third parties use this Opinion either to make investment decisions or to undertake any other business transactions. This Opinion may not be altered without the written consent of Kestrel Verifiers. Kestrel Verifiers reserves the right to revoke or withdraw this Opinion at any time. Kestrel Verifiers certifies that there is no affiliation, involvement, financial or non-financial interest in the District or the projects discussed. We are 100% independent. Language in the offering disclosure supersedes any language included in this Verifier's Report.

Use of the United Nations Sustainable Development Goal (SDG) logo and icons does not imply United Nations endorsement of the products, services or bond-financed activities. The logo and icons are not being used for promotion or financial gain. Rather, use of the logo and icons is primarily illustrative, to communicate SDG-related activities.

# Appendix A.
## UN SDG TARGET DEFINITIONS

**Target 6.3**
By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing the proportion of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

**Target 6.5**
By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.

**Target 9.4**
By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.

**Target 12.2**
By 2030, achieve the sustainable management and efficient use of natural resources.

**Target 13.1**
Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

# Appendix B.

## ASSURANCE PROCEDURES

| REQUIREMENT | | ASSURANCE PROCEDURES |
|---|---|---|
| 1. Use of Proceeds | | |
| 1.1 | Project Documentation | Review documentation of the Nominated Projects assessed as likely to be Eligible Projects, and list of Nominated Projects that Issuer will keep up-to-date during the term of the bond. |
| 1.2 | Valuation | Review net proceeds of the bond to ensure they are not greater than the value of the project. |
| 1.3 | Multiple Nominations for Certified Debt Instruments | Review Nominated Projects for previous nominations to other Certified Climate Debt Instruments, green bonds, or other designated instruments. |
| 1.3.1 | Nominations to Other Debt Instruments | Review Nominated Projects to determine whether certain portions are being financed by separately designated Certified Debt Instruments. |
| 1.3.2 | Refunding Existing Certified Climate Debt | Review and confirm whether Nominated Projects have been refinanced by other Certified Debt Instruments or bonds under assessment will refinance existing Certified Debt Instruments. |
| 2. Process for Project Evaluation and Selection | | |
| 2.1 | Environmental Statement & Process (2.1.1-2.1.4) | Review statement of the climate-related objectives of the bond. Review documentation of the process that the Issuer followed to identify projects and confirm eligibility requirements for inclusion of Nominated Projects in the bond. Review planning documents which establish goals, priorities and potential impact. |
| 2.2 | Eligibility (2.2.1-2.2.2) | Review additional documentation Issuer provided on further aspects of identification process including strategic directions and standards. Review the Issuer's environmental and social integrity policy, and/or Green Bond Framework, and confirm its coverage of the Nominated Projects. |
| 2.3 | Taxonomy & Technical Criteria | Test Nominated Projects to determine whether they meet the minimum technical requirements of the Climate Bonds Standard and relevant Sector Criteria (Part C: Eligibility of Projects and Assets). |
| 3. Management of Proceeds | | |
| 3.1 | Documentation of Processes & Procedures | Confirm that the policies, processes and procedures for tracking financial flows of the bond proceeds to the Nominated Projects are in place. |
| 3.1.1 | Tracking of Proceeds | Review the allocation of funds to ensure they can be tracked against Nominated Projects. |
| 3.1.2 | Managing of Unallocated Proceeds | Review documentation for the management of bond proceeds for funds that are not allocated to a Nominated Project and review eligible temporary investments for unallocated proceeds. |
| 3.1.3 | Earmarking Funds | Confirm that the policies, processes and procedures to identify flows of proceeds related to the Bond have been established. |
| 4. Reporting | | |
| 4.1 | Bond Disclosure Documentation | Review the Issuer's Green Bond Framework and confirm plans to make the document publicly available. Confirm inclusion of necessary information within the Green Bond Framework. |
| 4.1.1 | Confirmation of Alignment | In the Green Bond Framework, confirm documentation and review areas of investment align with the Climate Bonds Standard and review statements of alignment with other relevant standards. |
| 4.1.2 | Uses of Proceeds | In the Green Bond Framework, confirm documentation and review expected uses of proceeds and the amounts allocated to activities in relevant sectors and subsectors. |

| REQUIREMENT | | ASSURANCE PROCEDURES |
|---|---|---|
| 4.1.3 | Decision-making Process | In the Green Bond Framework, confirm documentation of decision-making processes and positioning in the context of the Issuer's overarching objectives. |
| 4.1.4 | Sector Criteria Assumptions and Methodologies | In the Green Bond Framework, confirm documentation of assumptions and methodologies to evaluate conformance with Sector Criteria. |
| 4.1.5 | Temporary Investment Instruments | In the Green Bond Framework, confirm documentation of allowable temporary investment instruments. |
| 4.1.6 | Reporting Approach | In the Green Bond Framework, confirm disclosure of intended approach to providing Update Reports and/or undertaking periodic Assurance Engagements during term of bond to reaffirm conformance with the Climate Bonds Standard. |
| 4.1.7 | List of Nominated Projects | In the Green Bond Framework, confirm disclosure of list of Nominated Projects likely to be eligible. |
| 4.1.8 | Refinancing | In the Green Bond Framework, confirm disclosure of proportion of proceeds for refinancing, if applicable. |
| 4.2 | Disclosure Documentation | Confirm incorporation of key information in Disclosure Documentation. |
| 4.2.1 | Sector Criteria Disclosure | Confirm "investment areas," or alignment with the Climate Bonds Taxonomy and relevant Sector Criteria for Nominated Projects. |
| 4.2.2 | Temporary Investments | Confirm disclosure of eligible temporary investments for unallocated proceeds. |
| 4.2.3 | Verifier | Confirm disclosure of Verifier selected for Pre-Issuance and Post-Issuance Engagements. |
| 4.2.4 | Ongoing Reporting | Confirm disclosure of intended ongoing reporting on the Nominated Projects and allocation of proceeds. |
| 4.2.5 | CBI Disclaimer | Confirm incorporation of the CBI Disclaimer as provided in the Certification Agreement. |

# Appendix C.
## RESPONSIBILITIES AND QUALITY CONTROL

**Verifier's Responsibilities**

Kestrel Verifiers' responsibilities for confirming alignment of the Series 2022A Bonds with the Climate Bonds Standard and *Water Infrastructure* Criteria include:

- assess and certify the District's internal processes and controls, including selection process for projects and assets, internal tracking of proceeds, and the allocation system for funds;
- assess policies and procedures established by the District for reporting;
- assess the readiness of the District to meet the Climate Bonds Standard (V3.0) and *Water Infrastructure* Sector Criteria; and
- express a Reasonable Assurance conclusion.

