REPORT ON OPERATIONS FOR 2016

B&V PROJECT NO. 195184

PREPARED FOR

Sewerage and Water Board of New Orleans

12 MARCH 2018

JULIEN ENGINEERING & CONSULTING

Bruno & Tervalon LLP Certified Public Accountants

BLACK & VEATCH

MISSION STATEMENT

Our mission is to provide safe drinking water to everyone in New Orleans;
To remove waste water for safe return to the environment;
To drain away storm water;
To provide water for fire protection;
To provide information about products and services;
And to do all of this continuously at a reasonable cost to the community

VISION STATEMENT

Our vision is to have the trust and confidence of our customers
for reliable and sustainable water services

OUR VALUES

We will focus on our customers and stakeholders
We will treat each customer and employee with dignity and respect
We will value each employee, their work, and their commitment
We will be truthful, trustworthy and transparent
We will be knowledgeable and diligent in the performance of our duties
We will use financial resources prudently
We will be accountable for our performance
We will continuously improve our performance
We will ensure that the systems that provide our services remain viable for future generations
We will remain on the job and will be prepared for storms and other risks

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March 12, 2018

Sewerage & Water Board of New Orleans
625 St. Joseph Street
New Orleans, LA 70165

Dear Board Members:

In accordance with our agreement, we are submitting this Report on Operations of the Water, Sewerage, and Drainage Departments for the year 2016. The report presents the findings of our analysis to confirm compliance with the covenants of the General Water Revenue Bond Resolution and the General Sewerage Revenue Bond Resolution.

The report also contains projections of expected future financial activity for the three departments for the period of 2017 through 2021. These projections are based upon historical trends and the Board's operating and capital budgets. Projected costs include an allowance for anticipated future price inflation.

We wish to acknowledge the cooperation and assistance of utility staff in providing guidance and information for the study.

We appreciate the opportunity to be of service to the Sewerage and Water Board.

Very truly yours,
BLACK & VEATCH MANAGEMENT CONSULTING, LLC

Anna White
Principal Consultant

Enclosure

Table of Contents

Table of Contents ..... **i**
Introduction **1**
Purpose and Scope 1
Definitions 1
History 1
Water Department 2
Sewerage Department 2
Drainage Department 3
General 4
Sources of Financial Data 5
Summary of Findings 5
Water Department 5
Sewerage Department 6
Drainage Department 7
Other Findings 7
2017 Power and Pumping Emergency Event 8
Facilities Evaluation – Operation, Maintenance, and Reconstruction **9**
Introduction 9
Staffing 10
Water Purification Plants 11
Carrollton Water Purification Plant 11
Algiers Water Purification Plant 13
Water Quality Laboratory 14
Water Pumping and Power 15
Central Control 17
Sewage Treatment Plants 17
East Bank Sewage Treatment Plant 17
West Bank Sewage Treatment Plant 19
Sewerage and Drainage Pumping Stations 20
Facility Maintenance 21
Engineering 22
Networks 24
Support Services 26
Environmental Affairs 28
Status of Consent Decree for Sewerage System 30
Summary of Findings 30

Water Department **33**
Adherence to Water Revenue Bond Resolution Requirements 33
Payment of Indebtedness; Limited Obligations 33
Limitations on Indebtedness 33
Covenants and Representations of Board 33
Covenants with Credit Banks, Insurers, etc. 33
Operation and Maintenance 33
Free Service, Competing Service, Billing and Enforcement of Charges 34
Sale or Encumbrance of System 34
Insurance 34
Damage, Destruction, Condemnation and Loss of Title 34
Records and Accounts; Inspections and Reports 34
Capital Budget 35
2016 Water Department Operations 35
Water Use 35
Operating Revenues 36
Non-Operating Revenues 36
Operation and Maintenance Expenses 36
Capital Budget and Expenditures 36
Summary of Operations 36
Proposed Capital Improvement Program 37
Ability to Finance Proposed Capital Expenditures 37
Operating Revenues 37
Other Revenue Sources 37
Operation and Maintenance Expenses 38
Debt Service Requirements 38
Adequacy of Revenues to Finance Proposed Capital Improvements 38
Sewerage Department **55**
Adherence to Sewerage Service Revenue Bond Resolution 55
2016 Sewerage Department Operations 55
Wastewater Volumes 55
Operating Revenues 56
Non-Operating Revenues 56
Operation and Maintenance Expenses 56
Capital Budget and Expenditures 56
Summary of Operations 57
Proposed Capital Improvement Program 57

Ability to Finance Proposed Capital Expenditures 57
Operating Revenues 57
Other Revenue Sources 57
Operation and Maintenance Expense 58
Debt Service Requirements 58
Adequacy of Revenues to Finance Proposed Capital Improvements 58
Drainage Department 75
2016 Drainage Department Operations 75
Revenues 75
Operation and Maintenance Expenses 75
Capital Budget and Expenditures 75
Summary of Operations 76
Proposed Capital Improvement Program 76
Ability to Finance Proposed Capital Expenditures 76
Revenues 76
Operation and Maintenance Expenses 77
Debt Service Requirements 77
Adequacy of Revenues to Finance Proposed Capital Improvements 77
Appendix 91

LIST OF TABLES

Table 1 Insurance in Force as of December 31, 2016 42
Table 2 Water Department – Historical and Projected Sales and Average Number of Customers 43
Table 3 Water Department – Existing Water Rates 44
Table 4 Water Department – Statement of Historical Revenues 45
Table 5 Water Department – Historical Operation and Maintenance Expenses 46
Table 6 Water Department – Capital Expenditures - 2016 47
Table 7 Water Department – Proposed Capital Improvements 48
Table 8 Water Department – Projected Operating Revenues 49
Table 9 Water Department – Projected Operation and Maintenance Expense 50
Table 10 Water Department – Debt Service Requirements 51
Table 11 Water Department – Capital Improvement Program Financing 52
Table 12 Water Department – Analysis of Ability of Forecasted Revenues to Finance Projected Revenue Requirements 53
Table 13 Water Department – Coverage Requirements 54
Table 14 Sewerage Department – Historical and Projected Billed Volumes and Average Number of Customers 62
Table 15 Sewerage Department – Existing Sewer Rates 63
Table 16 Sewerage Department – Statement of Historical Revenues 64
Table 17 Sewerage Department – Historical Operation and Maintenance Expenses 65
Table 18 Sewerage Department – Capital Expenditures - 2016 66
Table 19 Sewerage Department – Proposed Capital Improvements 67
Table 20 Sewerage Department – Projected Operating Revenues 68
Table 21 Sewerage Department – Projected Operation and Maintenance Expense 69
Table 22 Sewerage Department – Debt Service Requirements 70
Table 23 Sewerage Department – Capital Improvement Program Financing 71
Table 24 Sewerage Department – Analysis of Ability of Forecasted Revenue to Finance Projected Revenue Requirements 72
Table 25 Sewerage Department – Coverage Requirements 73
Table 26 Drainage Department – Historical Revenues Received 81
Table 27 Drainage Department – Historical Operation and Maintenance Expenses 82
Table 28 Drainage Department – Capital Expenditures - 2016 83
Table 29 Drainage Department – Proposed Capital Improvements 84
Table 30 Drainage Department – Projected Participation by Others 85
Table 31 Drainage Department – Projected Operating Revenues 86
Table 32 Drainage Department – Projected Operation and Maintenance Expenses 87
Table 33 Drainage Department – Debt Service Requirements 88

Table 34 Drainage Department – Capital Improvement Program Financing 89
Table 35 Drainage Department – Analysis of Ability of Forecasted Revenue to Finance Projected Revenue Requirements 90

LIST OF FIGURES

Figure 1 - Carrollton Water Purification Plant 12
Figure 2 - Algiers Water Purification Plant 14
Figure 3 - East Bank Sewage Treatment Plant 18
Figure 4 - West Bank Sewage Treatment Plant 19

Introduction

PURPOSE AND SCOPE

This report covers operations of the Sewerage and Water Board of New Orleans for the year ending December 31, 2016. This report presents findings of studies made in compliance with covenants of the 2014 General Water Revenue Bond Resolution and the 2014 General Sewerage Service Revenue Bond Resolution. This report also includes recommendations designed to assist the Sewerage and Water Board of New Orleans and its staff in planning future operational policies. Subjects covered include the following:

1. Adherence to covenants of the General Water Revenue Bond Resolution and the General Sewerage Service Revenue Bond Resolution.
2. Ability to finance projected revenue requirements including proposed capital improvements.
3. Operations of the water, sewerage, and drainage systems.

DEFINITIONS

In this report, "Sewerage and Water Board of New Orleans," "Sewerage and Water Board," and "Board" are used synonymously. "General Resolution" refers to either the 2014 General Water Revenue Bond Resolution or 2014 General Sewerage Service Revenue Bond Resolution.

"Water Department" is the Sewerage and Water Board organization providing domestic water service to residents of the City of New Orleans. "Sewerage Department" is the organization providing wastewater service, and "Drainage Department" is the organization providing stormwater conveyance and pumping. The Board organization includes some groups who participate in two or more operational activities.

HISTORY

The Sewerage and Water Board of New Orleans was created by Act No. 6 of the Louisiana Legislature in 1899 as a special board independent of City government to develop, operate, and maintain the water and sewerage systems in the City of New Orleans. In 1903, the Louisiana Legislature gave control of the City's drainage system to the Board. Since that time, growth of the service area and increased service requirements have expanded the magnitude and complexity of operations.

Available sources of funds prior to 1958 for financing utility operations and improvements included ad valorem taxes, contributions-in-aid-of-construction, general obligation bonds of the City of New Orleans, and water revenues.

In 1974, the American Institute of Certified Public Accountants expanded their reporting guidelines for government operated utilities to include depreciation accounting. As a result, the Board initiated a preliminary system of accounting recognizing estimated historical investment as a basis for annual depreciation accruals. Implementation of the detailed plant accounting and record keeping required was started in 1979.

The Board's computer based budget code system provides a method of identification of operation and maintenance expenses for the Water, Sewerage, and Drainage Departments. Allocation of

expenses is based upon actual or direct expenses of each Department together with an apportionment of joint expenses. The procedures permit utility plant accounting with annual costs charged to the appropriate property account instead of being charged to current Department income. In accounting for debt service, interest is charged to current year's income and principal and debt service reserve payments are charged to the respective account balances. Historical operating costs, discussed later in this report, reflect the functional classifications.

Water Department

Act No. 541 increased the Board's ability to finance needed water system improvements by authorizing the Board to issue water revenue bonds. Subsequently, water revenue bonds in the amounts of $6,200,000 in 1960, $1,500,000 in 1961, $2,500,000 in 1964, $4,000,000 in 1971, $6,000,000 in 1978, $17,000,000 in 1980, $3,000,000 in 1981, and $5,000,000 in 1982 were issued. All water system revenue bonds outstanding in 1986 were defeased by the $31,350,000 Series 1986 Water Revenue Refunding bond issue. Additional revenue bonds in the amount of $16,000,000 were issued in 1998 and $34,000,000 were issued in 2002. In 2014, the Board issued Water Revenue and Refunding Bonds in the amount of $103,525,000. A portion of the proceeds were used to defease Series 1998 in the amount of $5,570,000 and Series 2002 in the amount of $22,085,000. In 2015, the Board issued Water Revenue Bonds in the amount of $100,000,000. Principal payments will begin in 2018. As of December 31, 2016, total outstanding debt service on all outstanding revenue bonds totaled $203,200,000.

Act No. 566 reauthorized the Board to fix and administer a schedule of water rates to meet the operational and capital costs of the public water system, to issue water revenue bonds, and to discontinue the free water allowance for sewerage purposes effective November 9, 1966.

Sewerage Department

Act No. 567 gave the Board authority to set and collect sewerage service charges to be used for operational and capital costs of the Sewerage Department, and to issue sewerage service revenue bonds. This Act permitted the Board, for the first time in its history, to charge users of the sewerage system directly for related costs. Under the authority of Act No. 567, sewerage service charges were implemented May 1, 1967 and subsequently, sewerage service revenue bonds totaling $33,000,000 were sold in 1968, 1976, 1982 (2 issues), and 1983. All sewerage system revenue bonds outstanding in 1986 were defeased by the $21,280,000 Series 1986 Sewerage Service Revenue bonds. These bonds were fully retired in 1994. Sewerage system revenue bonds in the amount of $30,000,000 were issued in 1997; $25,000,000 in 1998; $47,100,000 in 2000 (two issues); $32,720,000 in 2001; $57,000,000 in 2002; and $5,500,000 in 2003. $33,000,000 in revenue bonds, $25,200,000 in Bond Anticipation Notes (BANs), and $111,800,000 in Refunding BANs were issued in 2004. The 2004 BANs were defeased by the $137,000,000 Refunding BANs Series 2005A. A portion of the 2005 BANs was refinanced with the Refunding BANs Series 2006. The remaining balance on the 2005 BANs were paid from funds on hand. The Refunding BANs Series 2006 were due July 15, 2009 and were paid in full by the issuance of Refunding Bonds Series 2009 in the amount of $23,375,000. In 2014, the Board issued Sewerage Service Revenue and Refunding Bonds in the amount of $158,990,000. A portion of the proceeds were used to defease all outstanding bonds with the exception of the Series 2011 bonds.

In November 2011, the Board and Louisiana Department of Environmental Quality (LADEQ) entered into a loan agreement whereby $9,000,000 of proceeds from the Revolving Loan Fund were

borrowed through the issuance of Sewerage Service Subordinate Revenue Bonds, Series 2011. Debt service payments assume a 20-year term with a 0.45 percent interest rate plus an administrative fee of 0.5 percent. The Board began drawing down the funds during the first quarter of 2012 and as of December 31, 2014, had received a total of $9,000,000 in disbursements. The Board began making principal payments in November of 2013. With the issuance of the Series 2014 bonds, the Series 2011 bonds became parity debt and entitled to the provisions of the General Sewerage Service Revenue Bond Resolution. In 2015, the Board issued Sewerage Service Revenue Bonds in the amount of $100,000,000. Principal payments will begin in 2021.Total outstanding principal on all revenue bonds totaled $242,668,000 as of December 31, 2016.

Drainage Department

In 1966 three constitutional amendments, Acts No. 565, 566, and 567 were enacted by the Louisiana Legislature and subsequently approved by the State's voters. Act No. 565 authorized the City of New Orleans to levy a three-mill ad valorem tax, effective January 1, 1967, to be used solely for operations and capital costs of the drainage system. Provision for issuance of bonds repayable solely from the three-mill tax was also included in the Act. In 1967, the Board issued $15,000,000 of three-mill tax bonds. These bonds were fully retired in 1992.

Under the Louisiana State Constitution, all assessments beginning in 1978 were equalized, with residential property assessed at 10 percent of its market value and commercial and personal property assessed at 15 percent of market value. The constitution also provides that no tax revenues shall be lost by reassessments; thus, it has been necessary to revise the millage rates in effect at various times. If reassessment results in a lower tax base, the millage rate may be adjusted upward. If a larger tax base results, the millage rates must be rolled back. However, by state law, the City Council, upon request and after a public hearing, may increase the millage rates to the prior year's level. The three-mill tax rate, 6.01 mills since 1988, was increased to 6.40 mills in 1992 due to reassessment, and remained at that level through 2007. In 2007, it was reduced to 4.544 and in 2010 it was increased to the current rate of 4.66 mills.

Passage of a referendum in April 1977, authorized the collection of an additional six-mill, ad valorem tax for drainage purposes, effective January 1, 1978. The six-mill ad valorem tax was increased to 6.09 mills in 1988 and to 6.48 mills in 1992 due to reassessment and remained at that level through 2007. In 2007, it was reduced to 4.60 and in 2010 it was increased to the current rate of 4.71 mills. In 1978, the State Legislature authorized a debt limit of $18,000,000 as sought by the Board of Liquidation, City Debt. That debt limit was eliminated by Legislative action in 2003. The Board issued $18,000,000 in Series A, six-mill tax bond in November 1978. During 1994 the Board issued Drainage System Refunding Bonds, Series 1994, for the purpose of refunding the six-mill 1978 bonds. The 1994 bonds were considered to be an obligation of the six-mill ad valorem tax revenue and have been repaid.

In 1980, a constitutional amendment, Act No. 844, authorized an increase in the exemption of each homestead from ad valorem taxes from $5,000 to $7,500, and provided for periodic reassessment.

In 1981, a nine-mill ad valorem tax was approved and became effective January 1, 1982. It was reauthorized in December 2016. The purpose of the nine-mill tax levy is to provide funds for the operation, maintenance, and construction of the drainage system. State law set the authorized debt

limit for nine-mill bonds at $68,000,000. That debt limit was eliminated by Legislative action in 2003. The Board sold nine-mill bond issues of $22,000,000 in 1982 and $30,000,000 in 1983. In 1986, $12,525,000 Drainage System Bonds Series 1986A and $15,755,000 Drainage System Bonds Series 1986B were authorized and sold for the purpose of refunding a portion the 1982 nine-mill bonds and a portion of the 1983 nine-mill bonds, respectively. In 1992 the Drainage System Bonds, Series 1982, was fully refunded, and beginning in 1993, debt service payments on the Drainage System Bonds, Series 1986A was paid from nine-mill tax revenue. In 1993, proceeds from the Drainage System Bonds, Series 1986B fully refunded the Drainage System Bonds, issue of 1983, and the debt service on these bonds became the obligation of nine-mill tax revenue. All Series 1986A and Series 1986B bonds have been retired. In 1998 nine-mill bonds in the amount of $10,000,000 were issued and additional nine-mill bonds in the amount of $20,000,000 were issued in 2002. In 2014, the Board issued Drainage System Refunding Bonds in the amount of $14,900,000 for the purpose of refunding Series 1998 and Series 2002. The total nine-mill Drainage System Bonds outstanding as of December 31, 2016 was $11,100,000.

In 1988, reassessment caused the nine-mill ad valorem tax to be increased to 9.13 mills. It was increased due to reassessment again in 1992 to 9.71 mills and remained at this level through 2007. In 2007, it was reduced to 6.89 and in 2010 it was increased to the current rate of 7.06 mills.

Collection of the three-mill ad valorem tax levy is authorized through 2046; six-mill tax through 2026; and nine-mill tax through 2031.

General

During January 2006, the Board entered into a long-term agreement with the Federal Emergency Management Agency (FEMA) under the Community Disaster Loan Act of 2005. The Board has drawn down $61,956,747 of the funds available. In December 2010, the Board was granted a partial forgiveness in the amount of $36,790,000 of principal and $4,648,410 of accrued interest, leaving a balance of $25,166,747 in principal. In September of 2013, the Board was granted full forgiveness of the remaining balance of $25,166,747.

In July of 2006 the Board entered into a Cooperative Endeavor Agreement with the State of Louisiana to secure proceeds from the State's Gulf Opportunity Tax Credit Bond Loan Program to assist in payment of debt service requirements from 2006 through 2008. The Board has borrowed $77,465,247, which was the total amount available to the Board. Of that amount, $31,500,000 was used to make a partial payment on the Sewerage Service Refunding BANs Series 2005A that matured on July 26, 2006. The remainder was used to make debt service payments on the Drainage System special tax bonds, the Sewerage Service revenue bonds, and the Water revenue bonds that were due on December 1, 2006; June 1, 2007; December 1, 2007; and June 1, 2008. Principal payments on the bonds began in July 2012 and continue through July 2026. As of December 31, 2016, the amount outstanding was $51,844,281.

The Board is currently receiving funds from the U.S. Army Corps of Engineers (COE) sponsored and congressionally authorized Southeast Louisiana Urban Flood Control (SELA) Project. This funding will allow additional construction projects which were identified in the 1970s, but which have not been completed because of funding limitations. The identified projects are to be funded either 100

percent from federal funds or 65 percent from federal funds and 35 percent from local funds. The payback period for the local share is 30 years and is anticipated to begin in 2020.

The Board provides water and sewer for public services to the City of New Orleans and its public institutions as mandated by state law in accordance with R.S. 33:4096 and R.S. 33:4121, respectively. During 2016, the Board provided 1,062,993,239 gallons of water for public services to agencies of the City of New Orleans. The value of this water, at current rates, is $46,141,187.68. The value of the sewerage charges is $110,153,094.86.

The three revenue-generating public agencies, the New Orleans Museum of Art, City Park, and Audubon Park, continued to receive water for public services under "caps", or maximum annual limits, established by the Legislature in 1982. The Museum of Art used 119,800 gallons or 2,434,000 below its annual "cap" of 2,553,800 gallons. City Park used 25,021,600 gallons or 210,301,800 below its annual "cap" of 235,323,400 gallons. Audubon Park used 97,490,200 gallons or 142,509,800 gallons below its annual "cap" of 240,000,000 gallons.

The Sewerage and Water Board and the Orleans Parish School Board (OPSB) reached an agreement effective July 1, 1992, whereby the schools would be charged for any water exceeding an allowance of six gallons per day, for 365 days per year, for each student enrolled and any other person regularly assigned to that campus or facility. The allowance was lowered to four gallons per day effective July 1, 1993.

SOURCES OF FINANCIAL DATA

Financial information included in this report is obtained from audited financial reports provided by the Board.

SUMMARY OF FINDINGS

This section contains a summary of the financial operations of the Water, Sewerage, and Drainage Departments for the year 2016. Projections of future operations are also presented as a basis for determining the adequacy of present revenue sources to finance projected operating expenses and proposed capital program costs of the respective departments.

The statistical data maintained by the Board includes the compilation of detailed information on water sales and revenues. Information provided for 2016 includes a summary of the number of bills issued, billed volume, and revenues by customer class for both the Water and Sewerage Departments.

Operation and maintenance expenses are summarized by supplemental accounts that are used for internal purposes to identify the cost in each functional category that is incurred for personal services, services and utilities, material and supplies, replacement and maintenance, and other special charges.

Water Department

Water Revenue Bond Resolution Requirements

Sewerage and Water Board financial operations for 2016 have complied with the requirements set forth in the 2014 General Water Revenue Bond Resolution.

Summary of 2016 Operations

Based upon a tabulation of water bills rendered during the year, the Water Department provided water service to an average of 134,872 regular billed customers and 1,107 governmental accounts, the latter of which are served without charge. According to data provided by the Board, of the 51,561.3 million gallons of water pumped by the Department during the year, 13,106.7 million gallons were sold, 1,042.7 million gallons were metered to customers without charge, treatment plant process water totaled 532.2 million gallons, and unmetered uses accounted for the remaining 36,681.2 million gallons. Unmetered water uses include fire protection; flushing streets, sewers, and drains; chlorinating and flushing new water mains; construction of streets; Sewerage and Water Board plant uses; and unaccounted for system losses.

The total revenue from water sales, delinquent fees, interest income and other income increased from $82,956,619 in 2015 to $88,358,817 in 2016. Operation and maintenance expenses (excluding claims paid) increased from $78,264,668 in 2015 to $76,886,448 in 2016. After adding claims of $1,847,021 and debt service payments of $10,222,220, a negative balance of $596,872 was available for capital related expenditures in 2016, unadjusted for depreciation.

Ability to Finance Future Operations and Proposed Improvements

A summary of projected financial operations of the Water Department for the period 2017 through 2021 is shown in Table 12 of the report. Revenues shown on Line 1 of Table 12 are based on rates that became effective January 1, 2017. Revenue from future annual water system revenue increases of 10 percent effective January 1, 2017 through January 1, 2020, followed by 6 percent effective January 1, 2021 are shown on Line 2 of Table 12.

Future long term debt financing of $178,000,000 in 2018 and $103,000,000 in 2021 is indicated to fund the proposed capital improvement program.

As demonstrated in Tables 11 and 12, it is anticipated that current revenue sources will be adequate to readily finance both projected capital program requirements and estimated future operation expenses of the Water Department during the 2017-2021 study period examined herein.

Sewerage Department

Sewerage Service Revenue Bond Resolution Requirements

Sewerage and Water Board financial operations for 2016 have complied with the requirements set forth in the 2014 General Sewerage Service Revenue Bond Resolution.

Summary of 2016 Operations

The total revenue from sewer charges, delinquent fees, interest income and other income increased from $98,165,766 in 2015 to $108,233,756 in 2016. Operation and maintenance expenses (excluding claims paid) increased from $$58,028,723 in 2015 to $58,240,656 in 2016. After adding claims of $2,380,775 and debt service payments of $24,616,125, a balance of $22,996,200 was available for capital related expenditures in 2016, unadjusted for depreciation.

Ability to Finance Future Operations and Proposed Improvements

A summary of projected financial operations of the Sewerage Department for the period 2017 through 2021 is shown in Table 24 of the report. Revenues shown on Line 1 of Table 24 are based on

rates that became effective January 1, 2016. Revenue from future annual wastewater system revenue increases of 10 percent effective January 1, 2017 through January 1, 2020, followed by 2.5 percent effective January 1, 2021 are shown on Line 2 of Table 24.

Future long term debt financing of $158,000,000 in 2018 and $120,000,000 in 2020 is indicated to fund the proposed capital improvement program.

It is anticipated that current revenue sources will be adequate to readily finance both projected capital program requirements and estimated future operation expenses of the Sewerage Department during the 2017-2021 study period examined herein.

Drainage Department

Summary of 2016 Operations

Total revenues received from all sources including interest income totaled $57,349,315 in 2016, an increase of approximately 5.5 percent from $54,367,386 reported for the same sources in 2015. Total operation and maintenance expenses decreased about 11.4 percent, from $37,814,502 in 2015 to $33,523,624 in 2016. After adding claims of $2,223,009 and debt service payments of $2,017,050, a balance of $19,585,632 was available for capital related expenditures in 2016.

Ability to Finance Future Operations and Proposed Improvements

An analysis of financial operations projected for the Drainage Department for the period 2017 through 2021 is summarized in Table 35 of the report. Revenue from the three-mill, six-mill, and nine-mill ad valorem taxes may be used for operating expenses, debt service, and capital expenditures.

The analysis indicates that the current revenue sources are not adequate to meet operation and maintenance expenses and total debt service on existing bond issues beginning in 2021. In addition, the Drainage Department will not have the debt capacity to fund all of the capital requirements through 2021. Due to constraints on revenue, it is anticipated that capital projects during the 5-year period will exceed the amount of funding available from the Drainage Department. It is recommended that the Board defer capital projects until an additional source of operating revenue has been identified and the SWBNO has the capacity to debt finance more projects. This deferment is shown on Line 9 of Table 34.

Other Findings

The Board operates a power plant at the Carrollton Water Purification Plant which provides power for the water purification process as well backup power in the event that commercial power fails or becomes unavailable. The Board's analysis of power purchased and produced is shown in the supplemental section of the 2016 Comprehensive Annual Financial Report. In 2016, approximately 69.7 million kilowatt hour (kWh) of power was purchased and 33.2 million kWh of power was generated.

On a unit cost basis, the average cost of purchased power has increased over the past five years from about 9.3¢ per kWh in 2012 to about 10.2¢ per kWh in 2016. During the same period, the Board's unit cost for generated power has increased from about 20.5¢ per kWh to about 27.4¢ per kWh. In 2016, the cost of Board generated power was 2.7 times higher than that of purchased power; however, this

higher cost is offset by the fact that the Board generated power is much more reliable that the purchased power from the local utility company.

In conducting our analyses and in forming an opinion of the projection of future operations summarized in this report, Black & Veatch has made certain assumptions with respect to conditions, events, and circumstances that may occur in the future. The methodology utilized by Black & Veatch in performing the analysis follows generally accepted practices for such projections. Such assumptions and methodologies are summarized in this report and are reasonable and appropriate for the purpose for which they are used. While Black & Veatch believes the assumptions are reasonable and the projection methodology valid, actual results may differ materially from those projected, as influenced by the conditions, events, and circumstances that actually occur.

2017 POWER AND PUMPING EMERGENCY EVENT

The City of New Orleans experienced heavy rains on August 5th that resulted in flooding events throughout the City. At the time of the rain event, several drainage pump stations were down for repairs or not operating due to limited staffing availability. In addition, repairs necessary at the Carrollton power plant resulted in power limitations to some of the operable drainage pumps. On August 9th, the existing Executive Director of the SWBNO declared a state of emergency and authorized the purchase of necessary materials and furnishing of the labor necessary to make all emergency repairs to the system. On August 10th, the Board of Directors unanimously adopted a motion to repair the power and pumping facilities, conduct an independent analysis of the power generation and drainage systems, and provide for interim management of the SWBNO. On August 22nd City officials named an interim emergency management team to focus on the SWBNO's pumping and power capabilities.

The Facilities Evaluation included in this report reflects the findings of onsite assessments of the SWBNO facilities conducted by Black & Veatch from May 16 to May 20 and does not reflect the condition and operation of the system in August. Black & Veatch made no additional inspections, evaluations, or assessments after May 20th.

In December 2016, the Board adopted the 2017 capital program, 2017-2026 capital program and 2017 operating budget. On September 20, 2017, the Board adopted amended capital and operating budgets reflecting the acceleration of seven large capital projects necessary to repair the system, lower than anticipated water and sewer revenue, higher than anticipated drainage system expenses, and changes to other operation and maintenance expenses following a mid-year review of activities. The financial evaluations of the Water, Sewerage and Drainage departments presented in this report reflect the amended budgets authorized in resolutions R-112-2017 and R-113-2017.

Facilities Evaluation – Operation, Maintenance, and Reconstruction

This evaluation summarizes the onsite assessments findings of the Sewerage and Water Board of New Orleans (SWBNO) facilities conducted by Black & Veatch from May 1 to May 5, 2017. Site visits were conducted at the water and wastewater treatment plants, Carrollton Power Plant facilities, and Central Yard facilities to evaluate their condition and operational capabilities. In addition, the sewage and drainage pump stations (DPSs) were inspected to evaluate their condition. Interviews were conducted with SWBNO management and supervisors during the site visit to assess the current operations status of the various facilities.

INTRODUCTION

The Operations Department of the SWBNO is comprised of four units: (1) Water Purification, (2) Sewage Treatment, (3) Water Pumping and Power, and (4) Sewage and Drainage Pumping. The SWBNO operates the Carrollton and Algiers Water Purification Plants (WPPs), which purify raw water from the Mississippi River and supply potable water to New Orleans residents. The Carrollton Plant currently purifies approximately 135 million gallons per day (mgd) of water for the east bank of the Orleans Parish. The Algiers Plant, which serves the predominantly residential west bank portion of the parish, purifies roughly 10 mgd of water. The treated water from the two plants is pumped through approximately 1,800 miles of mains to the service connections within the city, as well as to several customers in adjacent parishes.

The sewerage collection system includes several miles of lateral sewers, trunk sewers, and 83 electrically-operated pump stations. Raw sewage is conveyed through a force main system. Sewage Pumping Stations (SPSs) A and D on the east bank and SPSC on the west bank are attended stations. SPS A houses a supervisory control and data acquisition (SCADA) system, which monitors operation of all other sewage stations 24 hours a day.

The SWBNO operates two sewage treatment plants, one on the east bank and one on the west bank. The East Bank Sewage Treatment Plant has a treatment capacity of 122 mgd (dry weather) and treats sewage from the east bank community. The West Bank Sewage Treatment Plant has a treatment capacity of 20 mgd (dry weather) and serves the west bank community, as well as a few customers in Plaquemine Parish. Both plants were built or expanded in the 1970s and have been upgraded or expanded to increase reliability and capacity. The contract operator, Veolia Water, currently operates and maintains the plants for SWBNO.

In addition, the SWBNO is responsible for operating and maintaining the 24 major drainage pumping stations in New Orleans and 11 smaller (automatic) underpass stations. The majority of those stations are manned 24 hours per day, 7 days per week. Each station is equipped with multiple pumps, which are activated in response to increasing water levels. Personnel routinely monitor these pumps and the numerous miles of drainage canals to ensure proper drainage in the area.

The 25 cycle power plants operated by the SWBNO provides power to portions of the WPPs and approximately 60 percent of the drainage pumps. Two large vertical sewage pumping units at Station A are also run on 25 cycle power. The following sections summarize key issues within several departments of the SWBNO.

STAFFING

Adequate staffing continues to be an issue for most departments at the SWBNO. Additional maintenance is required for the SWBNO facilities as equipment ages and more equipment is added. Staffing levels have decreased as the system has aged and expanded within the SWBNO-owned facilities. Vacancies still exist in several departments, especially those departments requiring highly educated and skilled personnel. These shortages are reflected within the more technical disciplines such as mechanical maintenance, electrical maintenance, plant maintenance, welding and fabrication, and operations. The Engineering Department is still understaffed, especially at the senior level (most staff has under 10 years of experience), but it is improving because of the slowdown of private industry in the local area. Within the last year, both the department heads for electrical and mechanical engineering have retired and there will be a need to hire more senior level staff to mentor the younger engineering interns. Additionally, the SWBNO has a survey underway to determine how its compensation compares with similar utilities to assist in attracting additional staff.

The SWBNO suspended the domicile policy following Hurricane Katrina, which required employees live in New Orleans. This suspension allowed personnel hired by the SWBNO to live outside city limits, thus providing more housing options for employees. The city council reinstated the residency requirements on January 1, 2013, and this has slowed the hiring of individuals interested in working for SWBNO who live outside city limits. Departments within the SWBNO continue to actively recruit from local college campuses, career job fairs, and trade schools to fill vacancies.

In addition to those highly skilled positions, a significant portion of the SWBNO's leadership will retire within the next five years. Very few potential successors have been identified to assume the leadership positions of those personnel.

Most departments have staffing issues related to inadequate personnel to fulfill the current needs of the SWBNO. Table 1 summarizes the number of staff on the payroll for each department related to operations and maintenance, and the percentage of staff eligible for retirement within the next five years (as of December 31, 2016). These conditions demonstrate the need for an effective succession plan for the department heads and supervisors.

Table 1 - Current Number of Board Employees and Employees Eligible for Retirement

DEPARTMENT	EMPLOYEES ON PAYROLL	ELIGIBLE FOR RETIREMENT	% ELIGIBLE FOR RETIREMENT
Operations - WPPs	56	15	26.8%
Operations - Water Quality Laboratory at Carrollton Plant	9	3	33.3%
Operations - Water Pumping and Power	78	19	24.4%
Operations - Sewage and Drainage Pumping Stations	106	30	28.3%
Facility Maintenance	56	13	23.2%
Engineering	50	18	36%

DEPARTMENT	EMPLOYEES ON PAYROLL	ELIGIBLE FOR RETIREMENT	% ELIGIBLE FOR RETIREMENT
Networks	312	52	16.7%
Support Services	104	21	20.2%
Environmental Affairs	14	4	28.6%
Total	**785**	**175**	**22.3%**

WATER PURIFICATION PLANTS

The Black & Veatch representative accompanied the WPP superintendent on facility tours of the Carrollton and Algiers WPPs. The Carrollton and Algiers WPPs are currently operational and producing water that meets or exceeds federal drinking water standards. Treatment systems at both plants are functioning well and continue to produce potable water for the east bank and west bank.

The staffing levels at the Carrollton and Algiers WPPs have been able to consistently produce finished water that complies with federal and state regulations and meets the capacity of the service population. The SWBNO is facing the industry-wide problem of an aging workforce; so there is an immediate need to hire and train personnel for the plant's future sustainability. The SWBNO has hired entry-level personnel and is in the process of hiring more to begin addressing those long-term needs. SWBNO has an internal training program that assists operations staff with passing state certification exams. In addition, state certified operators are in short supply and are required to be onsite at all times because they are necessary to successfully operate the plants around the clock. The most senior operators will be retiring within the next few years and will need to be replaced in order to maintain compliance with the state requirements for operator certification in water treatment. At present, there are not enough certified water plant operators to cover all the shifts and the department is using overtime to ensure compliance is maintained.

Carrollton Water Purification Plant

The Carrollton WPP has a design capacity of 210 mgd. The water treatment processes at the plant consist of flocculation with a polymer and ferric sulfate followed by pH adjustment with lime. The flocculated particles are allowed to settle in sedimentation basins and traveling mechanical rakes remove the settled solids from the sedimentation basins for discharge to the Mississippi River.

Chlorine in the form of sodium hypochlorite is used to disinfect the clarified water. Anhydrous ammonia is then added to form chloramines for residual disinfection. Additional settling time and disinfection contact time occur in the secondary settling basins. The clarified water is also treated with sodium hexametaphosphate for calcium sequestration and hydrofluorosilicic acid for fluoride addition. The SWBNO is feeding all chemicals at appropriate dosages and maintaining adequate chemical storage at each site.

Filtration is the final step in the treatment process, which is where the water is filtered through rapid sand filters. Finished water is then pumped to the populace through the distribution network.

The Carrollton WPP is currently treating approximately 131.6 mgd of water for the east bank of the Orleans Parish, partly due to leaks in the water distribution system. Leaks in the distribution network are persistent problem. These leaks are currently being addressed under the water main replacement program funded by the Federal Emergency Management Agency (FEMA). The water delivery pressure at the WPP was between 65 and 70 psi, which has been consistent throughout the last year.

New Recycle Pumps in Service

Water Tower Construction

Figure 1 - Carrollton Water Purification Plant

Improvements initiated and/or completed at the Carrollton WPP during 2016 include:

- The G4 sedimentation basin was offline due to a leak in 2016. Emergency repairs were done to G4 in November 2016 to repair the leaks, but they did not correct it. G4 was placed back online in 2016 due to a mono-rack issue in the G3 sedimentation basin.
- Claiborne filter media rehab for filters 5 and 7 was completed in 2016 and they were returned to service. Both filters are performing well. The recycle basin pumps have been replaced. All six pumps were replaced in 2016 and were fully functional during the site visit.
- As part of the water hammer project, construction of 2 mg elevated storage tanks began in late 2016. These tanks will assist in helping maintain adequate distribution pressure in case of a line break.
- The following maintenance and/or improvement projects for existing facilities at the SWBNO are planned or ongoing:
- The L3 sedimentation basin has been offline due to flocculator rehab and maintenance of the basin's mechanical components. The rehab efforts are complete and L3 will be placed online in 2017.

- A tank mixing study was conducted on all tanks at the plant (including tanks at Algiers WPP) including hydraulic modeling. As a result, these storage tanks will be modified with manifold systems for better tank mixing.
- Four concrete 4 mg storage tanks are being repainted. Two of the four tanks were completely painted in 2016.
- A filter rehabilitation program is planned for the Sycamore and Claiborne filter galleries. Valves, actuators, corroded piping supports, and leaking pipes associated with the filters need to be repaired or replaced.
- The Sycamore filter wash water pump for the filters is planned for replacement. The packing seal was leaking during the last site visit and the pump was nearing the end of its service life. The project is complete and will go out to bid in 2017.
- Design for a new 30-inch sludge discharge line is underway. This new line will provide for much-needed capacity and redundancy improvements for the Carrollton WPP. This improvement was in design during the site visit and will be installed in 2018.
- An additional temporary ferric sulfate bulk storage facility (20,000 gallons of tanks and temporary containment) is in the process of being added due to limited local supply of the chemical.
- A new chemical storage and feed facility is currently under design. The facility will house most of the chemicals onsite.

Algiers Water Purification Plant

The Algiers WPP has a design capacity of 40 mgd. The treatment process at the plant is similar to that of the Carrollton facility and uses the same chemicals with a slightly modified application scheme in the upflow clarifiers. At present, the plant is treating approximately 9.7 mgd of water and is serving the predominantly residential west bank portion of the parish.