**Issuer's Responsibilities**

Issuer was responsible for providing detailed information and documents relating to:

- The details of the Nominated Projects and Assets and the project selection process;
- Maintaining adequate records and internal controls designed to support the Climate Bond Pre-Issuance Certification process; and
- The collection, preparation, and presentation of the subject matter in accordance with the Climate Bonds Standard and Criteria.

**Independence and Quality Control**

Kestrel Verifiers provides green bonds advisory services for corporate and public finance issuers. The Kestrel Verification Team is committed to providing robust, transparent, and accurate verifications. For over 20 years Kestrel has been a trusted advisor to state and local governments, nonprofits, and corporations. Kestrel certifies that there is no affiliation, involvement, financial or non-financial interest in the Issuer or the projects discussed. Accredited as an Approved Verifier by the Climate Bonds Initiative, Kestrel is qualified to evaluate bonds against the Climate Bonds Initiative Standards and Criteria.

# Appendix D.

## CLIMATE BONDS STANDARD WATER INFRASTRUCTURE ADAPTATION & RESILIENCE SCORECARD

**CONTENTS**



CRITERIA: The project must score at least 60% of the maximum potential score in all parts of the Scorecard. Section 4 only needs to be completed for "Nature Based and Hybrid Infrastructure" only (see Criteria for detail)

| **Vulnerability Assessment - Section 1: Allocation**<br>(To be completed for all Water Infrastructure assets) | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 1.1 | Are there accountability mechanisms in place for the management of water allocation that are effective at a sub-basin and/or basin scale? | 1 | 1 | Disclosure | Several plans outline management of water allocations both locally in Louisville and at the Ohio River Basin scale.<br>Louisville Water Company is responsible for providing drinking water services in Louisville and surrounding areas. Water supply is sourced from the Ohio River upstream from downtown Louisville at the Zorn Avenue Pumping Station (which is part of Crescent Hill Water Treatment Plant). Water is also sourced from wells in the aquifer adjacent to the Ohio River at the B.E. Payne Water Treatment Plant. These wells use deep soils to filter water prior to conventional treatment in the B.E. Payne facility. Deep collector wells pull water through sands and gravel that naturally remove contaminants from the water.<br>Louisville Water is permitted by the Kentucky Division of Water for Ohio River withdrawals. The daily draw from the river and the aquifer is less than 0.2% of the 75-billion-gallon average daily flow.<br>Ohio River protection and monitoring are coordinated by the Ohio River Valley Water Sanitation Commission (ORSANCO), an interstate agency which manages and protects the Ohio River. Louisville Water Company is on the Water Users Advisory Committee.<br>(Louisville Water Company, 2019 Official Statement https://emma.msrb.org/ER1391021.pdf; Kentucky Division of Water; Louisville Water Company Source Water Protection Program required through the Safe Drinking Water Act) |

| Vulnerability Assessment - Section 1: Allocation<br>(To be completed for all Water Infrastructure assets) | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 1.2 | Are the following factors taken into account in the definition of the available resource pool? | 7 | 4 | Evidence | This factor reviewed at the basin-scale. The Ohio River is critical to inland transportation and connections to the Mississippi and Tennessee-Tombigbee rivers, municipal and industrial water supplies, recreation, and hydroelectric facilities. |
| | a. Non-consumptive uses (e.g., navigation, hydroelectricity) | | Y | | Yes, inland navigation systems are included in reconnaissance research and plans from the USACE. (USACE Ohio River Basin Comprehensive Reconnaissance Report). The Ohio Falls Generating Station operated by Louisville Gas & Electric harnesses hydroelectric power from the river (Source). |
| | b. Environmental flow requirements | | N | | Not identified |
| | c. Dry season minimum flow requirements | | N | | Not identified |
| | d. Return flows (how much water should be returned to the resource pool, after use) | | N | | Not identified |
| | e. Inter-annual and inter-seasonal variability | | Y | | Variability is accounted for at basin-wide and sub-basin scales. It is considered in permitting through the state Department for Environmental Protection through supply assessments and infrastructure planning for the District (Critical Repair and Reinvestment Plan) |
| | f. Connectivity with other water bodies | | Y | | Watershed management plans and assessments of climate change impacts include considerations of connected water bodies. |
| | g. Climate change impacts | | Y | | Discussed and considered in Ohio River Basin – Climate Change Pilot Study Report (factors such as temperature, shifts in industry, and increased frequency of extreme weather events are considered) (USACE and ORBA Formulating Climate Change Mitigation/Adaptation Strategies). Also included in the District’s Critical Repair and Reinvestment Plan. |

| Vulnerability Assessment - Section 1: Allocation<br>(To be completed for all Water Infrastructure assets) | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 1.3 | Are arrangements in place to accommodate the potentially adverse impacts of climate change on the resource pool? (E.g., using best available science to plan for future changes in availability, undertaking periodic monitoring and updating of plans as climate science improves.) | 1 | 1 | Evidence | The Critical Repair and Reinvestment Plan accommodates projections of potential adverse impacts from climate change in areas related to wastewater, stormwater, and flood protection. The Prepare Louisville Plan outlines necessary activities to accommodate projected increased frequency of extreme weather events and potential for flooding. MSD was involved in developing and many of the programs/projects directly support the goals and strategies within these plans. Examples include Plan 2040, Climate Change Vulnerability Assessment, Sustain Louisville, and Resilient Louisville.<br><br>Efforts to reduce regional GHG emissions and plan for and mitigate extreme heat events, which can cause failure in electrical and water delivery systems, are also underway. High heat leads to significant increases in water demand and can increase stress on critical infrastructure (Louisville Urban Heat Management Study).<br><br>*"As climate change and regional development lengthen periods in excess of these temperature thresholds, water delivery systems may be increasingly stressed, resulting in potential water main breaks and increasing the cost of managing these systems. Mitigation of the urban heat island effect provides a set of management strategies that can extend the life and efficient performance of critical urban infrastructure."* |
| 1.4 | Are arrangements in place to accommodate the potentially adverse impacts of climate change on the resource pool? (E.g., using best available science to plan for future changes in availability, undertaking periodic monitoring and updating of available pool.) | 1 | 1 | Evidence | Louisville MSD is committed to an adaptive management approach to accommodate changing conditions and to respond to data collected through monitoring networks (IOAP). The 20-year Facility Plan includes projected rainfall intensity, duration, and frequency (IDF) curves for 2035 (reflecting and accounting for potential impacts from climate change" (Facility Plan p. 4)). |
| 1.5 | Are there plans to define "exceptional" circumstances, such as an extended drought, that influence the allocation regime? (E.g., triggers water use restrictions, reduction in allocations according to pre-defined priority uses, suspension of the regime plan, etc.) | 1 | 1 | Evidence | Water shortage response plans are required by the Kentucky Department for Environmental Protection. Louisville's Hazard Mitigation Plan includes definitions and defines triggers related to hazards and "exceptional circumstances" such as flooding, storms, extreme heat, and drought. The Kentucky Division of Water monitors hydrologic conditions throughout the state, including drought indices across 15 Drought Management Regions. Flooding conditions are also a key determinant of operations (https://louisvillemsd.org/sites/default/files/inline-files/lm_hmp_2016_final.pdf and 2019 update: https://louisvillemsd.org/programs/programs-and-projects/floodplain-management/flood-related-documents) |
| 1.6 | For international / trans boundary basins, is there a legal mechanism in place to define and enforce water basin allocation agreements? | 1 | 0 | Disclosure | Not identified |

| Vulnerability Assessment - Section 1: Allocation<br>(To be completed for all Water Infrastructure assets) | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 1.7 | Are water delivery agreements defined on the basis of actual in situ seasonal / annual availability instead of volumetric or otherwise inflexible mechanisms? | 1 | 1 | Evidence | Withdrawals from the Ohio River are permitted based on the rated treatment capacity. (Permits through the Kentucky Division of Water) (e.g., 2019 Louisville Water Company OS: https://emma.msrb.org/ER1391021.pdf) |
| 1.8 | Has a formal environmental flows (e- flows)/sustainable diversion limits or other environmental allocation been defined for the relevant sub-basin or basin? (If there is a pre-existing plan, then has the environmental flows program been updated to account for the new project?) | 1 | 1 | Evidence | Allowable discharges are permitted and monitored on a consistent basis. The Consent Decree required elimination of SSOs and control of CSOs. Additionally, reservoir storage and withdrawals must not "endanger other authorized purposes (e.g., flood control, recreation, low-flow augmentation, fish and wildlife habitat, etc.)" (USACE Ohio River Basin Comprehensive Reconnaissance Report, p. 49). |
| 1.9 | Have designated environmental flows / allocation programs been assured / implemented? | 1 | 0 | Evidence or Disclosure | Not identified |
| 1.10 | Has a mechanism been defined to update the environmental flows plan periodically (e.g., every 5 to 10 years) in order to account for changes in allocation, water timing, and water availability? | 1 | 1 | Evidence | Sanitary Surveys by the Kentucky Department of Environmental Protection are completed every three years for community water systems and includes an assessment of source water and infrastructure adequacy. |
| 1.11 | Is the amount of water available for consumptive use in the resource pool linked to a public planning document? (E.g., a river basin management plan or another planning document – please indicate) | 1 | 1 | Evidence | Defined by permitting regulations and supply adequacy assessments (Title 401 – Energy and Environment Cabinet – Department for Environmental Protection Chapter 4 – Water Resources and https://eec.ky.gov/Environmental-Protection/Water/Protection/Pages/WaterWithdrawal.aspx). |
| 1.12 | If present, is the river basin plan a statutory instrument that must be followed rather than a guiding document? | 1 | 1 | Disclosure | The consent decree is a federally enforceable agreement for the District (https://louisvillemsd.org/consent-decree). |
| Total Allocation Score | | 18 | 13/18 | | |
| Eligibility Criterion 1 passed/not passed | | | 72% | | Passed |

| Vulnerability Assessment - Section 2: Governance<br>(To be completed for all Water Infrastructure assets) | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 2.1 | Have water entitlements been defined according to one of the following?<br>▪ Purpose that water may be used for<br>▪ Maximum area that may be irrigated<br>▪ Maximum volume that may be taken in a nominated period<br>▪ Proportion of any water allocated to a defined resource pool | 1 | 1 | Disclosure | Entitlement is defined by the *proportion of any water allocated to a defined resource pool* and *maximum volume that may be taken in a nominated period* through the Kentucky Division of Water. Entitlements must disclose uses (domestic, industrial, commercial, municipal) and meet supply adequacy requirements to ensure base-level flows for any given water supply reservoir. Supply adequacy must also account for aquatic life, recreational uses, water conservation and demand management, quantity impacts as a result of the withdrawals, downstream or down-gradient impacts, and competing uses (Title 401 – Energy and Environment Cabinet – Department for Environmental Protection Chapter 4 – Water Resources).<br>Also of note: "Due to the abundant supply in the River, the [Louisville Water Company] anticipates no volume restrictions on its licenses to withdraw water from the Ohio River or the aquifer in the future…The Company's daily withdrawal from the Ohio River and its adjacent aquifer is less than 0.2% of the 75-billion-gallon average daily flow." (Louisville Water Company 2019 Official Statement https://emma.msrb.org/ER1391021.pdf) |
| | Is the surface water system currently considered to be neither over allocated nor over-used?<br>N.B. Over-allocated would be if e.g. current use is within sustainable limits but there would be a problem if all legally approved entitlements to abstract water were used.<br>Over-used would be if existing abstractions exceed the estimated proportion of the resource that can be taken on a sustainable basis. | 1 | 1 | Evidence | The Ohio River Basin is not considered to be over-allocated. The primary concern for water management agencies is the potential for extreme weather events to become more common (USACE and ORBA Formulating Climate Change Mitigation/Adaptation Strategies, p. 19). |
| 2.3 | If monitored and the investment uses groundwater, is the groundwater water system currently considered to be neither over- allocated nor over-used?<br>N.B. Over-allocated would be if e.g. current use is within sustainable limits but there would be a problem if all legally approved entitlements to abstract water were used.<br>Over-used would be if existing abstractions exceed the estimated proportion of the resource that can be taken on a sustainable basis. | 1 | 1 | Evidence | The nominated assets do not directly involve groundwater resources. Nonetheless, groundwater in the Ohio River Basin originates from four primary aquifers: Pennsylvania/Mississippian, Glacial Aquifer, Mississippi Embayment, and Ozark Aquifers (USACE and ORBA Formulating Climate Change Mitigation/Adaptation Strategies, p. 20). The Mississippi Embayment is considered to be a depleted aquifer, but input from the (upstream) Ohio River is not commonly cited as a contributing factor (https://pubs.usgs.gov/sir/2013/5079/SIR2013-5079.pdf). |