Improvements needed or ongoing at the plant include the following:

- Future SCADA upgrades are planned to tie in the filter flow and headloss instrumentation for each filter to assist with operation of the filters.
- Filter rehab (valves, filter media, air scour system) is needed on all filters and should be scheduled in 2018.
- EIMCO Clarifiers No. 3 and 4 are under contract for the design the replacement of the launder troughs. The troughs and steel structures have significant corrosion. No replacement work was done in 2016.
- In addition to the rehab and painting the EIMCO clarifiers, flash mixing will be added to assist with better total organic carbon (TOC) removal in the clarifiers. The existing clarifiers will be modified to include an additional mixer near the chemical injection point.
- The fluoride storage and feed system needs to be upgraded to meet state requirements. The fluoride system will consist of a bulk storage tank, a day tank, and metering pumps and it will be located in an existing building. A fluoride day tank was added to the system in 2016 and

commissioned in early 2017. The tank includes a level switch to let the operators know when the tank needs to be filled.

- The facility has fully commissioned a new ferric storage and feed system for flocculation at the WPP. This equipment, along with the existing temporary ferric storage and feed equipment, is supporting the needs of the plant. Lime is currently slaked at the WPP. SWBNO is looking into replacement of the lime equipment pending a decision to change the process (different type of lime) or direct replacement of existing slaking equipment. A study must be conducted to establish which option will be selected.
- The raw water pumping and piping systems need to be improved in order to provide redundancy to the intake system.

- **New Fluoride Day Tank**
- **New Ferric Chloride Set Up**

Figure 2 - Algiers Water Purification Plant

WATER QUALITY LABORATORY

The water quality laboratory located at the Carrollton WPP conducts daily analyses of river water quality and purified water for both WPPs. Water samples from the distribution network are also analyzed at the laboratory facility. The lab continues to meet the state and federally mandated analytical requirements of the water plants, and it is certified by the Louisiana Department of Health and Hospitals for analysis of coliform bacteria.

The laboratory collects samples for protozoan analysis in addition to coliform analysis. Other regular analyses include hardness, turbidity, fluoride, ammonia, pH, alkalinity, TOC, dissolved organic carbon, phosphorus, corrosion monitoring, and chlorine residual at different stages of treatment. The solids are analyzed for total suspended solids (TSS) and total dissolved solids concentrations. The laboratory also analyzes river water and finished water samples for volatile organic compounds.

The laboratory continues to maintain its involvement in the Early Warning Organics Contamination Detection System (EWOCDS) run by the State Department of Environmental Quality (LDEQ), but despite that several of the LDEQ upstream stations are unreliable. The EWOCDS program has been underfunded by Louisiana, which has caused a reduction in sampling and analysis.

The remaining reliable monitoring stations are connected by telecommunications to notify LDEQ if any of the 60 Environmental Protection Agency (EPA)-listed pollutants are detected in the river water samples. The LDEQ disseminates the information to the program participants, allowing early warning of possible problems. The LDEQ maintains EWOCDS equipment at all participating locations while the program participants provide the manpower to collect and analyze the samples.

The laboratory is currently under-staffed: One supervisor, one microbiologist, one chemist, and three technicians. The lab lost one chemist in the past year, which has created vacancies that SWBNO is working to fill. Much of the lab instrumentation and equipment is reaching or has reached the end of its service life and should be replaced. Newer analytical instruments and equipment, such as a new gas chromatograph/mass spectrometer (GC/MS), autoclaves for the microbiology lab, and fume hoods in the chemistry lab are needed. The SWBNO has money to purchase all the new equipment and will begin to make purchases to replace equipment that cannot be serviced or supported. The laboratory staff obtained certification to analyze TOC at the SWBNO facility in the past; however, the certification lapsed due to lack of lab staff (mainly chemists) to maintain the QA/QC requirements for TOC analysis.

WATER PUMPING AND POWER

The primary function of the water pumping and power unit of the Operations Department is to produce steam for the generation of 25 hertz (Hz) power in addition to pumping potable water to the City of New Orleans. The facilities at the Carrollton Power Plant include three pumping steam turbines and one gas turbine for a total theoretical capacity of 61 megawatts (MW of 25 cycle power). The steam required for the turbines is generated in the six boilers at a total capacity of 650,000 pounds of steam per hour. In addition to the 25 Hz turbine, the newly-installed Turbine 6 produces 15 MW of 60 Hz power and was made operational in early 2016. The turbine only serves as back up, but it is run every two weeks to ensure it is working properly.

The generating station at the Algiers Plant is capable of producing 60 cycle power using a diesel generator. The power generation facility can generate enough power to support operations at the Algiers Plant. This station is also capable of performing a frequency change from 25 Hz power supplied from the Carrollton Plant to 60 Hz power.

The current capacity of the Carrollton Power Plant is 40 MW, which is less than the 61 MW design capacity. Turbine 4, as of the end of 2016, was still being repaired due to delays with contractors and other parties associated to the project. Turbine 3 was online until early 2016 when it was taken offline for emergency rehab. During the site visit, the vendor was onsite doing a complete rehab and inspection of all the turbine parts. Currently, Turbine 1 is being used with Turbine 5 as needed. Rehabilitation of Boilers 4, 5, and 6 was completed in 2015 and 2016. The rehab on Boiler 3 was completed in 2016. The rehab on Boiler 1 started in early 2017 and should be completed in 2017. Additional boiler piping is scheduled for repair and replacement. This project will occur once all the boilers are rehabbed and operational. Contract 3070 is about to go out to bid, and it includes a large

portion of work to burners, fuel skids, all boilers except for two, additional metering to assist with data collection and monitoring (tie in to SCADA for power house as well as the major pumping stations such as Oak Street). Additionally, a new boiler water treatment system will be added to help reduce chemical dosing required to the boilers.

A 200 psi high pressure natural gas line supplies fuel for the 15 MW 60 cycle, dual fuel generator turbine package (Turbine 6) and the existing Turbine 5. The 15 MW, 60 Hz generator facility supplements the commercial power available from Entergy to provide power redundancy and continued service in the event of a commercial power loss due to storms, hurricanes, etc. The generator serves the majority of the plant and raw water intake stations and provides additional drainage station capacity.

Two steam-driven distribution pumps are located at the power plant. Pump A rehabilitation was completed in March 2014 and Pump B was completed at the end of 2015. Pump B was tested in 2016. Both are in service and working well. The Claiborne Pumping Station, which consists of four water distribution pumps (two 60 Hz drive and two 25 Hz drive), and the Panola Station, which consists of two pumping units (each with a 25 and 60 Hz motor), are usually adequate (with 100 percent redundancy) for pumping finished water to the distribution network. The 25 Hz pump at Panola Station has been converted to operate on both 25 and 60 Hz power for more pumping operation redundancy. The water hammer program will provide the replacement of equipment and associated valves at the Panola, A and B pump room and Claiborne pumping stations. Two elevated tanks are being installed to provide surge protection to the distribution system. These projects are currently in construction. SELA project completion is holding up work on the Claiborne project (largely due to road work).

Storm-proofing projects for critical SWBNO facilities, including the power buildings, were recently completed by USACE. Improvements for the power buildings included reinforcing the walls, roofing, doors, and windows. Additional damage-related work from Katrina primarily includes valve replacement and repair to electrical components and controls. Related items for the water pumping and power unit are in various stages of design or construction. Additional projects include replacement of the diesel storage tank with two new above-ground tanks that have a total capacity of 250,000 gallons. This project is currently under construction. A new fuel day tank was installed in early 2017 including concrete foundation work for the new storage tanks.

The water pumping and power unit has 75 employees, which is required for continued operations of the water, sewerage, and drainage systems that require staffing 24 hours per day, 7 days a week. Given the current levels of staffing, overtime is required to cover all the necessary areas within the pumping and power unit. In addition, approximately 18 senior operators or supervisors are set to retire in five years or less. Retirement was mentioned as the main staffing problem in this department, especially at higher pay levels, such as turbine and boiler operations positions. Additional staff will be hired and trained to fill the vacancies due to retirement. A high level manager within power and pumping retired in 2017. His replacement was transferred from engineering into the department to assist with technical FEMA contracts, technical questions related to the equipment, as well as managing and advocating for the staff within this department. This new manager is going through all the training manuals to assist with training lower level staff

to help make the replacement of higher level staff from retirement a smoother transition. Training for Turbine 6 will be conducted to help staff using the newer equipment and assist with the turbine.

Central Control

The Central Control Power Dispatching Department (Central Control) is primarily responsible for the delivery of an adequate supply of board-generated electrical power, the continuous monitoring of the operational status of all electrical switchgear, and the testing of related electrical feeders and equipment. This department is also responsible for verifying and enforcing the board's safety clearance procedures and associated clearances within the power distribution system. In addition, this department monitors local and regional weather to provide advance warning of storms, which could affect power generation requirements for the drainage and sewerage systems. Coordination of various power supplies, including alternative backup power supplies such as diesel generators and frequency changers, also comprise part of this department's responsibilities. The Central Control plays a vital role in many emergency operational situations. Serving as a hub of communications, Central Control informs the board's management and senior level staff of changes in conditions that will affect the board's ability to provide adequate sewerage, water, and drainage services. Central Control provides valuable information during emergencies such as hurricanes, floods, freezes, etc. to the Office of Emergency Preparedness through established board protocols. Lack of staffing continues to be a major issue for this department.

SEWAGE TREATMENT PLANTS

Operations and maintenance activities of both plants have been contracted to Veolia Water. A representative of the SWBNO oversees the contract operator. This representative works for the Operations Department, which is within the SWBNO. Both treatment plants were operational at the time of the site visits and were meeting the discharge limits according to treatment plant personnel. Veolia will continue to be the contract operator for the next eight years.

East Bank Sewage Treatment Plant

The East Bank Plant has a treatment capacity of 122 mgd (dry weather). The plant is receiving approximately 95 mgd of flow. In 2016, average flow for the plant was 96.46 mgd, which was greater than the 2015 average of 94.07 mgd. The treatment facilities at the plant include bar screens, grit removal, a pure oxygen activated sludge system, final clarification, and disinfection. The solids generated during sewage treatment are thickened, dewatered (using belt filter presses), and finally incinerated. A new sludge dryer is currently under design as an alternative sludge treatment system to supplement the existing fluid bed incinerator (FBI).

Clarifier 2 Rehab

Incinerator Wet Scrubber

Figure 3 - East Bank Sewage Treatment Plant

The following items summarize the improvements that will be or have recently been performed at the East Bank Plant:

- Reactor 1 was not placed online in 2016 due to issues with the mixers and was offline during the site visit. Rehab of Reactor 4 will start in 2017, which includes installation of the mixers.
- Lower Explosive Limit (LEL) sensors were installed in the reactors to monitor explosive gases along its automated valves to make the process safe to operate. This work was completed in 2016. The LEL sensors are currently not tied into SCADA but will be in 2017.
- There is no automation for the mechanical rake on the bar screens and raking must be conducted manually at regular intervals. A project to install automated rakes with controls is being performed in house and was completed in 2016 with startup in 2017.
- A temporary, above-ground replacement line is being used to return sludge from the return activated sludge pump stations to the influent channel. The permanent repair design was completed and awarded in 2015. The construction was completed in early 2016 and RAS Pumps 6 and 9 are currently tied into the line. RAS Pumps 7 and 8 were tied into the line in 2016 The scum arm on the secondary clarifiers was not in operation at the time of the field visit; however, the plant operator indicated that the clarifiers needed additional steel repairs and that the repair will be included as part of that project when it goes out to bid in 2016.
- The operator noted the liquid oxygen (LOX) tank is near the end of its useful life. High purity oxygen system components appeared in good condition. A new LOX tank was installed in 2016.
- Effluent pumps appeared to be in fair condition. The operator noted that there have been difficulties keeping these pumps operating reliably due to electrical system issues. The electrical system is being evaluated and will likely require upgrades to increase the reliability of the effluent pumps. A 2400 V effluent pump electrical distribution system, a switchgear, and VFDs started construction phase in 2016.
- The FBI wet scrubber was replaced in 2016.

- A new waste pump in the south pump house was added in 2016 to satisfy the EPA's request for pump redundancy.
- Clarifier 2 rehabilitation was ongoing in 2016 and scheduled to be completed in mid-2017. Clarifier 6 will be next to be rehabbed once Clarifier 2 is back online.
- Replacement of the vacuum swing absorption (VSA) oxygen system equipment (blowers, motors) is currently being solicited for quotes by the contract operator. The equipment is on order and should be completed in 2017.

The average influent Total Suspended Solids (TSS) and Biological Oxygen Demand (BOD) concentrations for 2016 were approximately 140 milligrams per liter (mg/L) and 94mg/L, respectively. Effluent quality has been adequate over the last year, with an average effluent TSS concentration of 10.8 mg/L and an average effluent BOD concentration of 16.0 mg/L. One permit violations occurred in 2016. One fecal coliform maximum day limit violations occurred in June 2016. The fecal violations in June 2015 were due to an operator error during sample collection and not due to improper disinfection. This facility's permit expired three years ago and a renewal was sent to LDEQ on time. SWBNO is in communication with LDEQ and is awaiting a draft permit to review and accept.

West Bank Sewage Treatment Plant

The West Bank Plant has a treatment capacity of 20 mgd (dry weather). The plant is currently receiving approximately 8 mgd of flow. The West Bank Treatment Facility consists of bar screens, primary clarifiers, trickling filters, final clarifiers, and chlorine disinfection. Primary and secondary solids are co-thickened in a gravity thickener and hauled to the East Bank Facility for incineration.

New Sodium Hypochlorite Metering Pumps

New Clarifier Scum Boxes

Figure 4 - West Bank Sewage Treatment Plant

The following items summarize the improvements that will be made or have recently been made at the West Bank Plant:

- Bar Screens 3 and 4 are operational. Bar Screen 3 was recently rehabbed and does not work in automatic timer mode. The operator has to manually start a cycle at the screen. Bar Screens 1 and 2 were offline. Bar Screen 1 is going to be pulled out and replaced with a new screen in 2017. The operator noted that the level system, which triggers the bar screens to cycle, is not operational.
- Three grit pumps were replaced in 2016 and are working well.
- Aerated Grit Basin 2 was cleaned in 2016.
- Rehab on the West Primary Clarifier was completed in 2016 and it was painted in 2016.
- The Central Primary Clarifier was offline during the site visit, the center well repairs were not conducted in 2016 as planned, and the scum boxes were added to the West Primary Clarifier in 2016 and to the Central Primary Clarifier in early 2017.
- Main Collection Basin Pump 3 had impeller replacements and rehabilitation work completed in 2016. Main Collection Basin Pumps 1 and 2 will be rehabbed later this year.
- The drive motor for the arms on the trickling filters is currently inoperable and operates based on hydraulics; however, treatment is still acceptable. The operator noted that the bearings for the arm for Trickling Filter 2 will be replaced to get the arm operational again.
- At the time of the visit in 2016, the SCADA was reloaded and operational. Minor upgrades to the system were completed in late 2016.
- Influent flow meter is currently not operational. The meter was replaced in 2016.
- A sludge pump on the East Primary Clarifier was replaced in 2016.
- The auto transfer switch installation started in 2016 and is ongoing. A project to convert gas chlorine to sodium hypochlorite was completed in 2016. The system is currently not tied into SCADA and that work is ongoing.
- The operator noted a few maintenance repairs were done to the following lines in 2016 due to leaks: fresh water line, old headwork line, and an underground PVC chlorine line. The lines were all repaired.

The monthly average TSS and BOD influent concentrations for 2016 were approximately 115 and 105 mg/L, respectively. The monthly average effluent TSS and BOD concentrations for 2016 were approximately 13.1 and 8.0 mg/L, respectively. The average flow for 2016 was 10.3 mgd, which is slightly higher than in 2015, which was 9.1 mgd. For 2016, this plant has met or exceeded all permitted effluent limits.

SEWERAGE AND DRAINAGE PUMPING STATIONS

Site assessments of the DPSs and sanitary sewer lift stations (SLSs) at both the east bank and west bank of New Orleans were conducted from May 4 to May 11, 2017. A Black & Veatch operations specialist was present for the inspections conducted with a Julien Engineering representative and SWBNO staff on May 4, 2017. The observation report and accompanying table details the operational status of each SLS and DPS across New Orleans. Pumps that were not turned on at the

time of the observations were deemed to be either "in service" or "out of service" based on direction from sewerage and water board supervisors or pump station operators. Refer to the tables in the Appendix.

Many SLSs are slated to be demolished and rebuilt, including Station 1, Shorewood Station, Weber Station, and others. These stations are older and many are below ground with an above ground steel and concrete access hatch. New stations will be constructed with similar layouts to the recently rebuilt stations such as Lake Forest Pumping Station and Bullard Pumping Station, which are above ground concrete and steel stations with below ground self-priming pumps in lieu of centrifugal pumps. Sewerage and water board is also in the process of installing emergency discharge connections to older above ground stations.

All significant DPS construction projects have been completed within the last few years. Maintenance and repair of pumps, screens and generators are the only items planned for the DPSs at this time. Pumps at several DPSs have been out of service and awaiting repair without a change in status over the last few years. There were a few instances where new issues including pumps out of service or broken screens were noted during this year's assessment. The majority of items noted were carry overs from previous year's reports. The pending repairs are deemed non-priority due to adequate capacity provided by other pumps at the stations.

FACILITY MAINTENANCE

The Facility Maintenance Department has four units: (1) Plant Maintenance, (2) Welding & Fabrication, (3) Electrical Maintenance, and (4) Mechanical Maintenance. These units provide meter repairs, removals and installations, major electrical, welding, and fabrication, as well as mechanical maintenance for all SWBNO facilities throughout the system with the exception of Veolia Water-operated sewage treatment plants. The Facility Maintenance Department has the specialized equipment and technology necessary to maintain the plant process equipment, drainage pumping stations, sewage pump stations, power generation equipment, and water meter servicing. Automated lathes and mills are located in the machine shop and break press, as well as shear and other specialized repair equipment that is located in the welding and fabrication shop, provide the ability to fabricate parts when replacement parts are excessively expensive or no longer available due to equipment vintage such as gears and parts for older valves. In addition, new facilities such as Turbine 6 have been built within the SWBNO system, which requires additional staff to operate and maintain it.

These additional assets prevent in-house rehabilitation and preventative maintenance from being completed, which creates a large backlog of work for this department. In 2016, maintenance completed a major rehab project (L3 Sedimentation Basin), which included a complete rebuild of gearboxes, drives, paddles, and other equipment. Maintenance has to do a full basin cleanup, and then L3 can be placed back into service in 2017. This maintenance project was delayed due to limited staff. Previous basins were contracted out; however, this department mentioned that many times that required them to inspect and, at times, redo the work contractors have done to keep the system online. Additional rehab work includes bearing work on Drainage Pump Station 11, which is also delayed due to staffing levels. The bearings are on order and maintenance is hoping to complete this task in 2017. Additionally, maintenance at Drainage Station 6 is needed and a pump is out due bearing failure. Maintenance took the pump apart but don't have staff to do the repairs in

house. Maintenance also assists engineering with pulling together contracts due to new hires in engineering. Maintenance expressed its concerns on being dependent on contractors for maintenance because they do not respond quickly enough in an emergency. Currently, the Facility Maintenance Department has 60 authorized positions. Most of the highly skilled positions (welding and fabrication, electrical, mechanical maintenance) still remain vacant. The department has opened some of these vacancies through Civil Service and use a labor contract to try to find skilled staff. It was noted during the interview that the residency requirement, as well as pay scales, prevented hiring permanent staff in this department. It was also mentioned that compensation for harder, more skilled positions were often paid similar or the same as less skilled positions. Additionally, staff mentioned equipment used to conduct work has reached its useful life, such as equipment used to find high voltage lines, bucket truck, welding trucks, and other equipment. A new bucket truck is on order and they hope to acquire it in 2017.

Currently, overtime is necessary to compensate for the limited workforce. The city reduced the amount of overtime each department can exceed (750 hours) and maintenance expressed that not being able to use overtime and being understaffed is delaying its ability to keep on top of equipment maintenance. Maintenance will acquire more facilities in the near future, such as the lake stations, which will add to the maintenance backlog. More work is being contracted out to subcontractors that was usually done in-house prior to Hurricane Katrina. Many of these contractors are not local and are not always able to provide timely service for critical pieces of equipment. The department is facing a lack of qualified personnel to adequately supervise or oversee subcontractors. Approximately 36 percent of the maintenance employees are eligible for retirement or will be eligible to retire within five years. Thirteen positions (mostly high level senior supervisors in the machine shop) are on deferred retirement option plan (DROP) and could leave in the next five years. Currently, three supervisors have retired only leaving one supervisor in the machine shop. Training lower level staff is not happening due to the lack of experienced people left to assist with training. The department is actively recruiting at job fairs, and trade schools. SWBNO is working on a partnership with a local community college to start a trade program for skilled trades and plans on hiring from that pool of students. Maintenance noted that the community college is not producing the skilled labor required of entry level candidates and the department is using the labor contract to find staff. The hiring process has been hindered by turnover in the Human Resources Department and new hiring procedures instituted by the Human Resources Department.

ENGINEERING

The Engineering Department includes mechanical engineering, electrical engineering, civil engineering, construction administration and inspection, and networks engineering. The Engineering Department administers major contracts throughout the SWBNO facilities and coordinates with other agencies for the design and construction activities impacting SWBNO-maintained facilities. Currently, the department manages over 60 project contracts for FEMA and capital improvement projects.

The status of major contracts administered through the Engineering Department is itemized in the following list:

- New sludge line from the Carrollton WPP to the river is at 90 percent design. Construction should begin in 2018.
- Rehabilitation of L3 was completed in 2016.
- The SWBNO plans to add a sludge dryer, including a new air emission system, to the East Bank Plant. The contract for the work was awarded in 2016 with delivery and install happening in 2017. An arc flash study is being conducted on electrical equipment for safety purposes and as part of various electrical upgrades at WPPs. This effort is ongoing.
- Chemical feed storage improvements to add additional chemical storage at the Carrollton WPP.
- The filter backwash pump replacement design is complete and will be under construction in 2017.
- The water hammer project, which includes installing two new elevated tanks at Carrollton WPP, is currently under construction and will be completed in 2018.
- The recycle pump improvements construction was completed in 2016 and was operational in early 2017.
- Rehabilitation of Turbine 4 is ongoing and will be completed by the end of 2017.
- Filter media rehab at Algiers WPP is currently scheduled but has not begun. The SWBNO has seven major uptown roadway drainage projects. Currently, five drainage projects were completed in 2016 and two more projects are still ongoing.
- The water line replacement program with the City of New Orleans is moving forward, contracts were awarded in 2016/2017 and will be ongoing for the next 3 to 4 years.
- Rehab of Clarifier 2 at East Bank Wastewater Treatment Plant (WWTP) is under construction and it is ongoing.
- The piping from the East Bank Plant to the expansion and demonstration cells was completed in 2016 and tree planting should start in 2016. The A2 project is scheduled for Fall 2017.
- Flood mitigation contracts for nine sewage pump stations were awarded and the Engineering Department is supervising these contracts. Eight station construction projects were completed in 2016 and one station is scheduled to start construction in 2017.
- At Carrollton WPP, fuel tanks are being replaced with a 250,000 gallon above-ground storage tank, which is currently under construction. This project is ongoing.
- A power plant project to improve valves, steam line, auxiliary power, and address steel was bid and the work is ongoing.
- 10 major underground 25 cycle electrical feeders are being replaced throughout the SWBNO facilities. The project is currently under construction. This project is the first design-build project for the SWBNO.
- The Old River Intake Station rehabilitation project was awarded in 2016 and it is currently under construction.
- Turbines 4 and 3 rehab is ongoing. Turbine 3 was taken offline for emergency rehab. Due to delays, Turbine 4 rehab has been ongoing for the last 5 years.

Additional projects planned by the Engineering Department include the following:

- The bulk sodium hypochlorite systems at the West Bank WWTP are completed. The East Bank WWTP system is currently under construction and scheduled to be completed in 2017. There will also be new lime storage and feed facilities at both WPPs. This project is on hold currently.
- Design of a new chemical storage and feed facility at Carrollton WPP. This project will go to bid by the end of 2017.
- Design of a new filter gallery addition at the Carrollton WPP. This is a long-term design and construction project (next 10 years).
- There are various water projects that include filter rehab, valve rehab, and pump replacement.
- Rehab of the head house building is planned to convert this building into the SWBNO's new resiliency complex.
- A new infield building is being planned for additional office space at Carrollton WPP. Both the infield and the resiliency complex will meet FEMA's safe house requirements for a hurricane shelter.
- The engineering building will be rehabilitated to replace roof, windows, and doors to make them withstand a higher wind rating.

In addition to contract administration, the Engineering Department is adding geographical information system (GIS) technology to enhance the capability to track water distribution and sewer pipes. The FEMA-funded water main replacement and emergency sewer system assessment requires GIS identify and fix broken or leaking pipes in the water distribution and collection system. It was noted during the interview that funding for drainage improvements projects is needed. In terms of staffing, the department needs to hire more electrical engineers (due to upcoming retirements) to manage electrical contracts and review electrical design work

NETWORKS

The Networks Department is charged with maintaining the sanitary sewer system and the potable water distribution system. The water distribution network that was damaged by uprooted trees and other debris during Hurricane Katrina has not been fully repaired. Consequently, the Carrollton WPP is currently purifying approximately 132 mgd of water while serving 96 percent of the pre-Katrina accounts. Prior to the levee failure caused by Hurricane Katrina, the plant was purifying approximately 115 mgd of water.

The Networks Department is divided into seven zones. Zone 2 operates the barricade unit that does street and lane closures, provides visibility around maintenance sites, and performs preventive maintenance activities such as exercising valves and maintaining fire hydrants. Zone 7 has the after-hours crews, which respond to emergency calls and provide limited surface restorations for repair excavations. Zones 1, 3, 4, 5, and 6 represent geographical areas in New Orleans that provide repair services for their respective areas. Each zone has a staff of approximately 20 to 35 people who are responsible for repairs within the designated areas. Typically, a six or seven person crew will complete a work order. More complex work orders may require additional crews on a single work order. Contractors are used to supplement repair work performed within each of the areas, if sufficient staff within the SWBNO is not available to perform necessary repairs. It was noted by the

department that cooperation from contractors has been a good resource to the Networks Department and the contractors are performing above the contract requirements. The use of contractors is the only way the Networks Department can complete its work with limited allowable overhead. The Networks Department expressed concern about the long-term risk to the Network Department's capabilities from dependency on contractors for large projects.

According to SWBNO personnel, the biggest challenge is to keep up with the backlog created due to the increased decay rate of the distribution and collection systems as well as the reduction in the amount of overhead that can be used by the department to complete work. Reduction in allowable overtime citywide went into effect in 2016. The Networks Department stated this new reduction has significantly impacted its ability to complete projects, assist with valve closures, and other responsibilities due to loss of staff. Due to its current staffing levels, the Networks Department is finding it harder to keep up with the amount of reactive repairs, which have risen from the last few years, which occur within the systems. The increase in residential development (new installations) and increase in city events (runs, bike-a-thons, etc.) has created additional workload, as well as delays in completing work within the systems. Lastly, equipment (backhoes, excavators, flush trucks) availability has been an issue in the last year. The Networks Department stated it has limited access to the dump trucks and backhoes needed to run the required number of crews. The Networks Department recently received 12 new mini-excavators.

The SWBNO conducted an evaluation of the piping system to detect leaks. The effort to find leaks is ongoing and the department is trying to focus more on lining and replacement, as well as repairs in both the water distribution system and sewer collection system. The department has conducted several large-diameter pipe lining projects on critical large diameter lines that have experienced cracking and failure due to excessive corrosion.

The department is very short-staffed, especially lacking experienced maintenance/crew staff and experienced zone operators. The overtime reduction resulted in a loss of approximately 10 more senior level operations staff. Additionally, high turnover in the field services staff is an ongoing situation due to lack of raises, reduced overtime, and delayed promotions. The Networks Department is more dependent on contractors for assisting with work that is generally done by its staff. It was noted by the department that cooperation from contractors has been a good resource to its department and contractors are performing above the contract requirements. The use of contractors is the only way the Networks Department can complete its work with limited allowable overhead. The Networks Department expressed concern about the long-term risk associated with the Networks Department's capabilities because of its dependency on contractors for large projects. The department has an internal training program for maintenance and engineering staff. The Networks Department noted that certification testing and certification classes for distribution and collection operators will take place at Delgado Community College. This situation will assist the department with staff obtaining operator licenses.

In terms of engineering staff, Technology Services lost two engineers and hired one engineering intern in 2016. It was noted by the department that staffing in engineering has improved since last year since the younger level staff are getting more experience and there are better entry level candidates. Staff retention is critical to the department. The high turnover in the Human Resources

Department and new requirements for hiring and promotions is hindering the departments in retaining staff.

Approximately 1,236 water mains were repaired in 2016. Identification of leaks is ongoing and the SWBNO will continue to incorporate identified leaks into the water main replacement program funded by FEMA. As part of the ESSA program, manholes are also being inspected as a part of the ongoing inspection of the sewer system. Approximately 1,241 sewer repairs were completed in 2016. In addition to the FEMA-funded projects, the Networks Department also responds to requests for valve closures by contractors and the city.

The Networks Department works in conjunction with the New Orleans Fire Department to monitor and maintain all fire hydrants located in the SWBNO's service area. The Networks Department inspects all fire hydrants within the system. All city hydrants have been mapped and assigned an identification number. The fire hydrants program requires the 16,500 fire hydrants in the database be inspected once every two years to supplement the semi-annual inspection cycle of the Fire Department. In 2016, the department inspected 6,303 hydrants. The Networks Department is assisting the city with hydrant capacity color coding to comply with the new hydrant rating standards required for the city's insurance rating. It also conducted flow testing on critical hydrants to find leaks, ensure they meet the rating, and are operational.

The Networks Department completed 4,757 paving projects in 2016, both in-house and in cooperation with contractors. This department has several contracts to assist with maintenance of the water distribution, wastewater collection, and drainage stations. These contracts have increased the amount of work accomplished within the division.

SUPPORT SERVICES

The SWBNO owns approximately 790 pieces of rolling stock, which includes trucks, backhoes, and sewer cleaning equipment. The available equipment is being assigned to the various divisions based on the needs of the departments. Approximately 107 pieces of new stock were obtained in 2016.

The Support Services Department performs most all-ground maintenance functions. In addition, Support Services Department operates the warehouse that stores valves, pipes, hydrants, tools, etc., required by the Networks Department for repair of existing water distribution and sewer pipelines.

Support Services Department also operates garages for vehicle repair. The garage areas were heavily damaged during Hurricane Katrina. Garage 1 was rehabbed in 2015 and 2016. Currently, the contractor has completed the final punch list and the substantial completion and letter of occupancy was issued in early 2017.

Garage 2 is currently being rehabbed and has been delayed due to electrical work. The primary contractor was delayed because of this uncompleted work and is scheduled to finish in mid-2017. Office supplies, shelving, and items for Garages 1 and 2 are in the process of being ordered. Once Garage 2 is completed, the administrative staff will move its offices into Garage 2.

A new Site Relocation Facility was constructed in 2014 to house personnel until the garage renovations are completed. Currently, staff and materials from both garages are being stored in the

site relocation building. Ultimately, the site relocation building will also be used to house the body repair shop of Garage 2.

FEMA continues to reimburse equipment and tools for each garage lost to the hurricane, in addition to replacing some of the buildings, such as the annex building, which will be used to house locker rooms, shower facilities, training rooms, CDL training unit, etc. Projects being completed or conducted within Support Services include the following:

- Six new vacuum trucks were purchased in 2015 and arrived on site in 2016. The remaining vacuum trucks were acquired in 2016. Support Services Department discontinued leasing vacuum trucks since all ordered trucks are onsite.
- Take home vehicles were reduced to 50 as of 2016.
- The contractor assigned to mitigate problematic vegetation (lilies) in the canal systems in 2015 continued to make significant headway in reducing lilies. The department continues to use this contractor for mitigation.
- Major change to janitorial services occurred in 2016 to include more facilities. This addition of more facilities is still ongoing but the request for services is not out to bid yet. The current company is working on a month-to-month basis with its contract.
- New employees were hired in all areas of support services, including mechanics etc., to help support all departments within SWBNO. The department noted that most of the staff is approaching retirement age and, as a result, it will be short staffed, including the director of the department. Many senior level staff, including many successors, is in the DROP or retiring within the next 5 years. The department has been actively identifying candidates to replace staff close to retirement. Ground maintenance continues to have high labor turnover due to the nature of the work. The Support Services Department is focused on filling vacancies and getting promotions awarded through the Human Resources Department.
- All departments with the SWBNO are required to reduce their overtime to no more than 750 hours. To comply with this requirement, the Support Services Department has established procedures for vetting overtime requests by department employees. Staff must now fill out an overtime authorization form including projected overtime for the task. The forms are reviewed every week and authorization sheets are submitted a week ahead of time, and then updated based on the actual work done.

Future projects/concerns:

- The HVAC system at the St. Joseph building is in need of rehabilitation. Currently, it is not effective at keeping the building cool. The conceptual design was completed in early 2016 and the HVAC was scheduled for rehab in late 2016. This effort is delayed to provide HVAC to the information systems building, which was installed in early 2017. Currently, St. Joseph building rotates its HVAC units to ensure the building remains cool in the summer. The annex area HVAC components are on order and should be installed in 2017. Currently, the annex is using portable units. The HVAC system components for the main building will be going out for bids in 2017.
- One elevator in the St. Joseph building is inoperable. Repairs or replacement is needed. The Engineering Department is working on bid documents and the project is scheduled to be

completed in 2017. The Peoples Avenue building elevator design is also complete but not out to bid yet.

- A new building generator will be installed at the St. Joseph building. The building is currently on a portable generator. The project will include a new generator with an automatic transfer switch.
- The Central Yard Facility plans to add an additional parking lot and replace the fence around the building. This project is still on hold due to planned street work.
- Support Services Department phone system will be upgraded once the Carrollton WPP is completed. This project was not completed in 2016 and is ongoing.
- Modular units that act as temporary offices will be moved off site once Garage 1 and 2 are done.
- Support Services Department noted that the Networks Department is conducting training sessions on how to operate heavy equipment to help support the department's efforts to keep the equipment in better condition.

ENVIRONMENTAL AFFAIRS

The Environmental Affairs Department oversees the consent decree and all administrative orders. This department reports there are sewer bypasses and overflow to the Region 6 EPA. Some activities being undertaken by the department include the following:

- Continuing to monitor industrial users through the pretreatment program.
- Permit compliance in air, water, wastewater, storm water management, solid waste, and underground fuel storage tanks.

The construction of the piping for the East Bank Sewage Treatment Plant wetlands assimilation has been completed. The piping allows treated effluent to be discharged to the demonstration and expansion cells. Currently, SWBNO has a permit from LDEQ to discharge to the demonstration cells, but no permit has been issued to discharge into the expansion cells. No trees have been planted in the cells due to too much water. Additional grant funds were available from the state, which paid for additional fill that was added to the cells in 2016. The tree type and company that will plant the trees were selected in 2016 and planting should start in fall 2017. LDEQ has not processed the permit application for the East Bank WWTP and cannot discharge into the expansion cells until a permit is issued. Tree planting cannot start until the permit is issued and the plant can discharge to the cells. The construction of the A2 project, a joint agreement of a wetlands assimilation project between St. Bernard Parish and SWBNO, did not start in 2016 and is placed on hold. Delays on permit issuances (coastal permit mainly), lack of agreement from land owners, and change in government officials within St. Bernard Parish caused the funds to not be used within the allotted time.

The components of the pretreatment program include monitoring the discharge of the East and West Bank Sewage Treatment Plants in addition to other significant industrial users during the year. No additional users were permitted in 2016. An annual report was submitted to LDEQ to demonstrate pretreatment performance. In addition, yearly revenue has been received from the following sources associated with the pretreatment program:

- Industrial users billed monthly for excess strength surcharges.

- Sanitary sewerage discharged to the wastewater plant from special events.
- Septage disposal program.

East Bank WWTP obtained its air permit in 2016. The use of diesel powered units to provide emergency power to DPSs and other SWBNO facilities required these facilities meet air quality regulations. Currently, the East Bank WWTP is in compliance with MAC 129: mercury emissions. Installation of the wet scrubber system was completed in 2016 and stack testing and all required paperwork was filed prior to the March 21, 2017 extension deadline. The permit renewal of the power plant was submitted in 2016 and LDEQ has not reviewed that application yet. SWBNO continues to utilize compliance software for air quality programs at the Carrolton WPP.

All Title V Air Permit reports for the East Bank Sewage Treatment Plant were filed on time and there were no permit violations in 2016.

The Municipal Separate Storm Sewer System (MS4) Permit for the Orleans Parish is managed by the SWBNO. The board, along with co-permittees, met the requirements found in the permit and it was documented in the annual report filed on May 1, 2016.

The Environmental Affairs Department used a contractor for stormwater sampling required for the M4 permit. The department purchased sampling equipment in 2016 and sampling is now done completely in-house by the department's staff. All required samples were successfully collected by the department's staff to meet 2016 permit requirements.

The department recently started a fats, oils and Grease (FOG) monitoring and permitting program and has issued permits to about 3,000 facilities such as schools, restaurants, and industries with grease traps. The department tracks all permits, trap pumping records, and applications using a database, and it proactively works with facilities to prevent improper disposal of grease to the SWBNO collection system. The department held meetings and community outreach events in 2016 to assist the public and businesses in being more aware of the impacts of FOG on the collection system. Additionally, the department has provided training and certification to grease trap pumping companies to make sure their staff are consistently pumping down and installing traps correctly. Department staff uses database software to manage the permitting process and is able to track noncompliance, permit applications, and grease trap pumping records.

The SWBNO will continue with its green infrastructure pilot program, which focuses on community outreach and education. In 2016, a green roof was installed at the St. Joseph building. Recently, a video with the SWBNO director was filmed for the One Water summit, which highlighted the roof and the importance of green infrastructure. The department continues to fund projects on publically-owned lands such as schools.

The Environmental Affairs Department continues to hire more staff for the tasks necessary to maintain compliance with all the rules and regulations that apply to the SWBNO. In 2016, four additional Environmental Technician 1s were hired to assist with the FOG program. Cameras were purchased to inspect sewer house connections and sewer lines and the department staff conducted those inspections in house. Additionally, the department acquired another vehicle for department use. The department continues to actively hire and fill vacancies and have added an additional city

planner, an administrative position, and a manager for the environmental technicians. The department did not express concerns about finding qualified candidates for these vacancies.

STATUS OF CONSENT DECREE FOR SEWERAGE SYSTEM

The SWBNO is complying with the EPA Region 6 and Department of Justice consent decree, which requires cessation of unauthorized discharges and the development of a schedule for repairs to both the collection system and the treatment plant.

Some provisions outlined in the consent decree include those listed below:

- Quarterly and annual reporting requirements are to be submitted to the regulatory agency.
- The SWBNO will meet the preventive maintenance requirements of the consent decree.
- Collection system repairs will begin once the hurricane damage to the sewage pump stations has been repaired.