| Vulnerability Assessment - Section 2: Governance<br>(To be completed for all Water Infrastructure assets) | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 2.4 | Is there a limit to the proportion (e.g. percentage) of water that can be abstracted? How might this need to change if water supplies become more variable due to climate change? (e.g. will having sufficient amounts to meet basic human needs take precedence over others?) | 1 | 1 | Evidence | Permitted extraction must be followed |
| 2.5 | Are governance arrangements in place for dealing with exceptional circumstances (such as drought, floods, or severe pollution events), especially around coordinated infrastructure operations? | 1 | 1 | Disclosure | Louisville's Hazard Mitigation Plan defines triggers related to hazards and "exceptional circumstances" such as flooding, storms, extreme heat, and drought. The Kentucky Division of Water monitors hydrologic conditions throughout the state, including drought indices across 15 Drought Management Regions. Flooding conditions are also a key determinant of operations (Hazard Mitigation Plan and updates). |
| 2.6 | Is there a process for re-evaluating recent decadal trends in seasonal precipitation and flow OR recharge regime, in order to evaluate "normal" baseline conditions? | 1 | 1 | Evidence | Multi-decadal water resources assessments are required by the state environmental agency, and local hydraulic and hydrologic modeling is updated to improve projections for changes in extreme weather events. The USACE has also completed an assessment of monitoring and projections for adaptation. Rain gauge analyses and updating rainfall data is directly informs re-evaluations of recent trends and adapt management strategies or capital improvement plans. |
| 2.7 | Is there a formal process for dealing with new entrants? | 1 | 1 | Disclosure | New withdrawals in Kentucky are governed by Kentucky Energy and Environment Cabinet and require a specific set of procedures and assessments to comply, including supply evaluations and planning, water protection, and land-use evaluations affecting the resource pool (Title 401 – Energy and Environment Cabinet – Department for Environmental Protection Chapter 4 – Water Resources and https://eec.ky.gov/Environmental-Protection/Water/Protection/Pages/WaterWithdrawal.aspx). |
| 2.8 | For existing entitlements, is there a formal process for increasing, varying, or adjusted use(s)? | 1 | 1 | Disclosure | A formal process exists for updating the Consent Decree and the District's obligations under the agreement. Substantially adjusting operations, including withdrawal or discharges, requires permit adjustments. Adjustments or changes to drinking water supply sources or allocations requires notification and assessment through the KY permitting agency (Title 401 – Energy and Environment Cabinet – Department for Environmental Protection Chapter 4 – Water Resources). |
| 2.9 | Is there policy coherence across sectors (agriculture, energy, environment, urban) that affect water resources allocation, such as a regional, national, or basin-wide Integrated Water Resources Management (IWRM) plan? | 1 | 1 | Evidence | Multiple basin-wide cooperative planning and monitoring activities are in place. The Ohio River Valley Water Sanitation Commission, Ohio River Basin Alliance, and US Army Corps of Engineers are involved in IWRM planning (Plan for the Ohio River Basin 2020-2025). |

| Vulnerability Assessment - Section 2: Governance<br>(To be completed for all Water Infrastructure assets) | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 2.10 | Are obligations for return flows and discharges specified and enforced? | 1 | 1 | Disclosure | Obligations and requirements for discharge amount and potential negative impacts on water quality are specified and enforced through National Pollution Discharge Elimination System permitting through the Kentucky Department for Environmental Protection. |
| 2.11 | Is there a mechanism to address impacts from users who are not required to hold a water entitlement but can still take water from the resource pool? | 1 | 0 | Disclosure | Not identified |
| 2.12 | Is there a pre-defined set of priority uses within the resource pool? (E.g., according to or in addition to an allocation regime) | 1 | 0 | Disclosure | Not identified |
| 2.13 | If there are new entrants and/if entitlement holders want to increase the volume of water they use in the resource pool and the catchment is open, are these entitlements conditional on either assessment of third party impacts, an Environmental Impact Assessment (EIA) or an existing user(s) forgoing use? | 1 | 1 | Evidence | Depending upon the activity, activities affecting the Ohio River would be subject to a formal environmental review process (National Environmental Policy Act) and/or local environmental assessments. Submittal for permitting requires assessment of environmental impacts. |
| 2.14 | Are withdrawals monitored, with clear and legally robust sanctions? | 1 | 1 | Evidence | Withdrawals are recorded daily and reported monthly to the Kentucky Department for Environmental Protection through the Monitoring Results Submittal Form and Water Withdrawal Report Form. The District's NPDES permit also requires monitoring and reporting on discharges (General information from the Kentucky Energy and Environment Cabinet) |
| 2.15 | Are there conflict resolution mechanisms in place? | 1 | 1 | Disclosure | Formal adaptive management processes for requesting adjustments to a Consent Decree are in place. Additionally, procedures for conflict resolution related to water supply are outlined in Kentucky statues (Title 401 – Energy and Environment Cabinet – Department for Environmental Protection Chapter 4 – Water Resources). |
| Total Governance Score | | 15 | 13/15 | | |
| Eligibility Criterion 2 passed / not passed | | | 87 % | | Passed |

| Vulnerability Assessment - Section 3: Technical Diagnostics<br>(To be completed for all Water Infrastructure assets) | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 3.1 | Does a water resources model of the proposed investment and ecosystem (or proposed modifications to existing investment and ecosystem) exist? Specify model types, such as WEAP, SWAT, RIBASIM, USACE applications). Scale should be at least sub-basin. | 1 | 1 | Evidence | InfoWorks ICM is used for integrated water system and sanitary sewer system and combined sewer system modeling. HEC-RAS used for stormwater and watershed modeling. |
| 3.2 | Can the system model the response of the managed water system to varied hydrologic inputs and varied climate conditions? | 1 | 1 | Evidence | The model has dynamic inputs to address effects of varying conditions (such as addition/removal of structures, unique storm parameters and rainfall intensity-duration curves) on collection and treatment systems and other infrastructure in the District (MSD Design Manual). |
| 3.3 | Are environmental performance limits (ecosystem, species, ecological community) and/or ecosystem services specified? | 1 | 1 | Evidence | Environmental benefits analysis has set specific multi-year targets for projects (2021 IOAP Executive Summary – ES.1.3, p. ES-17). Wet Weather stream sampling and third party ORSANCO Ohio River water quality data collection has demonstrated direct water quality benefits from program implementation (2021 IOAP Executive Summary – ES.1.1.2, p ES-3). Robust in-system monitoring are also utilized to calibrate the models on a recurring basis and monitor system performance. |
| 3.4 | Can these performance limits be defined and quantified using the water resources model? | 1 | 1 | Evidence | Yes, performance targets will be monitored and quantified through the model (2021 IOAP Executive Summary – ES.1.3, p. ES-17). ORSANCO data is not directly used to quantify impacts in the water resources model. The model is a primary tool in Post-Construction Performance Monitoring (PCCM) and determining program compliance (2021 IOAP Volume 1 – Section 6.3, p. 6-7 through 6-24) |
| 3.5 | Have these limits been defined based on expert knowledge and/or scientific analysis? | 1 | 1 | Evidence | Environmental benefits and targets were set based on negotiations in the Amended Consent Decree and involved parties. |
| 3.6 | Are these performance limits linked to infrastructure operating parameters? | 1 | 1 | Evidence | Yes, impacts of specific projects and their characteristics are tied to the modeled elimination of SSOs (2021 IOAP Volume 1 – Section 6.3.4, p. 6-21), the combined sewer system's system-wide performance for CSOs (2021 IOAP Volume 1 – Section 6.3.5, p. 6-22) and other environmental benefits. System modelling informs MSD's real-time control (RTC) operating parameters in order to maximize system capacity. |
| 3.7 | Are these limits linked to an environmental flows regime? | 1 | 1 | Evidence | The targets are related to certain storm scenarios and conditions which are likely to have adverse impacts on water quality (runoff, discharges, etc) (2021 IOAP Volume 1 – Section 5.3.1, p. 5-14). For the Combined Sewer System, LTCP projects are designed to Typical Year Levels of Control. For the Separate Sewer System, SSDP projects are designed to 3-hour Cloudburst Storm Levels of Control. |
| 3.8 | For new projects, is there an ecolo gical baseline evaluation describing the pre-impact state? | 1 | 1 | Evidence | Yes, the Consent Decree is accompanied by baseline data/existing conditions and sets specific environmental targets to achieve through implementation of projects in the IOAP. |