The SWBNO is in compliance with the consent decree. It has met every construction and reporting deadline in the decree and has had no fines related to construction or reporting schedules in 2016.

SUMMARY OF FINDINGS

The following items are a summary of the findings during the site inspections:

- The management team consists of individuals with significant water, sewerage, and drainage experience. This experience has been developed both internally at SWBNO and at other respected water and sewer utilities.
- Similar to water and sewer utilities across the United States, the SWBNO departments are faced with a significant number of pending retirements. Approximately 22 percent of current employees are either on the DROP or are eligible for retirement. Unless these employees are replaced with qualified individuals, these pending retirements pose a significant threat to SWBNO's ability to perform its core operational and administrative functions. Succession planning and recruitment of qualified employees to mitigate the pending retirements will be a key element for SWBNO. This problem was noted by every department.
- Many key system-wide projects that were in design phase in 2016 are currently out to bid. Construction of the two 2 mg water towers, as part of the water hammer project, started construction in late 2016.
- Several departments are experiencing vacancies, including the water purification unit of the Operations Department, as well as the Facilities Maintenance and Networks departments. Within the last year, two high level department heads have retired, one in the Pumping and Power Department and the other in the Facility Maintenance Department. SWBNO needs to address these vacancies as soon as possible to ensure effective operational and maintenance performance and administrative oversight. It was noted by every department that within the last year, the high turnover within the SWBNO's Human Resources Department along with new Human Resource Department's procedures hinders efforts to hire and promote staff in a timely fashion
- The SWBNO has a clear understanding of the existing conditions of the drainage, water, and sewage facilities and is aware of the immediate needs within each division and area; however,

funding is needed for the SWBNO to address these issues. Water and sewer customer rate increases went into effect and the SWBNO is currently prioritizing immediate needs such as filter rehabilitation at the Carrollton WPP.

- The SWBNO has started to initiate the filter rehabilitation program at the Carrollton WPP, as the filter system is in need of extensive repairs due to pipes, valves, actuators, and filter media being at the end of its expected service life. Media rehab of Claiborne filter gallery filters 1 and 5 were completed in 2016 and were back online. The Algiers WPP filter gallery is in need of filter rehab and SWBNO is working on scheduling that work along with other projects such as the clarifier rehab.
- The rate of decay of the potable water distribution network and the sanitary sewer collection system presents the two biggest challenges. Lines are being replaced or repaired where leaks have been detected by the contractor. The Networks Department has experienced high turnover rates in field staff due to the reduction in allowable overtime and are now relying more on contractors to perform work the department normally does in house. This situation has added to the stress of dealing with the rate of decay and system needs.
- West Bank WWTP was fully converted to sodium hypochlorite at time of visit. East Bank WWTP should be fully converted to sodium hypochlorite by 2017. This conversion from gas to sodium hypochlorite ensures the safety of the neighboring communities, as well as the operators at each location.
- Based on the SPS and SLS inspection, all DPSs and SLSs are considered operational either from permanent pumps or the use of temporary pumps. All significant DPS construction projects have been completed within the last few years. Maintenance and repair of pumps, screens, and generators are the only items planned for DPSs at this time.
- The sewage plants are meeting permit requirements except for one exceedance in 2016. The incident occurred at the East Bank WWTP and was due to operator sampling error, which resulted in an exceedance of effluent maximum daily concentration for fecal coliforms. The SWBNO and the contract operator, Veolia, have addressed the issue.

Water Department

ADHERENCE TO WATER REVENUE BOND RESOLUTION REQUIREMENTS

In 2014, the Sewerage and Water Board sold $103,525,000 of Water Revenue and Refunding Bonds. The sale of these bonds has obligated the Board to fulfill the covenants of the current bond resolutions. The covenants are designed to protect the interests of the bond holders. Particular covenants of the Board in the General Water Revenue Bond Resolution pertain to the payment of indebtedness; limitations on indebtedness; covenants and representations of the Board; covenants with credit banks, insurers, etc.; operation and maintenance; free service, completing service, billing and enforcement of charges; sale or encumbrance of the system; insurance; damage, destruction, condemnation and loss of title; records and accounts, inspections and reports; and the capital budget. The Requirements of the 2014 General Water Revenue Bond Resolution adopted on May 21, 2014, (hereafter collectively called the General Resolution) are discussed in this section. Water Department tables are included at the end of this section.

The Board was in compliance with the 2014 General Water Revenue Bond Resolution in 2016.

Payment of Indebtedness; Limited Obligations

The General Resolution obligates the Board and the Board of Liquidation (BOL) to promptly pay the principal and interest on all senior and subordinate debt that are obligations payable from the net revenues of Board.

Limitations on Indebtedness

The Board must not issue bonds, other senior parity indebtedness or subordinate debt unless it complies with Sections 4.03, 4.04 or 4.05 of the General Resolution, as applicable.

Covenants and Representations of Board

The General Resolution gives the Board the power to issue bonds and pledge the revenues according to the resolution. In addition, the Board "… faithfully observe and perform all covenants, conditions and agreements on its part contained in this Resolution, in every issue of Indebtedness issued hereunder and in all proceedings of the Board pertaining thereto."

Covenants with Credit Banks, Insurers, etc.

The Board may make covenants and agreements in a supplemental resolution with any insurer, credit bank or other financial institution that agrees to insure or to provide a credit facility to the Board. These covenants and agreements shall be binding on the Board and all the holders of indebtedness the same as if such covenants were set forth in the General Resolution.

Operation and Maintenance

The Board "… shall establish and enforce reasonable rules and regulations governing the use of and the services furnished by the System, shall maintain and operate the System in an efficient and economical manner shall maintain the same in good repair and sound operating condition and shall make all necessary repairs, replacements and renewals." In addition, all compensation, salaries, fees and wages paid by the Board shall be reasonable. Finally, the Board shall observe and perform the terms and conditions contained in the Sewerage and Water Board Act (Part III of Chapter 9 of Titles

33 of the Revised Statutes of Louisiana, as amended), and "comply with all valid acts, rules, regulations, orders and directions of any legislative, executive, administrative, or judicial body applicable to the System or the Board."

Free Service, Competing Service, Billing and Enforcement of Charges

The Board shall not " … provide any services of the System without making a charge therefor in accordance with the Board's schedule of rates, fees and charges … other than those connections, use or services already in existence or as may be required by law …" In addition, the Board may not "… provide, grant any franchise to provide or give consent for anyone else to provide such services which would compete with the System unless the Board determines that such franchise … would provide services that the Board has determined are not in its best interest to provide and would not materially impair the interests of the holders of indebtedness."

The Board will bill customers for services on the regular basis and if the rates, fee or other charges are not paid when due, the Board shall " … to the extent permitted by applicable laws and regulations, disconnect the premises from the System or otherwise suspend service to such premises until …" delinquent rates, fees or other charges have been paid or a payment plan has become effective.

Sale or Encumbrance of System

The General Resolution requires that, with exceptions, "… neither the System nor any integral part thereof shall be leased, sold, mortgaged or otherwise disposed of …"

Insurance

The Board "… shall continuously maintain insurance with recognized responsible commercial insurance companies against such risks and in such amounts as are customary for public bodies owning and operating similar systems …"

Damage, Destruction, Condemnation and Loss of Title

The Board shall restore "… property destroyed or damaged to substantially the same condition as before such destruction, damage; condemnation or loss of title …"

Records and Accounts; Inspections and Reports

The Board is required to "… keep proper books of records and accounts … showing complete and correct entries of any transactions relating to the System…."

The Board is also required to file with the Board of Liquidation, City Debt an annual report with financial statements audited by and containing the report of a nationally recognized independent public accountant. The auditor's report is to include a statement that during their examination, made in accordance with generally accepted auditing standards, nothing came to their attention that would lead them to believe that a default had occurred under the resolution, or to state the nature of the default.

The Board engaged the firms of Postlethwaite & Netterville and Bruno & Tervalon to comply with this covenant. Financial reports with the Accountants' Certificate have been furnished to the Board of Liquidation, City Debt and have been reproduced for public distribution. The Government Finance

Officers Association (GFOA) has awarded to the Board the "Certificate of Achievement for Excellence in Financial Reporting" for their annual financial reports for 29 years.

Capital Budget

The Board is required to adopt an annual multi-year financial plan for capital expenses for a minimum of 5 future years.

2016 WATER DEPARTMENT OPERATIONS

Funds for the operation and maintenance of Water Department properties were derived from sales of water, delinquent fees, plumbing inspection and license fees, charges for disconnections and reconnections, and from interest earned on available funds. Analyses of the 2016 Water Department operations are discussed in the following paragraphs.

Water Use

According to statistics provided by the Board during 2016 51,561,280,000 gallons of water were pumped by the Water Department. Water sales accounts for 13,106,735,840 gallons and 1,042,722,355 gallons were metered to City departments without charge. Metered treatment plant process water totaled 532,233,700 gallons. The remaining 36,879,588,105 gallons resulted from unmetered uses, such as fire protection; flushing streets, sewers, drains, and gutters; and unaccounted for system losses.

Number of Customers

Table 2 presents a summary of the historical and projected average number of treated water customers for the period 2015 through 2021. Based on year-end billing summaries, the number of monthly billed customers during 2016 averaged 134,872 compared with 133,904 for 2015. Based on year-to-date customer data through August of 2017, it is projected that the Board will average approximately 135,535 open accounts in 2017 and that the number of accounts will continue to grow at approximately 0.3 percent each year.

In addition to regular customers, water is sold to construction contractors and other customers on an irregular basis. The Board, by law, also provides water service free of charge to certain municipal and public connections including the Board itself. In 2016 there were 1,107 connections in this group, compared with 1,119 for 2015.

Billed Water Usage

Table 2 also presents a summary of historical and projected treated water sales. Based on year-end billing summaries, a total of 13,107 million gallons of water sales were billed on a monthly basis in 2016, compared with a total of 13,266 million gallons in 2015. Over the past few years, the Board and other water utilities operating in the United States have experienced minimal to no growth in water usage and in some cases, a decline. As a result, a resistance factor is applied to the projected annual usage per customer for each customer class to reflect the impact of price elasticity and the trend of decreasing per capital demand due to conservation efforts and more efficient water fixtures. Projected water usage for 2017 is based on an analysis of water usage by customer class for 2016 and year-to-date water usage through August of 2017. As a result, the volume of water sold is projected to increase approximately 2.8% in 2017. Due to the application of a resistance factor, the volume of water sold is projected to decrease approximately 0.7 percent per year beginning in 2018.

Operating Revenues

The 2017 schedule of rates for retail treated water service is presented in Table 3 and reflects a 10 percent rate increase over 2016 rates. The rates consist of monthly service charges, which vary by meter size, plus a 4-step declining block volume charge, with the exception of the first block, which is a life-line related charge. Current rates for flat rate fire service are also shown in Table 3. Separate rate schedules, not shown, are used for billing water sold to construction projects and other purposes.

A summary of historical treated water billings and other Water Department revenue is presented in Table 4 for the period 2012 through 2016. The historical revenues shown in Table 4 were developed from detailed records provided by Board Staff. Operating revenues are derived from charges for sale of water and delinquent fees. Sales of water in 2016 were $82,060,525 which, when compared with $76,719,113 for 2015, shows an increase of approximately 7.0 percent. Delinquent fee revenues were $1,098,415 in 2016 which represent a 14.8 percent decrease over 2015 delinquent fees.

Non-Operating Revenues

Also shown in Table 4, non-operating revenue of the Water Department includes interest earned on invested funds, and other income from miscellaneous sources. During 2016, non-operating revenue included $2,097,442 of interest earned from the investment of available funds in the Water System Fund and the Water Revenue Bond Account and $3,102,435 from other sources.

Operation and Maintenance Expenses

Table 5 presents a summary of historical expenses. Expenditures in 2016 decreased about 1.8 percent from 2015 expenditures and increased about 10.8 percent from 2014 expenditures. Historical operation and maintenance expenses shown in Table 5 do not include the non-cash portion of Provision for Claims as recorded in the Comprehensive Annual Financial Report. Estimates of future Water Department claims are included in Line 7 of Table 12.

Capital Budget and Expenditures

Capital expenditures of the Water Department include the cost of replacements and improvements to waterworks facilities, the water distribution system, and the Water Department pro rata share of power projects and general budget costs.

The Water Department's 2016 capital expenditures totaled $40,135,472. The Water Department's capital improvement expenditures for the year are shown in Table 6.

Summary of Operations

The following tabulation shows a summary of the receipts and expenditures of the Water Department during 2016:

Total Revenues	$88,358,817
Operation and Maintenance Expense	76,886,448
Claims	1,847,021
Debt Service Payments	10,222,220
Revenue Primarily Available for Capital Expenditures [a]	**-596,872**

[a] Excludes depreciation.

PROPOSED CAPITAL IMPROVEMENT PROGRAM

Table 7 presents a summary of the projected major capital improvement program for the period 2017 through 2021. Table 7 is based on the Board's amended 2017 Capital Budget and 2017 -2026 Capital Improvement Program. The five-year major capital improvement program costs are estimated to total $534,212,030. About 56 percent of this amount, or $299,282,030, is for recurring annual capital improvements, with the remaining $234,930,000 for major improvements. The proposed routine annual capital expenditures for water system improvements and extensions include $82,199,230 for the Water Department's share of power projects, and $70,630,800 for its share of general budget items.

ABILITY TO FINANCE PROPOSED CAPITAL EXPENDITURES

This section of the report analyzes the adequacy of projected revenues to finance the proposed capital improvements shown in Table 7.

Operating Revenues

Operating revenues of the Water Department consist of revenues from water sales. Projected operating revenues for the years 2017 through 2021 are shown in Table 8. These estimates reflect the rate schedule effective January 1, 2017 applied to the projected number of customers and water usage and are projected to decrease, on average, about 0.5 percent per year throughout the study period due the anticipated decline in water consumption. Projected revenue from adopted revenue increases is also shown in Table 8.

Other Revenue Sources

Based upon past practices, the Water Department can expect to obtain revenues or funds from non-operating sources. These include interest earned on available funds, participation by others, house connection charges, fire connections, fire hydrant relocations, and various other income sources. Also, by Board policy, the Water Department receives one-half of the plumbing inspection and license fees currently projected at $299,700 per year.

Interest income from the investment of funds held for future use depends upon the level of water revenue available for investment and the amount of revenue accrued towards payment of future capital expenditures.

Projections of other revenue sources are presented in a subsequent table, which summarizes the Department's financial position during the financing of projected operating and capital requirements.

Operation and Maintenance Expenses

A summary of projected operation and maintenance expense for the period 2017 through 2021 is shown in Table 9. Estimates of future expenses are based on anticipated future operating conditions and allowances for inflationary factors.

Projections of future operating and maintenance expenses for the study period are based on the Board's amended 2017 Operating Budget and an analysis of the current and anticipated operating conditions and trends.

Debt Service Requirements

Future debt service requirements of the Water Department are made up of principal, interest, and reserve fund payments for currently outstanding and future water revenue bond issues. As of December 31, 2016, outstanding debt obligations consisted of $103,200,000 Water Revenue and Refunding Bonds, Series 2014 and $100,000,000 Water Revenue Bonds, Series 2015.

To adequately fund the proposed capital improvements, additional revenue bonds are indicated as shown in Table 10. It is anticipated that the Board will issue revenue bonds in the amount of $178,000,000 in 2018 and $103,000,000 in 2021. Projected bonds shown in Table 10 for 2017 through 2021 are assumed to be sold at an average annual interest rate of 5.5 percent for a term of 30 years with 1 year of capitalized interest.

The Water Department has borrowed from the City of New Orleans Department of Public Works (DPW) and from the Drainage Department. It is anticipated that these funds will be reimbursed during the study period.

Adequacy of Revenues to Finance Proposed Capital Improvements

Total revenue requirements for the Water Department recognized for purposes of this report include operation and maintenance expense, allowance for claims, debt service costs on major capital improvements financed through the sale of bonds, and expenditures for capital improvements not financed from bond proceeds. Table 11 examines the financing of the major capital improvement program and Table 12 summarizes the financing of operation and maintenance expense, debt service costs on outstanding and proposed bonds, and the transfer of operating funds for major capital improvement financing.

Capital Projects Funding

Table 11 presents the major capital improvement financing plan which summarizes the projected source and application of funds over the five-year study period. The amount of Funds Available at Beginning of Year, shown on Line 1, is $150,580,400. This amount is based on audited data provided by the Board.

Projected revenue bond proceeds, totaling $281,000,000, are shown on Line 2. The amounts and years of issue are developed by considering capital program needs, current policies, other sources of major capital improvement financing, and the debt service coverage requirements of the bond covenants regarding the issuance of parity revenue bonds.

Financing of the major capital improvement program anticipates the transfer of a total of $75,000,000 of operating revenue as shown on Line 3. Other sources of funds available to meet major

capital improvement expenditures are Participation by Others and interest income. Participation by Others, as shown on Line 4 includes anticipated funding by the COE and FEMA. Interest earnings recognize an assumed 1.0 percent average annual interest rate and are shown on Line 5. Line 6 of the table shows the projected major capital improvement funds available each year.

As of December 31, 2016, the Board had $24,890,500 obligated for open contracts and capital jobs as shown on Line 7 of Table 11. Line 8 shows the projected Major Capital Additions to be funded. These costs reflect the total improvements shown Table 7 with 3 percent inflation beginning in 2018. Estimated issuance costs and capitalized interest related to the proposed bond issue amounts are shown on Lines 9 and 10.

Line 11 shows the required deposits into the Revenue Bond Reserve Fund associated with proposed bond issues. The debt service reserve on proposed debt is a three-prong test estimated as the lessor of (i) 10 percent of the original principal amount, (ii) the maximum annual debt service, or (iii) 125 percent of the average annual debt service.

The Total Application of Funds is shown on Line 12 of Table 11. The net End of Year Balance is shown on Line 13.

Operating Fund

Line 1 of Table 12 shows projected Revenue from Charges under 2017 rates as previously presented in Table 8. In 2012, the New Orleans City Council approved eight consecutive annual 10 percent water rate increases beginning January 1, 2013. Revenue from these future annual revenue increases of 10 percent effective January 1, 2017 through January 1, 2020 is shown on Line 2. It is projected that a 6 percent revenue increase will be necessary effective January 1, 2021. The revenue from this proposed revenue increase is also included in Line 2. The date and magnitude of proposed revenue increase in 2021 is based on consideration of two principal criteria, which include: (1) total revenue necessary to meet cash requirements, and (2) total revenue required to meet minimum bond coverage requirements.

Other revenue available for system operations is shown on Line 4. Interest Income available to the operating fund, included in Line 4, is estimated to be 1.0 percent of the average of the beginning and end of year Net Annual Balance, except as the average is affected by identifiable nonrecurring major receipts, transfers, or expenditures during the year. Revenue from Plumbing Inspection and License Fees and Other Miscellaneous Revenue are also included in Line 4 Table 12. Total Operating Revenue is shown on Line 5.

Operation and Maintenance expense, previously projected in Table 9, is shown on Line 6 of Table 12. Line 7 includes the estimated allowance for claims and bad debt expense which is assumed to be 2 percent of projected revenue. Projected Net Operating Revenue from system operations is shown on Line 8.

Lines 9 through 11 present debt service requirements on currently outstanding and proposed senior revenue bonds. Existing debt includes the Series 2014 and Series 2015 bonds. Line 10 reflects projected principal and interest payments on additional revenue bond debt financing of $178,000,000 in 2018 and $103,000,000 in 2021. Proposed debt is assumed to be 30 year, 5.5

percent fixed interest rate bonds issued in March, with 1 year of capitalized interest and equal annual payments of principal and interest.

In July of 2006 the Board entered into a Cooperative Endeavor Agreement with the State of Louisiana to secure proceeds from the State's Gulf Opportunity Tax Credit Bond Loan Program to assist in payment of debt service requirements from 2006 through 2008. The Board has borrowed $77,465,247 on this agreement. No principal or interest was payable during the initial five-year period of the loan, but after that period, the loan began to bear an interest rate of 4.64 percent. Payments for the water portion of principal and interest began in July 2012 and are shown on Line 12 of Table 12 as subordinate debt.

Anticipated non-operating revenue is shown on Line 14.

Line 15 reflects the projected transfer of accumulated net earnings from system operations to assist in major capital financing. Typically, such accumulated net earnings may be used to help recover portions of the annual costs of system operations or to assist in major capital improvement financing. Line 16 reflects repayment to the DPW and the Drainage Department as well as claimants.

The General Resolution requires an Operating Reserve Fund of 90 days of the previous year's operation and maintenance expense; however the SWBNO's Financial Management Policy requires an Operating Reserve Fund of not less than 180 days. Line 17 indicates the projected annual transfers available to meet this requirement throughout the study period. The General Resolution also sets forth the option to maintain a rate stabilization fund. The amount to be transferred to this fund, as well as the timing, is determined by the Executive Director. There are no transfers currently anticipated during the study period as shown on Line 18 of Table 12.

Line 19 indicates the estimated Net Annual Balance from operations remaining at the end of each year.

The balance of operating funds available at the beginning of the year 2017, shown on Line 20, is comprised of the current cash assets and reflects a balance of $6,005,200. The End of Year Balance, which is exclusive of the operating reserve fund and rate stabilization fund, is shown on Line 21.

Lines 22 through 27 demonstrate that the Board is maintaining an operating reserve equal to at least 180 days of the previous year's operation and maintenance expense beginning in 2018.

As demonstrated in Tables 11 and 12, it is anticipated that current revenue sources will be adequate to readily finance both projected capital program requirements and estimated future operation expenses of the Water Department during the 2017-2021 study period examined herein, with the adopted 10 percent revenue increases in 2017 through 2020, and a 6 percent revenue increase in 2021.

Bond Coverage Requirements

An additional consideration in measuring the adequacy of revenues is the provision of sufficient debt service coverage to meet the bond covenant requirements for the issuance of parity revenue bonds. The General Resolution provides that rates shall be maintained at levels which are expected to yield net revenues (as defined in the resolution) equal to at least 125 percent of the annual principal and interest requirement for senior debt and 110 percent for senior and subordinate debt in each fiscal

year. The SWBNO's Financial Management Policy requires coverage at a minimum of 150 percent for senior debt and 125 percent for senior and subordinate debt.

The calculation of net revenue is shown on Lines 1 through 9 of Table 13. The ability of the Water Department revenues to meet revenue bond coverage requirements is shown on Lines 10 through 14. As shown on Lines 12 and 14, the indicated projected revenue and revenue increases will provide sufficient net revenue to meet coverage requirements during the study period.

The General Resolution further prescribes that additional parity revenue bonds may be issued if net revenue from a previous test year (any 12 consecutive months of the last 24 months) is equal to at least 125 percent of the maximum annual principal and interest requirement for senior debt and 110 percent for senior and subordinate debt. For purposes of the additional bonds test, net revenue may be adjusted to reflect any increases not in effect during the selected test year but have been approved by the Board, Board of Liquidation and City Council and will go into effect within the following five years.

The results of the additional bonds test are shown on Lines 15 through 21 of Table 13. Lines 19 and 21 of the table indicate that with the magnitude of the adopted annual revenue increases, required minimum levels of coverage are met in each year with indicated coverage levels ranging from 229 percent to 426 percent.

Table 1

Insurance in Force as of December 31, 2016

Insurer	Coverage	Deductible	Premium
Lexington	Commercial Property	5% per building subject to minimum $500,000 per occurrence for named storm; $50,000 earth movement deductible; $1,000,000 minimum per occurrence for any other peril not excluded	$513,765
Homeland	Commercial Property		$48,930
RSUI	Commercial Property		$28,306
Lloyds of London	Commercial Property		$35,796
Lexington	Commercial Auto Physical Damage	$150,000	$200,827
ACE	Commercial Auto Liability	$1,000,000 SIR/Deductible	$250,000
RSUI	Excess Auto Liability		$75,500
Endurance	Excess Auto LIability		$68,125
Hudson	Fiduciary Liability	$50,000	$20,156
Illinois Union	Public Officials Liability	$250,000	$70,256
Zurich	Commercial Crime	$5,000	$6,335
Beazley	Cyber Security	$25,000 per claim	$33,514

Customer Class	Historical		Projected				
	2015	2016	2017	2018	2019	2020	2021
Single Family Residential (b)							
Customers	116,078	117,202	117,800	118,300	118,800	119,200	119,600
Sales (1,000,000 gal.)	6,567	6,330	6,680	6,645	6,613	6,578	6,546
Sales Per Customer (1,000 gal.)	57	54	57	56	56	55	55
Multi-family Residential							
Customers	4,666	4,678	4,700	4,700	4,700	4,700	4,700
Sales (1,000,000 gal.)	707	702	698	691	685	679	674
Sales Per Customer (1,000 gal.)	152	150	148	147	146	144	143
Commercial							
Customers	11,642	11,501	11,500	11,500	11,500	11,500	11,500
Sales (1,000,000 gal.)	3,234	3,311	3,278	3,247	3,218	3,190	3,164
Sales Per Customer (1,000 gal.)	278	288	285	282	280	277	275
Industrial							
Customers	38	35	35	35	35	35	35
Sales (1,000,000 gal.)	217	162	161	159	158	156	155
Sales Per Customer (1,000 gal.)	5,709	4,634	4,589	4,543	4,503	4,466	4,429
Dual Service & Metered Fire Service (c)							
Customers	1,480	1,456	1,500	1,500	1,500	1,500	1,500
Sales (1,000,000 gal.)	2,541	2,602	2,654	2,628	2,605	2,582	2,561
Sales Per Customer (1,000 gal.)	1,717	1,787	1,769	1,752	1,736	1,722	1,708
Total							
Customers	133,904	134,872	135,535	136,035	136,535	136,935	137,335
Sales (1,000,000 gal.)	13,266	13,107	13,470	13,370	13,278	13,186	13,100

(a) Excludes customers receiving free service.
(b) Includes duplex.
(c) Does not include flat rate fire protection customers.
(d) Does not include flat rate fire protection customers.

Table 3

Water Department
Existing Water Rates
(Effective January 1, 2017)

Rate Components			General Service	Dual Service (a)
			$	$
Monthly Water Service Charge				
Meter Size				
Inches				
5/8			6.53	8.87
3/4			7.99	10.79
1			10.14	14.18
1-1/2			16.74	22.07
2			22.07	31.57
3			49.93	70.06
4			86.97	122.41
6			170.72	238.36
8			252.86	354.31
10			343.04	479.93
12			402.63	563.68
16			536.29	750.51
Monthly Water Quantity Charge - per 1,000 Gallons				
First	3,000	gallons	4.35	4.35
Next	17,000	gallons	7.41	7.41
Next	980,000	gallons	5.83	5.83
Over	1,000,000	gallons	4.88	4.88
Flat Rate Fire Service				
Meter Size				
Inches				
2			14.81	
3			20.13	
4			37.04	
6			64.42	
8			85.35	
10			135.28	
12			175.55	
16			241.58	

(a) Includes Dual Service and all metered fire services.

Table 4

Water Department
Statement of Historical Revenue

Revenue Source	2012	2013	2014	2015	2016
	$	$	$	$	$
Operating Revenue					
Sales of Water	59,208,198	63,248,555	69,601,809	76,719,113	82,060,525
Delinquent Fee	1,048,107	1,150,054	1,216,445	1,288,824	1,098,415
Total Operating Revenue	60,256,305	64,398,610	70,818,254	78,007,937	83,158,940
Nonoperating Revenue					
Interest Earned	92,849	82,893	349,607	966,017	2,097,442
Plumbing Inspection and License Fees	343,903	321,518	339,176	305,384	319,991
Revenue Sharing	123,885	219,877	254,577	258,721	251,002
Other Income (a)	10,851,066	5,234,998	2,459,234	3,418,560	2,531,442
Total Nonoperating Revenue	11,411,703	5,859,286	3,402,593	4,948,682	5,199,877
Total Revenue	71,668,008	70,257,896	74,220,847	82,956,619	88,358,817

(a) Includes $7,617,063 in operating and maintenance grants in 2012, $1,981,568 in 2013, -$381,876 in 2014,$2,405 in 2015 and $24,738 in 2016.

Table 5

Water Department
Historical Operation and Maintenance Expenses (a)

	2012	2013	2014	2015	2016
	$	$	$	$	$
Personal Services	31,410,463	32,375,467	34,802,991	42,333,498	39,659,020
Services & Utilities	12,230,597	15,964,882	16,936,254	17,408,686	17,603,566
Supplies & Materials	17,109,745	14,229,820	14,998,094	18,276,404	19,143,488
Special Current Charges	1,532,863	1,304,502	2,357,932	(103,530)	248,523
Furniture & Equipment	173,656	233,244	298,973	349,610	231,850
Repairs & Facility Maintenance	0	0	0	0	0
Total Operation and Maintenance	62,457,322	64,107,915	69,394,244	78,264,668	76,886,448

(a) Historical operation and maintenance expenses do not include the non-cash portion of provision for claims as recorded in the Comprehensive Annual Financial Report. Estimates of future Water Department claims payable are included in Table 12.

Table 6

Water Department
Capital Expenditures
2016

C.P. #	Project	Actual Expenditures
		$
	Waterworks	
110	Normal Extensions & Replacements	3,483,175
156	Advanced Water Treatment	735,405
175	Water Hurricane Recovery Bonds	4,886,835
180	FEMA Review of Change Orders - Water	11,683,197
	Total Waterworks	20,788,612
	Water Distribution	
214	Normal Extensions & Replacements	2,142,181
215	Rehabilitation - Mains, Hydrants & Services	2,096,192
239	Mains DPW Contracts	(158,500)
	Total Water Distribution	4,079,874
	Power Projects and General Budget	
600	Water Share of Power Projects	5,864,914
700	Water Reserve for Emergencies	233,731
800	Water Share of General Budget Items	9,168,341
	Total Power Projects and General Budget	15,266,986
	Total Water Department	40,135,472

Table 7

Water Department
Projected Capital Improvements (a)

C.P. #	Project	2017	2018	2019	2020	2021	Total
		$	$	$	$	$	$
	Reinvestment in Assets						
110	Normal Extension & Replacement	18,884,000	16,320,000	5,745,000	4,920,000	5,470,000	51,339,000
112	Modification to Oak St. Raw Water Intake Station	1,200,000	5,500,000	5,000,000	0	0	11,700,000
122	Sycamore and Claiborne Filter Rehabilitation	6,625,000	5,050,000	0	0	0	11,675,000
160	SELA Water Relocation Costs	1,300,000	603,000	237,000	578,000	2,145,000	4,863,000
214	Normal Extensions & Replacements	2,535,000	2,535,000	2,535,000	2,535,000	2,535,000	12,675,000
216	Water System Replacement Program	5,100,000	5,100,000	5,200,000	5,000,000	5,000,000	25,400,000
239	Mains In Streets Department Contracts	3,200,000	6,000,000	3,200,000	3,200,000	3,200,000	18,800,000
600	Water Share of Power Projects	51,397,230	15,570,000	9,072,000	3,780,000	2,380,000	82,199,230
701	Water Reserve for Emergencies	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	10,000,000
800	Water Share of General Budget Items	23,595,800	19,767,000	10,479,000	8,160,000	8,629,000	70,630,800
	Total Routine Capital Improvements	115,837,030	78,445,000	43,468,000	30,173,000	31,359,000	299,282,030
	Major Capital Improvements						
135	Improvements to Chemical System	7,370,000	2,100,000	3,000,000	0	0	12,470,000
156	Advanced Carrollton Water Treatment	8,815,000	700,000	20,120,000	120,000	120,000	29,875,000
157	Advanced Algiers Water Treatment	6,940,000	3,900,000	1,000,000	0	0	11,840,000
158	Water Treatment Carr.	200,000	200,000	0	0	0	400,000
159	Water Plant Security Improvements	2,495,000	1,980,000	3,320,000	0	0	7,795,000
175	Water Hurricane Recovery Bonds	40,600,000	23,200,000	44,000,000	33,200,000	31,200,000	172,200,000
221	Feeder Main Extension, General	100,000	100,000	50,000	50,000	50,000	350,000
	Total Major Capital Improvements	66,520,000	32,180,000	71,490,000	33,370,000	31,370,000	234,930,000
	Total Water Department Improvements	182,357,030	110,625,000	114,958,000	63,543,000	62,729,000	534,212,030

(a) The improvements for 2017-2021 are based on the amended 2017 capital budget and 2017-2026 capital improvement program.

Table 8

Water Department
Projected Operating Revenue

	(1)	(2)	(3)
Year	Revenue From Charges	Additional Revenue (a)	Total Service Charge Revenue
	$	$	$
2017	91,193,500	0	91,193,500
2018	90,675,500	8,925,900	99,601,400
2019	90,198,400	18,704,000	108,902,400
2020	89,718,000	29,351,800	119,069,800
2021	89,273,400	30,077,900	119,351,300

(a) Reflects additional revenue from adopted revenue increases.

Table 9

Water Department
Projected Operation and Maintenance Expenses

	2017 (a)	2018	2019	2020	2021
	$	$	$	$	$
Personal Services	36,692,100	37,792,900	38,926,600	40,094,400	41,297,300
Services & Utilities	16,286,600	16,775,200	17,278,500	17,796,800	18,330,700
Supplies & Materials	17,711,400	18,242,700	18,790,000	19,353,700	19,934,300
Special Current Charges	229,900	236,800	243,900	251,200	258,800
Furniture & Equipment	214,500	220,900	227,600	234,400	241,400
Repairs & Facility Maintenance	0	0	0	0	0
Total Operation and Maintenance	71,134,500	73,268,500	75,466,600	77,730,500	80,062,500

(a) Represents the amended operating budget approved on September 20, 2017.

Table 10

Water Department
Debt Service Requirements

		2017	2018	2019	2020	2021
		$	$	$	$	$
Existing Bonds						
Series 2014		7,700,000	7,693,000	7,700,000	7,690,000	7,683,500
Series 2015		4,940,600	5,640,600	5,694,600	5,783,600	5,787,800
Total Existing Debt Service		12,640,600	13,333,600	13,394,600	13,473,600	13,471,300
Projected Bonds						
	Amount of Issue					
	$					
2017	0	0	0	0	0	0
2018	178,000,000		0	10,767,500	12,921,000	12,921,000
2019	0			0	0	0
2020	0				0	0
2021	103,000,000					0
Total Projected Debt Service		0	0	10,767,500	12,921,000	12,921,000
Total Debt Service		12,640,600	13,333,600	24,162,100	26,394,600	26,392,300

Table 11

Water Department
Capital Improvement Program Financing

Line No.	Description	Fiscal Year Ending December 31, 2017	2018	2019	2020	2021	Total
		$	$	$	$	$	$
1	Funds Available at Beginning of Year	150,580,400	209,200	83,212,900	15,771,000	4,141,900	150,580,400
2	Revenue Bond Proceeds	0	178,000,000	0	0	103,000,000	281,000,000
3	Operation Fund Transfers	22,000,000	3,000,000	12,000,000	17,000,000	21,000,000	75,000,000
4	Participation By Others	33,944,000	40,265,000	41,917,000	40,648,000	33,035,000	189,809,000
5	Interest Income	932,300	1,063,500	600,000	158,100	782,500	3,536,400
6	Total Funds Available	207,456,700	222,537,700	137,729,900	73,577,100	161,959,400	699,925,800
7	Obligated Contracts & Capital Jobs	(24,890,500)	0	0	0	0	(24,890,500)
8	Major Capital Additions	(182,357,000)	(113,943,800)	(121,958,900)	(69,435,200)	(70,602,000)	(558,296,900)
9	Bond Issuance Expense	0	(2,670,000)	0	0	(1,545,000)	(4,215,000)
10	Capitalized Interest Requirement	0	(9,790,000)	0	0	(5,665,000)	(15,455,000)
11	Revenue Bond Reserve Fund	0	(12,921,000)	0	0	(7,476,700)	(20,397,700)
12	Total Application of Funds	(207,247,500)	(139,324,800)	(121,958,900)	(69,435,200)	(85,288,700)	(623,255,100)
13	End of Year Balance	209,200	83,212,900	15,771,000	4,141,900	76,670,700	76,670,700

Table 12

Water Department
Analysis of Ability of Forecasted Revenue to Finance Projected Revenue Requirements

Line No.	Description	Fiscal Year Ending December 31, 2017	2018	2019	2020	2021
		$	$	$	$	$
1	Revenue from Charges	91,193,500	90,675,500	90,198,400	89,718,000	89,273,400
2	Total Additional Revenue (a)	0	8,925,900	18,704,000	29,351,800	36,642,200
3	Total Service Charge Revenue	91,193,500	99,601,400	108,902,400	119,069,800	125,915,600
4	Other Operating Revenue	7,113,900	7,188,400	7,323,300	7,333,400	7,384,600
5	Total Operating Revenue	98,307,400	106,789,800	116,225,700	126,403,200	133,300,200
6	Operation & Maintenance	(71,134,500)	(73,268,500)	(75,466,600)	(77,730,500)	(80,062,500)
7	Non-Cash Expense Accruals	(3,130,100)	(3,337,400)	(3,563,800)	(3,808,800)	(3,988,500)
8	Net Operating Revenue	24,042,800	30,183,900	37,195,300	44,863,900	49,249,200
	Debt Service					
	Senior Lien Revenue Bonds					
9	Existing	(12,640,600)	(13,333,600)	(13,394,600)	(13,473,600)	(13,471,300)
10	Projected	0	0	(10,767,500)	(12,921,000)	(12,921,000)
11	Total Senior Lien Revenue Bonds	(12,640,600)	(13,333,600)	(24,162,100)	(26,394,600)	(26,392,300)
	Subordinate Revenue Bonds					
12	Gulf Opportunity Zone Act Loan	(639,900)	(639,900)	(639,900)	(639,900)	(639,900)
13	Total Debt Service	(13,280,500)	(13,973,500)	(24,802,000)	(27,034,500)	(27,032,200)
14	Other Non-Operating Revenue	400,500	400,500	400,500	400,500	400,500
15	Transfer to Construction	(22,000,000)	(3,000,000)	(12,000,000)	(17,000,000)	(21,000,000)
16	Due from/(to) Other Departments	(436,000)	(436,000)	0	0	0
17	Transfer to Operating Reserve Fund	0	0	0	0	(208,100)
18	Transfer from/(to) Rate Stabilization Fund	0	0	0	0	0
19	Net Annual Balance	(11,273,200)	13,174,900	793,800	1,229,900	1,409,400
20	Beginning of Year Cash Balance (b)	6,005,200	(5,268,000)	7,906,900	8,700,700	9,930,600
21	End of Year Balance	(5,268,000)	7,906,900	8,700,700	9,930,600	11,340,000
22	Beginning of Year Cash Balance (b)	6,005,200	25,463,802	38,638,702	39,432,502	40,662,402
23	Customer Deposits	11,773,500	0	0	0	0
24	Operating Reserve Fund	18,958,302	0	0	0	208,100
25	Net annual Balance	(11,273,200)	13,174,900	793,800	1,229,900	1,409,400
26	End of Year Balance	25,463,802	38,638,702	39,432,502	40,662,402	42,279,902
27	Days of O&M Cash on Hand	125	184	182	182	184

(a) Reflects revenue from an eight-year series of annual 10% rate increases effective January 1, 2013; adopted by the City Council in 2012 and a proposed 6% annual increase in 2021.