| Vulnerability Assessment - Section 3: Technical Diagnostics<br>(To be completed for all Water Infrastructure assets) | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 3.9 | For rehabilitation / reoperation projects, is there an ecological baseline evaluation available before the projects was developed? | 1 | 1 | Evidence | Yes, the Consent Decree is accompanied by baseline data and sets specific environmental targets to achieve through implementation of projects in the IOAP. |
| 3.10 | Has there been an analysis that details impacts related to infrastructure construction and operation that has been provided? | 1 | 1 | Evidence | Hydraulic and hydrologic models are used to assess the impacts of construction or renovations. The District also requires evidence of no adverse downstream impacts as a result of new development in the Critical Repair and Reinvestment Plan, which is managed through the System Capacity Assurance Program (SCAP). |
| 3.11 | Are lost species and/or lost or modified ecosystem functions specified for restoration in the environmental evaluation? | 1 | 0 | | Not identified |
| 3.12 | Have regional protected areas / nature reserves been included in the analysis for impacts from the investment asset and future climate impacts? | 1 | 1 | Evidence | Yes, landscape inputs account for various land uses, including undeveloped areas or "nature reserves." |
| 3.13 | Does the model include analysis of regression relationships between climate parameters and flow conditions using time series of historical climate and stream flow data? | 1 | 1 | Evidence | Relationships between climate parameters and flow conditions are considered.<br>▪ CRRP Historical and Projected Precipitation Technical Memos<br>▪ CRRP Stormwater Volume 3 Executive Summary (ES.5, p. 16 of 28)<br>▪ Updated storm event analysis through 2021 |
| 3.14 | Does the model include climate information from a multi modal ensemble of climate projections (eg from the Climate Wizard or the World Bank's Climate Portal) to assess the likelihood of climate risks for the specified investment horizons (s)? | 1 | 1 | Evidence | Nine separate combinations of Atmospheric Ocean Global Climate Models and multiple emission scenarios were used for basin-wide model projections (USACE and ORBA Formulating Climate Change Mitigation/Adaptation Strategies, p. 12). |
| 3.15 | Are changes in the frequency and severity of rare weather events such as droughts and floods included? | 1 | 1 | Evidence | Yes, the District's protocols allow for modeling extreme weather events Level of Protection reviews consider rainfall projections and extreme weather events.CRRP Wastewater Volume 2 Executive Summary (ES.3.3, p. 11 of 47)<br>▪ CRRP Stormwater Volume 3 Executive Summary (ES.5, p. 16 of 28)<br>▪ CRRP Flood Protection Volume 4 Executive Summary (ES.3, p. 4 of 8) |
| 3.16 | Are sub-annual changes in precipitation seasonality included? | 1 | 1 | Evidence | Yes, the District's modeling protocols include seasonal dry and wet weather conditions. |

| Vulnerability Assessment - Section 3: Technical Diagnostics (To be completed for all Water Infrastructure assets) | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 3.17 | Is GCM climate data complemented with an analysis of glacial melt water and sea level rise risks, where appropriate (e.g., high or coastal elevation sites)? | 1 | 1 | Evidence | As an inland community, glacial melt and sea level rise are not direct risks, but the coincident frequency risk of extreme rainfall events during Ohio River Flood conditions is increasing due to climate change. Analyses and tools used by MSD integrate climate data from local, regional, and global scales. For example, the Ohio River Basin – Formulating Climate Change Mitigation/Adaption Strategies (USACE and ORBA 2017) considers Global Circulation Models in documenting the threat of extreme episodes becoming more prevalent and potent as well as less predictable (p. 6). |
| 3.18 | Is paleo-climatic data (e.g., between 10,000 and >1000 years before present) included? | 1 | 0 | Evidence | Not identified |
| 3.19 | Is the number of model runs and duration of model runs disclosed? | 1 | 1 | Evidence | The role and results of modelling in programmatic plans (IOAP and CRRP) is disclosed. For example, the IOAP project analysis included model simulations for preferred solution type and level of control that are used in a benefit-cost analysis to determine the preferred solution. |
| 3.20 | Has a sensitivity analysis been performed to understand how the asset performance and environmental impacts may evolve under shifting future flow conditions? | 1 | 1 | Evidence | Sensitivity analysis has been performed under varying scenarios such as precipitation projects. See example sensitivity analysis for wastewater system future conditions (CRRP Volume 2 Executive Summary (ES.3, p. 11 of 47). Facility Plans for each Water Quality Treatment Center service area consider future buildout conditions in their project outlook per 401 KAR 5:006. |
| 3.21 | Is directly measured climate data available for more than 30 years and incorporated into the water resources model? | 1 | 1 | Evidence | Historical Precipitation analysis included National Weather Service stations with 60+ years of data (one station's data dated back to 1893). Analysis of historic and future rainfall projections (per technical memorandums) was included in wastewater, stormwater, and flood protection project analyses in the CRRP.<br>• Stormwater and Drainage (CRRP Vol 3, Chapter 5, Section 5.2, p. 1 of 21)<br>• Flood Protection (CRRP Vol 4, Chapter 2, Section 2.3, p. 8 of 16)<br>"For projects directly affected by precipitation events, the Facility Plan includes projected rainfall intensity, duration, and frequency (IDF) curves for year 2035. These projections consider both statistical trends going back 60 years, along with state-of-the art global circulation models that project future precipitation conditions" (http://louisvillemsd.org/sites/default/files/file_repository/CRRP%2020-Year/Volume_2_Wastewater-Collection-and-Treatment.pdf). |
| 3.22 | Has evidence demonstrated that climate change has already had an impact on operations and environmental targets? Are these impacts specified and, to the extent possible, quantified? These impacts should be responded to directly in the Adaptation Plan. | 1 | 1 | Evidence | Yes, climate change is viewed as already having impacts on operations and quantified impacts are available (USACE and ORBA Formulating Climate Change Mitigation/Adaptation Strategies; Critical Repair and Reinvestment Plan). |

| Vulnerability Assessment - Section 3: Technical Diagnostics<br>(To be completed for all Water Infrastructure assets) | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 3.23 | Does the evidence suggest that climate change will have an impact on operations and environmental targets over the operational lifespan? Are these impacts specified and, to the extent possible, quantified? These impacts should be responded to directly in the Adaptation Plan. | 1 | 1 | Evidence | Yes, climate change is expected to have an impact on the Ohio River Basin and on the Louisville region (Critical Repair and Reinvestment Plan). |
| 3.24 | Is there a discussion of the uncertainties associated with projected climate impacts on both operations and environmental impacts? | 1 | 1 | Evidence | The Report on Lessons Learned from USACE Climate Change Adaptation Pilot Projects Fiscal Years 2010-2015 (USACE 2017) describes how "climate change increases uncertainty because (1) the rate of change itself appears to be changing; (2) feedbacks can enhance or reduce consequences in unexpected ways; and (3) our knowledge of the climate system, and models of that system, is incomplete." It also acknowledges the need for "nonstationarity" approaches in federal planning efforts since past events cannot reliably predict future climate change risks. |
| Total Governance Score | | 24 | 21/24 | | |
| Eligibility Criterion passed / not passed | | | 88% | | Passed |

## Vulnerability Assessment - Section 4: Nature Based Solutions

(to be completed for nature-based solutions and hybrid water infrastructure only)

I.e. this section only needs to be completed if:

A. As a nature based solution, the asset reflects the intentional use of natural and / or nature based features, processes, and functions, as an integral part of addressing a human need and doing so in a manner that protects, manages, restores, and / or enhances natural features, processes, and systems in a functioning and sustainable manner.

B. Where feasible, the asset prioritizes natural features over nature – based features. Such features include the protection, restoration, expansion, and / or creation of natural systems and processes as an explicit component of the desired project outcomes.

## Section 4.1: Site Inventory

How well do we understand the systems and processes at the project site?

| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
|---|---|---|---|---|---|
| 4.1.1 | Is this a "greenfield site" (i.e., undeveloped land used for agriculture, landscape design, or left to evolve naturally)? If so, will existing ecosystem services be expanded / supported / maintained? | 1 | 1 | Evidence | The intent of green infrastructure is to harness ecosystem services and prioritize them above grey infrastructure to support and expand natural processes. MSD tracks all green infrastructure projects (e.g. Green Infrastructure Program Reports; 2021 IOAP Green infrastructure program updates (Vol 1, Sectons 2.2.3, 4.6, and 6.3.6.1)). Additionally, the MS4 permit required continued green program activities. |
| 4.1.2 | Has an eco-hydrological model been developed?<br><br>Specify model type, such as WEAP, SWAT, RIBASIM,<br><br>USACE.<br><br>Is this a quantitative model?<br><br>Has it been calibrated against site data?<br><br>Does the model include water quantity? | 4 | 4 | Evidence | Modeling for stormwater management uses USACE HEC-HMS and HEC-RAS or HEC-1 and HEC-2. Models are quantitative and historic stream gauge data or regressions based on USGS data are used for calibration (Watershed Master Plan).<br><br>Infoworks ICM used for wastewater system evaluations and includes variable inputs and site-specific factors, and provides quantified outputs. |
| 4.1.3 | Has the calibrated eco-hydrological model been<br><br>reviewed by an independent expert? | 1 | 1 | Evidence | Yes, widely used and accepted modeling tools |

| Section 4.1: Site Inventory<br>How well do we understand the systems and processes at the project site? | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 4.1.4 | Have sources of pollution been analyzed for the following (even if none have been found)?<br>▪ Point source<br>▪ Nonpoint source | 2 | 2 | Evidence | A set of Source Water Protection Plans exists for the Ohio River Basin that outline, among other things, point source pollution detection.<br>As summarized: “Required by the Safe Drinking Water Act Amendments to protect public drinking water supplies, the Source Water Assessment Program requires states to: delineate source water protection areas for public water systems; identify the origins of regulated and certain unregulated contaminants in the delineated area; determine the susceptibility of public water supplies to contamination by sources inventoried. States are also required to describe how they will attempt to coordinate assessments of interstate waterways with other states, tribes and nations” (ORSANCO SWAP).<br>Kentucky Division of Water permits for MSD Water Quality Treatment Centers are housed online in the ProjectWIN library (https://www.msdprojectwin.org/library/#6-76-operational). Amended Consent Decree reports are compiled on a semi-annual basis (https://www.msdprojectwin.org/library/#6-473-2acd-annual-reports).<br>The Department operates the Municipal Separate Storm Sewer System (MS4) to address nonpoint source pollution associated with stormwater runoff (MS4 Program).<br>Kentucky Department for Environmental Protection also has a nonpoint source pollution program and associated annual reports (e.g. 2020 Report). |
| Total Site Inventory Score | | 8 | 8/8 | | |
| Eligibility Criterion passed / not passed | | | 100% | | Passed |

| Section 4.2: Ecological Baselines For Management<br>Do we understand how the ecological characteristics of the site will evolve over time? | | | | | |
|---|---|---|---|---|---|
| | | *Max Score* | *Actual Score* | *Requirement: Evidence and/or Disclosure* | *Comments* |
| 4.2.1 | Is there an inventory of species that can be used as a baseline for vegetation and animal species? | 1 | 1 | Evidence | Yes, biological species and habitat assessments inventory (what kinds, how many, and health of organisms) in Jefferson County streams exists. Data on these assessments is stored in LIMS with metrics reported in the State of our Streams Water Quality Synthesis Report (https://www.msdprojectwin.org/library/#6-52-water-quality-synthesis-reports-ms4 & https://louisvillemsd.org/sites/default/files/file_repository/2016%20Synthesis%20Report%20pages%20FINAL.pdf). At least one basin-wide inventory is also presented in USACE Ohio River Basin Comprehensive Reconnaissance Study (pp. 33 & 80). |
| 4.2.2 | If there is an inventory of species that can be used as a baseline for vegetation and animal species, does it specify or identify endangered / threatened species, ecological communities, or categories of species? | 1 | 1 | Evidence | Yes, USACE inventory includes threatened and endangered species by state (USACE Ohio River Basin Comprehensive Reconnaissance Report, p. 33). |
| 4.2.3 | Have studies on current or potential climate impacts on key species (e.g., endangered or threatened species) been included? | 1 | 1 | Evidence | Yes, potential impacts of climate change such as higher water temperatures and changes in water quality as a result of increased frequency of flooding events have been evaluated (e.g., USACE and ORBA Formulating Climate Change Mitigation/Adaptation Strategies, pp. 2 & 43; also Ohio River Basin Fish Habitat Partnership and species priority lists). |
| 4.2.4 | Is the flow regime used as a basis for ecological management? | 1 | 0 | Evidence | Not identified |