(b) Reflects beginning of year balance in unrestricted and undesignated cash and cash equivalents and cash and cash equivalents designated for capital projects, less operating reserve requirement.

Table 13

Water Department
Coverage Requirements

Line No.	Coverage Requirements	2017	2018	2019	2020	2021
		$	$	$	$	$
	Projected Net Revenues					
1	Revenue Under Existing Rates	91,193,500	90,675,500	90,198,400	89,718,000	89,273,400
2	Additional Revenue Under Proposed Rate	0	8,925,900	18,704,000	29,351,800	36,642,200
3	Interest Income	1,396,300	1,602,000	1,273,400	841,600	1,517,200
4	Plumbing and Inspection Fees	299,700	299,700	299,700	299,700	299,700
5	Other Miscellaneous Revenue	4,155,100	4,155,100	4,155,100	4,155,100	4,155,100
6	Operation & Maintenance Grants	2,195,100	2,195,100	2,195,100	2,195,100	2,195,100
7	Transfer from Rate Stabilization Fund	0	0	0	0	0
8	Operation & Maintenance	(71,134,500)	(73,268,500)	(75,466,600)	(77,730,500)	(80,062,500)
9	Net Revenue	28,105,200	34,584,800	41,359,100	48,830,800	54,020,200
	Rate Covenant Coverage					
10	Projected Net Revenues	28,105,200	34,584,800	41,359,100	48,830,800	54,020,200
	Annual Debt Service					
11	Senior Debt	12,640,600	13,333,600	24,162,100	26,394,600	26,392,300
12	Coverage (a)	222%	259%	171%	185%	205%
13	All Debt	13,280,500	13,973,500	24,802,000	27,034,500	27,032,200
14	Coverage (b)	212%	248%	167%	181%	200%
	Additional Bond Coverage					
15	Preceding Year Projected Net Revenues	11,472,300	28,105,200	34,584,800	41,359,100	48,830,800
16	Future Additional Revenue	45,899,200	45,187,400	39,999,600	35,062,300	30,344,900
17	Adjusted Projected Net Revenues	57,371,500	73,292,600	74,584,400	76,421,400	79,175,700
	Maximum Debt Service					
18	Senior Debt	13,473,600	26,394,600	26,394,600	26,394,600	33,871,200
19	Coverage (a)	426%	278%	283%	290%	234%
20	All Debt	14,113,500	27,034,500	27,034,500	27,034,500	34,508,400
21	Coverage (b)	407%	271%	276%	283%	229%

(a) The General Bond Resolution requires net revenue to equal or exceed 125% of debt service.
(b) The General Bond Resolution requires net revenue to equal or exceed 110% of debt service.

Sewerage Department

ADHERENCE TO SEWERAGE SERVICE REVENUE BOND RESOLUTION

In 2014, the Board issued $158,990,000 Sewerage Service Revenue and Refunding Bonds. Issuance of these bonds obligated the Board to adhere to the covenants of the Bond Resolution. Briefly, the covenants are concerned with:

- Payment of indebtedness; limited obligations.
- Limitations on indebtedness.
- Covenants and representations of Board.
- Covenants with credit banks, insurers, etc.
- Operation and maintenance.
- Free service, competing service, billing and enforcement of charges.
- Sale or encumbrance of system.
- Insurance
- Damage, destruction, condemnation and loss of title.
- Records and accounts; inspections and reports.
- Capital budget.

The provisions of the General Sewerage Service Revenue Bond Resolution are virtually identical to those of the General Water Revenue Bond Resolution described in the preceding section of this report. The Board was in compliance with these covenants in 2016. Sewerage Department tables are included at the end of this section.

2016 SEWERAGE DEPARTMENT OPERATIONS

Funds for the operation, maintenance, and debt service requirements of the Sewerage Department are obtained from sewerage service charges. The balance of revenue remaining after meeting these costs may be used for cash financing capital improvements as required. Other fund sources include participation by others, interest earned on invested funds, and other minor sources.

Revenues and expenditures related to the 2016 operations of the Sewerage Department are discussed in the following paragraphs.

Wastewater Volumes

Number of Customers

Table 14 presents a summary of the historical and projected average number of sewer customers for the period 2015 through 2021. Based on year-end billing summaries, the number of monthly billed customers during 2016 averaged 133,277 compared with 132,264 for 2015. Based on year-to-date customer data through August of 2017, it is projected that the Board will average approximately 133,834 open accounts in 2017 and that the number of accounts will continue to grow at approximately 0.3 percent each year.

Billed Wastewater Volume

Table 14 also presents a summary of historical and projected billed wastewater volumes. Based on year-end billing summaries, a total of 9,992 million gallons of wastewater volume was billed in 2016,

compared with a total of 9,485 million gallons in 2015. Since 85 percent of residential water usage and 100 percent of non-residential usage is treated as billable sewer flows, the decrease in sewage volume billed is similar to the decrease in water usage. After factoring in the number of annual bills rendered, the average annual usage per customer for each customer class and the projected resistance factor, the resulting projected contributed wastewater volume reflects a decrease of approximately 0.7 percent per year.

Operating Revenues

The 2016 schedule of rates for retail sewerage service is presented in Table 15 and reflects a 10 percent rate increase over 2016 rates. The rates consist of monthly service charges, which vary by meter size, plus a volume charge. Quantity charges for single family residential and multi-residential customers are based on 85 percent of the metered water consumption to allow 15 percent for lawn watering and other uses, which contribute no flow to the sanitary sewer. All other classes are based on 100 percent of water consumption. Water from private wells or other non-Board sources that is discharged to the sanitary sewer system is to be metered and the consumption included in computing sewerage service charges. Any customer who can show that only a portion of his metered water usage is discharged to the sanitary sewer system is to be charged for only that portion of the total water quantity. A residential customer may have either the 15 percent allowance or a special exemption, but not both.

A summary of historical sewer billings and other Sewerage Department revenue is presented in Table 16 for the period 2012 through 2016. The historical revenues shown in Table 16 were developed from detailed records provided by Board staff. Operating revenues are derived from sewerage service charge revenue, which includes excess strength charges, and delinquent fees. Sewerage service charge revenues in 2016 were $104,060,458 which, when compared with $94,775,797 for 2015, shows an increase of approximately 9.8 percent. Delinquent fee revenues were $734,725 in 2016 which represent a decrease of approximately 14.7 percent over 2015 delinquent fees.

Non-Operating Revenues

Also shown in Table 16, Sewerage Department non-operating revenue includes interest earned on the investment of available funds and other minor items of revenue. Interest earned in 2016 consisted of $2,301,168 from investments in the Sewerage System fund, the capital projects and construction fund. Miscellaneous income was $1,137,406 for 2016.

Operation and Maintenance Expenses

Table 17 presents a summary of 2012 through 2016 historical operation and maintenance expenses of the Sewerage Department. Expenditures for 2016 increased about 0.4% percent from 2015 expenditures. Historical operation and maintenance expenses shown in Table 17 do not include the non-cash portion of Provision for Claims as recorded in the Comprehensive Annual Financial Report. Estimates of future Sewerage Department claims are shown on Line 7 in Table 24.

Capital Budget and Expenditures

Capital expenditures of the Sewerage Department include the cost of replacements and improvements to wastewater treatment and collection facilities and the Sewerage Department pro rata share of power projects and general budget costs.

The Sewerage Department's 2016 capital expenditures totaled $40,544,444. Capital improvement expenditures for the year are shown in Table 18.

Summary of Operations

The following tabulation shows a summary of the receipts and expenditures of the Sewerage Department during 2016:

Total Revenues	$108,233,756
Operation and Maintenance Expense	58,240,656
Claims	2,380,775
Debt Service Payments	24,616,125
Revenue Primarily Available for Capital Expenditures [a]	**22,996,200**

[a] Excludes depreciation.

PROPOSED CAPITAL IMPROVEMENT PROGRAM

Table 19 presents a summary of the projected major capital improvement program for the period 2017 through 2021. Table 19 is based on the Board's amended 2017-2026 Capital Program and 2017-2026 Capital Improvement Program. The five-year major capital improvement program costs are estimated to total $438,109,000. Of the projected total, $351,179,000 is considered to be for recurring annual capital improvements. The remaining $86,930,000 is for proposed major capital expenditures. Costs of power projects and general budget items are prorated between the Water, Sewerage and Drainage Departments on the basis of relative use. The projected Sewerage Department pro rata share of power projects and general budget item costs for the five-year period 2017 through 2021 total $37,266,200 and $44,255,800, respectively.

The Board is currently complying with the EPA Region 6 Administrative Order. In January of 2010, the Board successfully completed negotiations for a modification of the Consent Decree. The Capital Improvement Program shown in Table 19 represents the schedule for complying with the modified Consent Decree.

ABILITY TO FINANCE PROPOSED CAPITAL EXPENDITURES

This section of the report analyzes the adequacy of projected revenues to finance the proposed capital improvements shown in Table 19.

Operating Revenues

Future operating revenues of the Sewerage Department consist of sewerage service charge revenues which are summarized for 2017 through 2021 in Table 20. These estimates reflect the rate schedule effective January 1, 2017 applied to the projected number of customers and contributed wastewater flow and are projected to decrease, on average, about 0.2 percent per year throughout the study period due to the anticipated decline in water consumption. Projected revenue from adopted revenue increases is also shown in Table 20.

Other Revenue Sources

Based upon past practices, the Sewerage Department can expect to obtain revenues or funds from non-operating sources. These include interest earned from the investment of available funds,

participation by others, and miscellaneous other income. By Board policy, the Sewerage Department receives one-half of the plumbing inspection and license fees, currently projected at $326,100 per year.

Interest income from the investment of funds held for future use depends upon the level of sewerage revenue available for investment and the amount of revenue accrued towards payment of future capital expenditures.

Projections of other revenue sources are presented in a subsequent table, which summarizes the Department's financial position during the financing of projected operating and capital requirements.

Operation and Maintenance Expense

A summary of projected operation and maintenance expense for the period 2017 through 2021 is shown in Table 21. Estimates of future expenses are based on anticipated future operating conditions and allowances for inflationary factors.

Projections of future operating and maintenance expenses for the study period are based on the Board's amended 2017 Operating Budget and an analysis of the current and anticipated operating conditions and trends.

Debt Service Requirements

Future debt service requirements of the Sewerage Department are made up of principal, interest, and reserve fund payments for currently outstanding and future sewerage revenue bond issues. As of December 31, 2016 outstanding debt obligations consisted of $7,333,000 Sewerage Revenue Bonds Series 2011, $135,355,000 Sewerage Service Revenue and Refunding Bonds Series 2014, and $100,000,000 Sewerage Service Revenue and Refunding Bonds Series 2015.

To adequately fund the proposed capital improvements, additional revenue bonds are indicated as shown in Table 22. It is anticipated that the Board will issue revenue bonds in the amount of $158,000,000 in 2018 and $120,000,000 in 2020. Projected bonds shown in Table 22 for 2017 through 2021 are assumed to be sold at an average annual interest rate of 5.5 percent for a term of 30 years.

The Sewerage Department has borrowed from the DPW. It is anticipated that this amount will be reimbursed during the study period.

Adequacy of Revenues to Finance Proposed Capital Improvements

Total revenue requirements for the Sewer Department recognized for purposes of this report include operation and maintenance expense, allowance for claims, debt service costs on major capital improvements financed through the sale of bonds, and expenditures for capital improvements not financed from bond proceeds. Table 23 examines the financing of the major capital improvement program and Table 24 summarizes the financing of operation and maintenance expense, debt service costs on outstanding and proposed bonds, and the transfer of operating funds for capital improvement financing.

Capital Projects Funding

Table 23 presents the major capital improvement financing plan which summarizes the projected source and application of funds over the five-year study period. The amount of Funds Available at Beginning of Year, shown on Line 1, is $151,780,100. This amount is based on audited data provided by the Board.

Projected revenue bond proceeds, totaling $278,000,000, are shown on Line 2. The amounts and years of issue are developed by considering capital program needs, current policies, other sources of major capital improvement financing, and the debt service coverage requirements of the bond covenants regarding the issuance of parity revenue bonds.

Financing of the major capital improvement program anticipates the transfer of a total of $73,000,000 of operating reserves as shown on Line 3. Other sources of funds available to meet major capital improvement expenditures are Participation by Others and interest income. Participation by Others, as shown on Line 4 includes anticipated funding by the COE and FEMA. Interest earnings recognize an assumed 1.0 percent average annual interest rate and are shown on Line 5. Line 6 of the table shows the projected major capital improvement funds available each year.

As of December 31, 2016, the Board had $47,957,300 obligated for open contracts and capital jobs as shown on Line 7 of Table 23. Line 8 shows the projected Major Capital Additions to be funded. These costs reflect the total improvements shown in Table 19 with 3 percent inflation beginning in 2018. Estimated issuance costs related to the proposed bond issue amounts are shown on Line 9.

Line 10 shows the required deposits into the Revenue Bond Reserve Fund associated with proposed bond issues. The debt service reserve on proposed debt is a three-pronged test estimated as the lessor of (i) 10 percent of the original principal amount, (ii) the maximum annual debt service, or (iii) 125 percent of the average annual debt service.

The Total Application of Funds is shown on Line 11 of Table 23. The net End of Year Balance is shown on Line 12.

Operating Fund

Line 1 of Table 24 shows projected Revenue from Charges under 2017 rates as previously presented in Table 20. In 2012, the New Orleans City Council approved eight consecutive annual 10 percent sewer rate increases beginning January 1, 2013. Revenue from these future annual revenue increases of 10 percent effective January 1, 2016 through January 1, 2020 is shown on Line 2. It is projected that a 2.5 percent revenue increase will be necessary effective January 1, 2021. The revenue from this proposed revenue increase is also included in Line 2. The date and magnitude of proposed revenue increase in 2021 is based on consideration of two principal criteria, which include: (1) total revenue necessary to meet cash requirements, and (2) total revenue required to meet minimum bond coverage requirements.

Other revenue available for system operations is shown on Line 4. Interest Income available to the operating fund, included in Line 4, is estimated to be 1.0 percent of the average of the beginning and end of year Net Annual Balance, except as the average is affected by identifiable nonrecurring major receipts, transfers, or expenditures during the year. Revenue from Plumbing Inspection and License

Fees and Other Miscellaneous Revenue are also included in Line 4 of Table 21. Total Operating Revenue is shown on Line 5.

Operation and Maintenance expense, previously projected in Table 21, is shown on Line 6 of Table 24. Line 7 shows the estimated allowance for claims and bad debt expense which is assumed to be 1 percent of projected revenue. Projected Net Operating Revenue from system operations is shown on Line 8.

Lines 9 through 11 present debt service requirements on currently outstanding and proposed senior revenue bonds. Existing bonds include the Series 2011, Series 2014 and Series 2015 bonds. Line 10 reflects projected principal and interest payments on additional revenue bond debt financing of $158,000,000 in 2018 and $120,000,000 in 2020. Proposed debt is assumed to be 30 year, 5.5 percent fixed interest rate bonds issued in March, with equal annual payments of principal and interest.

In July of 2006, the Board entered into a Cooperative Endeavor Agreement with the State of Louisiana to secure proceeds from the State's Gulf Opportunity Tax Credit Bond Loan Program to assist in payment of debt service requirements from 2006 through 2008. The Board has borrowed $77,465,247 on this agreement. No principal or interest was payable during the initial five-year period of the loan, but after that period, the loan began to bear an interest rate of 4.64 percent. Payments for the sewerage portion of principal and interest began in July 2012 and are shown on Line 12 of Table 24 as subordinate debt.

Anticipated non-operating revenue is shown on Line 14.

Line 15 reflects the projected transfer of accumulated net earnings from system operations to assist in major capital financing. Typically, such accumulated net earnings may be used to help recover portions of the annual costs of system operations or to assist in major capital improvement financing. Line 16 reflects payment to the DPW as well as claimants.

The General Resolution requires an Operating Reserve Fund of 90 days of the previous year's operation and maintenance expense; however the SWBNO's Financial Management Policy requires an Operating Reserve Fund of not less than 180 days. Line 17 indicates the projected annual transfers available to meet this requirement throughout the study period. The General Resolution also sets forth the option to maintain a rate stabilization fund. The amount to be transferred to this fund, as well as the timing, is determined by the Executive Director. There are no transfers currently anticipated during the study period as shown on Line 18 of Table 24.

Line 19 indicates the estimated Net Annual Balance from operations remaining at the end of each year.

The balance of operating funds available at the beginning of year 2017, shown on Line 20, is comprised of the current cash assets and reflects a balance of $47,055,200. The End of Year Balance, which is exclusive of the operating reserve fund and rate stabilization fund, is shown on Line 21.

Lines 22 through 26 demonstrate that the Board is maintaining an operating reserve equal to at least 180 days of the previous year's operation and maintenance expense beginning in 2018.

As demonstrated in Tables 23 and 24, it is anticipated that current revenue sources will be adequate to readily finance both projected capital program requirements as currently scheduled and estimated future operation expenses of the Sewerage Department during the 2017-2021 study period examined herein, with the adopted 10 percent revenue increases in 2017 through 2020, and a 2.5 percent revenue increase in 2021.

Bond Coverage Requirements

An additional consideration in measuring the adequacy of revenues is the provision of sufficient debt service coverage to meet the bond covenant requirements for the issuance of parity revenue bonds. The General Resolution provides that rates shall be maintained at levels which are expected to yield net revenues (as defined in the resolution) equal to at least 125 percent of the annual principal and interest requirement for senior debt and 110 percent for senior and subordinate debt in each fiscal year. The SWBNO's Financial Management Policy requires coverage at a minimum of 150 percent for senior debt and 125 percent for senior and subordinate debt.

The calculation of net revenue is shown on Lines 1 through 9 of Table 25. The ability of the Sewerage Department revenues to meet revenue bond coverage requirements is shown on Lines 10 through 14. As shown on Lines 12 and 14, the indicated projected revenue and revenue increases will provide sufficient net revenue to meet coverage requirements during the study period.

The General Resolution further prescribes that additional parity revenue bonds may be issued if net revenue from a previous test year (any 12 consecutive months of the last 24 months) is equal to at least 125 percent of the maximum annual principal and interest requirement for senior debt and 110 percent for senior and subordinate debt. For purposes of the additional bonds test, net revenue may be adjusted to reflect any increases not in effect during the selected test year but have been approved by the Board, Board of Liquidation and City Council and will go into effect within the following five years.

The results of the additional bonds test are shown on Lines 15 through 21 of Table 25. Lines 19 and 21 of the table indicate that with the magnitude of the adopted annual revenue increases, required minimum levels of coverage are met in each year with indicated coverage levels ranging from 178 percent to 413 percent.

Table 14

Sewerage Department
Historical and Projected Billed Volumes
and Average Number of Customers (a)

Customer Class	Historical		Projected				
	2015	2016	2017	2018	2019	2020	2021
Single Family Residential (b)							
Customers	115,192	116,226	116,800	117,300	117,800	118,200	118,600
Sales (1,000,000 gal.)	5,919	5,899	5,722	5,692	5,665	5,635	5,608
Sales Per Customer (1,000 gal.)	51	51	49	49	48	48	47
Multifamily Residential							
Customers	4,639	4,647	4,600	4,600	4,600	4,600	4,600
Sales (1,000,000 gal.)	605	643	631	625	619	614	609
Sales Per Customer (1,000 gal.)	130	138	137	136	135	133	132
Commercial							
Customers	12,396	12,370	12,400	12,400	12,400	12,400	12,400
Sales (1,000,000 gal.)	2,918	3,414	3,303	3,272	3,242	3,214	3,188
Sales Per Customer (1,000 gal.)	235	275	266	263	261	259	257
Industrial							
Customers	37	34	34	34	34	34	34
Sales (1,000,000 gal.)	44	36	36	36	35	35	35
Sales Per Customer (1,000 gal.)	1,188	1,066	1,056	1,047	1,035	1,026	1,018
Total							
Customers	132,264	133,277	133,834	134,334	134,834	135,234	135,634
Sales (1,000,000 gal.)	9,485	9,992	9,692	9,624	9,561	9,498	9,440

(a) Excludes customers receiving free service.
(b) Includes duplex.