| Section 4.2: Ecological Baselines For Management<br>Do we understand how the ecological characteristics of the site will evolve over time? | | | | | |
|---|---|---|---|---|---|
| | | *Max Score* | *Actual Score* | *Requirement: Evidence and/or Disclosure* | *Comments* |
| 4.2.5 | Is there a climate trends analysis for the site or region based on at least 30 years of climate data? | 1 | 1 | Disclose | Forecasts are presented at the Hydrologic Unit Code-4 sub-basin level through three 30-year time periods between 2011 and 2099. Analysis of historic and future rainfall projections are included in wastewater, stormwater, and flood protection project analyses in the CRRP.<br>"For projects directly affected by precipitation events, the Facility Plan includes projected rainfall intensity, duration, and frequency (IDF) curves for year 2035. These projections consider both statistical trends going back 60 years, along with state-of-the art global circulation models that project future precipitation conditions" (http://louisvillemsd.org/sites/default/files/file_repository/CRRP%2020-Year/Volume_2_Wastewater-Collection-and-Treatment.pdf) |
| 4.2.6 | Is there an assessment of exotic invasive species? | 1 | 1 | Evidence | Yes, general assessments available in Ohio River Basin Comprehensive Reconnaissance Report (p. 82 & 144). Invasive Species List is also compiled in the District's Design Manual. |
| 4.2.7 | If there is an assessment of exotic invasive species, has a plan been developed to cope with exotic invasive species? | 1 | 0 | Evidence | Need for sub-basin adaptation plans for invasives identified, but comprehensive management plan not yet developed (USACE and ORBA Formulating Climate Change Mitigation/Adaptation Strategies; Design Manual). |
| 4.2.8 | Has there been an assessment of trade-offs between reliability vs environmental benefits to support decision making processes? | 1 | 0 | Evidence | Recognition of increased competition between human needs and ecological system functions is recognized, but a qualitative or quantitative assessment of trade-offs was not identified (USACE and ORBA Formulating Climate Change Mitigation/Adaptation Strategies). |
| Total Ecological Management Score | | 8 | 5 /8 | | |
| Eligibility Criterion passed / not passed | | | 63 % | | Passed |

| Section 4.3: Data Inventories of Localized & Indigenous Assets<br>Do we have access to adequate, credible data about the project site? | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 4.3.1 | Is there an inventory of existing water-related ecosystem services based on 30 or more years of data? | 1 | 1 | Evidence | Yes, described and summarized (USACE and ORBA Formulating Climate Change Mitigation/Adaptation Strategies, p. 21) and in Critical Repair and Reinvestment Plan. |
| 4.3.2 | Does any existing inventory of water-related ecosystem services related to runoff / land-use include the following data?<br>▪ Fire regime<br>▪ Sediment / erosion load<br>▪ Nutrient load<br>▪ Land-use change | 3 | 3 | Evidence | p. 26 land-use change<br>p. 25 forest and fisheries production as related to nutrient load and sediment pollution<br>p. 28 fire regime<br>(USACE and ORBA Formulating Climate Change Mitigation/Adaptation Strategies) |
| 4.3.3 | Do inventories of water-related ecosystem services related to water *quality* include the following data:<br>▪ Water quality for environmental services (e.g., habitat, ecological communities, erosion)<br>▪ Water quality for human needs / services (e.g., drinking water, agriculture) | 2 | 1 | Evidence | Data for water quality across the basin that directly affects both human needs and environmental services is tracked on a consistent basis (ORSANCO). Direct link and tracking of connections between water quality factors and environmental services identified in MSD's Synthesis Report (2016) (Executive Summary – page 3).<br>IOAP values-based alternative analyses established by the Wet Weather Team include environmental enhancement and eco-friendly solutions among the five project-specific core values. The CRRP development built on the same methodology, validating and updating these community values (2021 IOAP, Volume 1, Section 2.5, p.2-14 & CRRP Volume 1, Chapter 3.2, p. 3 of 15). |
| 4.3.4 | Is there an existing inventory of water-related ecosystem services related to water *quantity*?<br>▪ Water quantity for environmental services (e.g., habitat, flow regime)<br>▪ Water quality for human needs / services (e.g., service reliability) | 2 | 1 | Evidence | The CRRP values-based alternative analyses updated by the Wet Weather Team included public health protection, sustainability, and property protection among the six community values (CRRP Volume 1, Chapter 3.2, p. 3 of 15).<br>Inventory of water quantity for human uses is also available in USACE Ohio River Basin Comprehensive Reconnaissance Report (e.g., Raw water intakes p. 50; land cover types p. 15). |
| Total Existing Inventories Score | | 8 | 6/8 | | |
| Eligibility Criterion passed / not passed | | | 75% | | Passed |

| Section 4.4: Broader Ecosystem Impacts<br>Do we understand how the project's impacts may extend beyond the site? | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 4.4.1 | Has there been a determination of proposed / estimated impacts from project construction and operations regarding local, upstream, and downstream species / ecological communities? | 1 | 1 | Evidence | Yes, projected impacts of capital projects are determined using modeling results. The MS4 team also completes a State of the Streams report which compiles water quality data around the District. It specifically reviews changes and trends in water quality (discussed in 4.4.4 in more detail). |
| 4.4.2 | Has there been a determination of proposed / estimated impacts on existing local, upstream, and downstream eco-hydrological systems from modification regarding:<br>▪ Pollution<br>▪ Downstream flow regime<br>▪ Groundwater impacts<br>▪ Land tenure (e.g., public vs private) | 4 | 3 | Disclose | Estimated impacts on downstream flows, pollution, and land uses are available (IOAP LTCP vol 2, e.g., p. ES-25). For example, impact of certain pump station failures on business, homes and neighborhoods; pollution prevention as a result of treatment capacity expansion; and potential impacts on discharge volume into various creeks. |
| 4.4.3 | Has there been a determination of proposed / estimated impacts and benefits on eco-hydrological systems from changes in allocation via the following?<br>▪ Relevant environmental flows management plans<br>▪ Groundwater management plans | 2 | 0 | Disclose | Not identified |
| 4.4.4 | Has the monitoring system contributed to the development and goals of the basin management plan? | 1 | 1 | Disclose | Yes, identified and expected changes in air and water temperatures, shifts in industry, and increased frequency and duration of extreme weather events have impacted management plans (USACE Ohio River Basin Comprehensive Reconnaissance Report)<br><br>The District's Design Manual has also adopted updates based on results from monitoring networks (e.g., Rainfall Analysis Update based on NOAA data; Design Manual)<br><br>The MS4 team completes a State of the Streams report which compiles water quality data for all Jefferson County watersheds. Stream health parameters include fish, insect, and algae biological samples; habitat assessment; bacteria, nutrient, suspended solids, etc. in stream samples; and water temperature, dissolved oxygen, and flow parameters from in-stream meters. It specifically reviews changes and trends in water quality. Additionally, we've seen the benefits of completed projects through ORSANCO data and wet weather sampling data. The 2nd Amended Consent Decree acknowledges water quality benefits and environmental progress made since Consent Decree projects started in 2005 (2021 IOAP Executive Summary, ES.1.1.2, p. ES-3). |
| Total Broader Impacts Systems Score | | 8 | 5/8 | | |
| Eligibility Criterion passed / not passed | | | 63 % | | Passed |

| Section 4.5: Monitoring & Management Systems<br>Do we have effective management processes and tools to maintain ecological integrity over time? | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| 4.5.1 | Have target performance indicators been explicitly defined for:<br>▪ Infrastructure services<br>▪ Ecosystem services | 1 | 1 | Evidence | Defined performance indicators are available in the Critical Repair and Reinvestment Plan and include factors such as CSO and SSO elimination or management and related water quality standards. |
| 4.5.2 | Is there a monitoring plan in place for infrastructure performance indicators? | 2 | 2 | Evidence | The 2021 IOAP documents Post-Construction Performance Monitoring (PCCM) compliance metrics (2021 IOAP Volume 1 – Section 6.3, p. 6-7 through 6-24)<br>Discharge monitoring and annual MS4-related reporting will continue indefinitely.<br>At a local scale, the District maintains a Long Term Monitoring Network throughout the 11 watersheds in Jefferson County https://www.louisvillemsd.org/sites/default/files/inline-files/Web_FINALcompiledAR%202017-11-7jab1.pdf. |
| 4.5.3 | Is there a monitoring plan in place for ecosystem performance indicators? | 2 | 2 | Evidence | Yes, ORSANCO operates monitoring programs for factors with significant effects on ecosystem functions (ORSANCO Data).<br>MSD has developed a Stormwater Quality Management Plan for program permit compliance (https://louisvillemsd.org/sites/default/files/file_repository/Water%20Quality/PDF/SWQMP%20-%20compiled%20for%20web.pdf) as well as a quality assurance project plan for stormwater data and process management. |
| 4.5.4 | Are monitoring outcomes connected to the decision making and management / operations process? | 1 | 1 | Evidence | Adaptive management is integrated into decision-making and long-term planning. |
| 4.5.5 | Is there a multi-stakeholder basin management plan? | 1 | 1 | Disclose | ORSANCO operates a cooperative management approach and has multiple programs which allow for collaboration among federal and state agencies across member states (ORSANCO Programs). At the local level, MSD's Wet Weather Team serves as a consensus-seeking stakeholder body that represents a cross-section of the community and provides input on Consent Decree and Capital program implementation. |
| Total Monitoring and Management Systems Score | | 6 | 6/6 | | |
| Eligibility Criterion passed / not passed | | | 100 % | | Passed |

| Section 5: Adaptation Plan<br>(To be completed for all Water Infrastructure assets) | | | | | |
|---|---|---|---|---|---|
| | | Max Score | Actual Score | Requirement: Evidence and/or Disclosure | Comments |
| AP.1 | Is there a plan to restore or secure lost/modified ecosystem functions / species? | 1 | 1 | Evidence | The Prepare Louisville Plan (Adaptation Plan) includes preservation of natural capital as one of the seven primary Strategies to Prepare for Change. The Critical Repair and Reinvestment Plan also addresses adaptation. |
| AP.2 | Is the adaptation plan for environmental targets / infrastructure robust across specified <u>observed</u> / recent climate conditions? | 1 | 1 | Evidence | The Adaptation Plan has specified goals in response to observed conditions, including expanded range of non-native vegetation, tree canopy and habitat loss, and increased frequency of extreme storms (p. 47). The District's Design Manual has also already been modified to account for shifting conditions. MSD was involved in developing multiple long-range plans and the District's programs/projects directly support the goals and strategies within these plans (Plan 2040; Climate Change Vulnerability Assessment; Sustain Louisville; and Resilient Louisville). |
| AP.3 | Is the adaptation plan for environmental targets / infrastructure robust across specified <u>projected</u> climate conditions? | 1 | 1 | Evidence | The Adaptation Plan has targets related to projected changes, including sewer and flood mitigation projects to address the most at-risk infrastructure. Certain roads, highways, and neighborhoods are particularly flood-prone (for example, p. 47). Sub-volumes of the Critical Repair and Reinvestment Plan address projected changes in rainfall, etc. and infrastructure design response. Larger-scale adaptation plans and projections are also available and used to inform the District's planning (USACE and ORBA Formulating Climate Change Mitigation/Adaptation Strategies). |
| AP.4 | Is there a monitoring plan designed to track ongoing progress and impacts to inform future decisions? | 1 | 1 | Evidence | Discharge monitoring, in-system flow monitoring, and stream monitoring will continue indefinitely and the District has an adaptive management policy. Each of these components serve to track progress and inform future program decisions.<br>▪ IOAP PCCM and Adaptive Management (2021 IOAP Volume 1 – Section 6.3, p. 6-7 through 6-24)<br>▪ CRRP PCCM and Adaptive Management (Volume 1, Section 3.6, p. 12 of 15)<br>▪ MS4 SQMP and QAPP |
| AP.5 | Is there a plan to reconsider on a periodic basis for operational parameters, governance and allocation shifts, and environmental performance targets? | 1 | 1 | Evidence | Multiple programs and monitoring parameters inform changes in operations, including the Post Construction Compliance Monitoring Program; Strategic Business Plan and critical success factors/key performance indicators; and Real Time Control operational assessments |
| Total Adaptation Plan Score: | | 5 | 5/5 | | |
| Eligibility Criterion passed / not passed | | | 100% | | Passed |