Table 15

Sewerage Department
Existing Sewer Rates
(Effective January 1, 2017)

Rate Components	General Service
	$
Monthly Sewerage Service Charge	
Meter Size Inches	
5/8	18.68
3/4	26.59
1	37.85
1-1/2	69.66
2	101.87
3	241.58
4	402.63
6	805.26
8	1,207.89
10	1,610.51
12	1,852.09
16	2,496.30
Monthly Quantity Charge	
Per 1,000 Gallons	6.50
Excessive Strength Charge per Pound	
BOD	0.43
SS	0.25

Table 16

Sewerage Department
Statement of Historical Revenue

Revenue Source	2012	2013	2014	2015	2016
	$	$	$	$	$
Operating Revenue					
Sewerage Service Charges	70,707,230	77,767,114	85,740,367	94,775,797	104,060,458
Delinquent Fee	700,605	768,670	812,895	861,169	734,725
Total Operating Revenue	71,407,835	78,535,785	86,553,262	95,636,965	104,795,182
Nonoperating Revenue					
Interest Income	194,080	178,122	257,824	1,340,586	2,301,168
Plumbing Inspection and License Fees	343,903	321,518	339,176	305,384	318,511
Revenue Sharing	154,509	274,229	317,506	322,674	313,048
Other Income (a)	296,406	771,397	1,289,474	560,157	505,847
Total Nonoperating Revenue	988,898	1,545,265	2,203,980	2,528,801	3,438,574
Total Revenue	72,396,734	80,081,050	88,757,242	98,165,766	108,233,756

(a) Includes $1,533,624 in operating and maintenance grants in 2011 , -$7,463 in 2012, -$5,367 in 2013 and -$383,354 in 2014.

Table 17

Sewerage Department
Historical Operation and Maintenance Expenses (a)

	2012	2013	2014	2015	2016
	$	$	$	$	$
Personal Services	24,403,860	24,785,716	23,301,162	30,903,283	27,619,358
Services & Utilities	17,225,768	17,463,783	18,342,982	17,148,698	20,269,282
Supplies & Materials	2,800,856	3,201,309	4,946,831	9,090,197	10,205,920
Special Current Charges	296,041	588,515	1,762,961	617,675	(56,248)
Furniture & Equipment	157,870	199,073	205,113	268,870	202,343
Repairs & Facility Maintenance	0	0	0	0	0
Total Operation and Maintenance	44,884,396	46,238,396	48,559,050	58,028,723	58,240,656

(a) Historical operation and maintenance expenses do not include the non-cash portion of provision for claims as recorded in the Comprehensive Annual Financial Report. Estimates of future Water Department claims payable are included in Table 24.

Table 18

Sewerage Department
Capital Expenditures
2016

C.P. #	Project	Actual Expenditures
		$
	Sewerage Systems	
313	Extensions & Replacements - Sewer Force Mains EPA Consent Decree	321,042
317	Normal Extensions & Replacement of Gravity Mains	10,126,432
318	Rehabilitation Gravity Sewer System	3,015,865
326	Extensions & Replacements to Sewer Pumping Stations	839,571
339	Mains in Street Dept. Contracts	(1,610,845)
340	Sewerage Hurricane Recovery Bonds (FEMA)	4,466,847
348	Normal Extensions & Replacements	8,511,325
368	Wetlands Assimilation Project	1,052,444
375	Sewerage Hurricane Recovery Bonds	1,324,030
380	FEMA Review of Change Orders-Sewer	1,356,523
	Total Sewerage System	29,403,235
	Power Projects and General Budget	
600	Sewerage Share of Power Projects	2,110,436
700	Sewer Reserve for Emergencies	63,521
800	Sewerage Share of General Budget Items	8,967,253
	Total Power Projects and General Budget	11,141,209
	Total Sewerage Department	40,544,444

Table 19

Sewerage Department
Projected Capital Improvements (a)

C.P. #	Project	2017	2018	2019	2020	2021	Total
		$	$	$	$	$	$
	Reinvestment in Assets						
317	Extensions and Replacements - Gravity Mains	22,200,000	29,000,000	25,700,000	23,700,000	23,700,000	124,300,000
318	Rehabilitation Gravity Sewer System	9,335,000	8,035,000	9,335,000	8,035,000	9,435,000	44,175,000
319	Extension and Replacements - Sanitary Sewer Mains Algiers	2,000,000	2,000,000	3,000,000	2,500,000	3,000,000	12,500,000
326	Extensions and Replacements to Pumping Stations	3,960,000	5,990,000	6,790,000	2,300,000	3,600,000	22,640,000
339	Mains in Streets Department Contracts	5,300,000	5,300,000	5,300,000	5,300,000	5,300,000	26,500,000
348	Extensions and Replacements - Treatment Plants	8,580,000	3,595,000	4,805,000	5,225,000	850,000	23,055,000
360	SELA Sewerage Relocation Costs	844,000	643,000	0	0	0	1,487,000
382	Paving Repair Contracts	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	5,000,000
600	Sewer Share of Power Projects	29,467,230	5,013,970	99,000	2,196,000	490,000	37,266,200
702	Sewer Reserve for Emergencies	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	10,000,000
800	Sewer Share of General Budget Items	11,136,800	9,092,000	9,296,000	7,131,000	7,600,000	44,255,800
	Total Routine Annual Improvements	95,823,030	71,668,970	67,325,000	59,387,000	56,975,000	351,179,000
	Major Capital Improvements						
313	Extensions and Replacements - Sewer Force Mains	8,700,000	6,600,000	9,350,000	9,000,000	11,750,000	45,400,000
358	WWTP Normal Extensions & Replacements	0	0	10,000	0	0	10,000
368	Wetland Assimilation	4,300,000	300,000	0	0	0	4,600,000
375	Sewerage Hurricane Recovery Bonds	9,110,000	5,850,000	4,250,000	6,000,000	3,670,000	28,880,000
381	Modification and Expansion of WBSTP to 20/50 MGD	1,305,000	1,590,000	2,935,000	210,000	0	6,040,000
383	Sewerage Hurricane Recovery Bonds (Non FEMA)	2,000,000	0	0	0	0	2,000,000
	Total Major Improvements	25,415,000	14,340,000	16,545,000	15,210,000	15,420,000	86,930,000
	Total Sewerage System Improvements	121,238,030	86,008,970	83,870,000	74,597,000	72,395,000	438,109,000

(a) The improvements for 2017-2021 are based on the amended 2017 capital budget and 2017-2026 capital improvement program.

Table 20

Sewerage Department
Projected Operating Revenue

	(1)	(2)	(3)
Year	Revenue From Charges	Additional Revenue (a)	Total Service Charge Revenue
	$	$	$
2017	110,429,700	0	110,429,700
2018	110,204,900	10,863,100	121,068,000
2019	110,031,900	22,725,200	132,757,100
2020	109,833,100	35,674,100	145,507,200
2021	109,557,400	36,717,300	146,274,700

(a) Reflects additional revenue from adopted revenue increases.

Table 21

Sewerage Department
Projected Operation and Maintenance Expenses

	2017 (a)	2018	2019	2020	2021
	$	$	$	$	$
Personal Services	35,409,700	36,472,000	37,566,200	38,693,100	39,853,900
Services & Utilities	25,986,500	26,766,100	27,569,100	28,396,200	29,248,000
Supplies & Materials	13,084,600	13,477,100	13,881,500	14,297,900	14,726,800
Special Current Charges	(72,100)	(74,300)	(76,500)	(78,800)	(81,100)
Furniture & Equipment	259,400	267,200	275,200	283,500	292,000
Repairs & Facility Maintenance	0	0	0	0	0
Total Operation and Maintenance	74,668,100	76,908,100	79,215,500	81,591,900	84,039,600

(a) Represents the amended operating budget approved on September 20, 2017.

Table 22

Sewerage Department
Debt Service Requirements

Debt Issue		2017	2018	2019	2020	2021
		$	$	$	$	$
Existing Bonds						
Series 2014		19,309,800	17,642,500	16,217,500	16,234,100	13,106,300
Series 2015		5,000,000	5,000,000	5,000,000	5,000,000	6,950,000
Series 2011 (LADEQ)		496,700	496,600	496,500	496,400	496,200
Total Existing Debt Service		24,806,500	23,139,100	21,714,000	21,730,500	20,552,500
Projected Bonds						
	Amount of Issue					
	$					
2017	0	0	0	0	0	0
2018	158,000,000		9,059,417	10,871,300	10,871,300	10,871,300
2019	0			0	0	0
2020	120,000,000				6,880,500	8,256,600
2021	0					0
Total Projected Debt Service		0	9,059,417	10,871,300	17,751,800	19,127,900
Total Debt Service		24,806,500	32,198,517	32,585,300	39,482,300	39,680,400

Table 23

Sewerage Department
Capital Improvement Program Financing

Line No.	Description	Fiscal Year Ending December 31, 2017	2018	2019	2020	2021	Total
		$	$	$	$	$	$
1	Funds Available at Beginning of Year	151,780,100	350,300	76,729,400	10,261,200	63,829,400	151,780,100
2	Revenue Bond Proceeds	0	158,000,000	0	120,000,000	0	278,000,000
3	Operation Fund Transfers	17,000,000	5,000,000	15,000,000	18,000,000	20,000,000	75,000,000
4	Participation by Others	0	14,329,000	7,072,000	6,399,000	5,679,000	33,479,000
5	Interest Income	765,500	880,600	437,500	740,000	363,300	3,186,900
6	Total Funds Available	169,545,600	178,559,900	99,238,900	155,400,200	89,871,700	541,446,000
7	Obligated Contracts & Capital Jobs	(47,957,300)	0	0	0	0	(47,957,300)
8	Major Capital Additions	(121,238,000)	(88,589,200)	(88,977,700)	(81,514,200)	(81,481,200)	(461,800,300)
9	Bond Issuance Expense	0	(2,370,000)	0	(1,800,000)	0	(4,170,000)
10	Revenue Bond Reserve Fund	0	(10,871,300)	0	(8,256,600)	0	(19,127,900)
11	Total Application of Funds	(169,195,300)	(101,830,500)	(88,977,700)	(91,570,800)	(81,481,200)	(533,055,500)
12	End of Year Balance	350,300	76,729,400	10,261,200	63,829,400	8,390,500	8,390,500

Table 24

Sewerage Department
Analysis of Ability of Forecasted Revenue to Finance Projected Revenue Requirements

Line No.	Description	2017	Fiscal Year Ending December 31, 2018	2019	2020	2021
		$	$	$	$	$
1	Revenue from Charges	110,429,700	110,204,900	110,031,900	109,833,100	109,557,400
2	Total Additional Revenue (a)	0	10,863,100	22,725,200	35,674,100	40,069,400
3	Total Service Charge Revenue	110,429,700	121,068,000	132,757,100	145,507,200	149,626,800
4	Other Operating Revenue	4,152,300	4,148,600	4,202,300	4,257,500	4,310,600
5	Total Operating Revenue	114,582,000	125,216,600	136,959,400	149,764,700	153,937,400
6	Operation & Maintenance	(74,668,100)	(76,908,100)	(79,215,500)	(81,591,900)	(84,039,600)
7	Non-Cash Expense Accruals	(2,361,100)	(2,512,500)	(2,676,500)	(2,853,300)	(2,936,200)
8	Net Operating Revenue	37,552,800	45,796,000	55,067,400	65,319,500	66,961,600
	Debt Service					
	Senior Lien Revenue Bonds					
9	Existing	(24,806,500)	(23,139,100)	(21,714,000)	(21,730,500)	(20,552,500)
10	Projected	0	(9,059,400)	(10,871,300)	(17,751,800)	(19,127,900)
11	Subtotal	(24,806,500)	(32,198,500)	(32,585,300)	(39,482,300)	(39,680,400)
	Subordinate Revenue Bonds					
12	Gulf Opportunity Zone Act Loan	(6,235,200)	(6,235,200)	(6,235,200)	(6,235,200)	(6,235,200)
13	Total Debt Service	(31,041,700)	(38,433,700)	(38,820,500)	(45,717,500)	(45,915,600)
14	Other Non-Operating Revenue	462,100	462,100	462,100	462,100	462,100
15	Transfer to Construction	(17,000,000)	(5,000,000)	(15,000,000)	(18,000,000)	(20,000,000)
16	Due from/(to) Other Departments	(486,000)	0	0	0	0
17	Transfer to Operating Reserve Fund	0	(4,050,600)	(552,300)	(568,900)	(586,000)
18	Transfer from/(to) Rate Stabilization Fund	0	0	0	0	0
19	Net Annual Balance	(10,512,800)	(1,226,200)	1,156,700	1,495,200	922,100
20	Beginning of Year Cash Balance (b)	47,055,200	36,542,400	35,316,200	36,472,900	37,968,100
21	End of Year Balance	36,542,400	35,316,200	36,472,900	37,968,100	38,890,200
22	Beginning of Year Cash Balance (b)	47,055,200	36,542,400	39,366,800	41,075,800	43,139,900
23	Operating Reserve Fund	0	4,050,600	552,300	568,900	586,000
24	Net annual Balance	(10,512,800)	(1,226,200)	1,156,700	1,495,200	922,100
25	End of Year Balance	36,542,400	39,366,800	41,075,800	43,139,900	44,648,000
26	Days of O&M Cash on Hand	173	181	183	186	187

(a) Reflects revenue from an eight-year series of annual 10% rate increases effective January 1, 2013; adopted by the City Council in 2012 and a proposed 2.5% annual increase in 2021.

(b) Reflects beginning of year balance in unrestricted and undesignated cash and cash equivalents and cash and cash equivalents designated for capital projects, less operating reserve requirement.

Table 25

Sewerage Department
Coverage Requirements

Line No.	Coverage Requirements	2017	2018	2019	2020	2021
		$	$	$	$	$
	Projected Net Revenues					
1	Revenue Under Existing Rates	110,429,700	110,204,900	110,031,900	109,833,100	109,557,400
2	Additional Revenue Under Proposed Rates	0	10,863,100	22,725,200	35,674,100	40,069,400
3	Interest Income	1,799,400	1,910,800	1,521,400	1,879,100	1,555,500
4	Plumbing and Inspection Fees	326,100	326,100	326,100	326,100	326,100
5	Other Miscellaneous Revenue	597,300	597,300	597,300	597,300	597,300
6	Operation & Maintenance Grants	2,195,000	2,195,000	2,195,000	2,195,000	2,195,000
7	Transfer from Rate Stabilization Fund	0	0	0	0	0
8	Operation & Maintenance	(74,668,100)	(76,908,100)	(79,215,500)	(81,591,900)	(84,039,600)
9	Net Revenue	40,679,400	49,189,100	58,181,400	68,912,800	70,261,100
	Rate Covenant Coverage					
10	Projected Net Revenues	40,679,400	49,189,100	58,181,400	68,912,800	70,261,100
	Annual Debt Service					
11	Senior Debt	24,806,500	32,198,500	32,585,300	39,482,300	39,680,400
12	Coverage (a)	164%	153%	179%	175%	177%
13	All Debt	31,041,700	38,433,700	38,820,500	45,717,500	45,915,600
14	Coverage (b)	131%	128%	150%	151%	153%
	Additional Bond Coverage					
15	Preceding Year Projected Net Revenues	49,993,000	40,679,400	49,189,100	58,181,400	68,912,800
16	Future Additional Revenue	52,471,200	43,993,200	33,396,200	23,568,200	14,433,000
17	Adjusted Projected Net Revenues	102,464,200	84,672,600	82,585,300	81,749,600	83,345,800
	Maximum Debt Service					
18	Senior Debt	24,806,500	32,601,800	32,601,800	39,680,400	39,680,400
19	Coverage (a)	413%	260%	253%	206%	210%
20	All Debt	31,041,700	38,837,000	38,837,000	45,915,600	45,915,600
21	Coverage (b)	330%	218%	213%	178%	182%

(a) The General Bond Resolution requires net revenue to equal or exceed 125% of debt service.
(b) The General Bond Resolution requires net revenue to equal or exceed 110% of debt service.

Drainage Department

2016 DRAINAGE DEPARTMENT OPERATIONS

The Sewerage and Water Board has provided for the drainage needs of New Orleans since 1903. The City encompasses a saucer-shaped depression between the Mississippi River and Lake Pontchartrain on the East Bank and an area bordered by the river and adjoining wet lands on the West Bank. Prior to January 1, 1967, when the three-mill drainage tax became effective, the City of New Orleans was obligated to reimburse the Board for the cost of operating and maintaining drainage facilities.

In 1969, studies of projected capital improvement financing needs and revenue requirements indicated the need for additional sources of funds. Constitutional amendments, which would have provided the required funds from an additional three-mill ad valorem tax, were offered in 1970, and again in 1972. The State's electorate rejected both amendments; however, an additional six-mill ad valorem tax was approved April 16, 1977 and became effective January 1, 1978. Subsequently, a nine-mill property tax increase was approved May 16, 1981 and implemented January 1, 1982. The nine-mill tax, which is to be used for operation and maintenance as well as funding of capital improvements, was reauthorized in December 2016.

The Board is charged with operating, maintaining, repairing, and expanding the major drainage system located throughout the City.

Revenues

Revenues that were available to the Drainage Department for operation and maintenance expenses, and capital additions, consisted of proceeds from the three-mill, six-mill, and nine-mill ad valorem tax, interest on investments, and miscellaneous income. Other revenues available for Drainage Department capital improvements included interest income and other miscellaneous sources.

A summary of historical revenues received by source is shown in Table 26 for the period 2012 through 2016. The historical revenue shown in Table 26 was developed from detailed records provided by Board Staff.

Operation and Maintenance Expenses

Table 27 presents a summary of 2012 through 2016 operation and maintenance expenses of the Drainage Department. Expenditures for 2016 decreased about 11.4% percent over 2015 expenditures. Historical operation and maintenance expenses shown in Table 27 do not include the non-cash portion of Provision for Claims as recorded in the Comprehensive Annual Financial Report. Estimate of future Drainage Department claims are included on Line 5 in Table 35.

Capital Budget and Expenditures

Capital expenditures of the Drainage Department include the cost of replacements and improvements to pumping stations and canals and the Drainage Department's pro rata share of power projects and general budget costs.

The Drainage Department capital improvement expenditures for 2016 totaled $39,267,762. The Drainage Department's capital improvement expenditures for the year are shown in Table 28.

Summary of Operations

The following tabulation shows a summary of receipts and expenditures of the Drainage Department during 2016:

Total Revenues	$57,349,315
Operation and Maintenance Expense	33,523,624
Claims	2,223,009
Debt Service Payments	2,017,050
Revenue Primarily Available for Capital Expenditures [a]	**19,585,632**

[a] Excludes depreciation.

PROPOSED CAPITAL IMPROVEMENT PROGRAM

Table 29 presents a summary of the projected major capital improvement program for the period 2017 through 2021. Table 29 is based on the Board's amended 2017 Capital Budget and 2017-2016 Capital Improvement Program. The five-year major capital improvement program costs are expected to total $437,343,100. About 46 percent of this amount, or $235,361,700, is for recurring annual capital improvements, with the remaining $201,981,400 for major improvements. The proposed routine annual capital expenditures for drainage system improvements and extensions include $94,179,300 for the Drainage Department's share of power projects, and $46,093,000 for its share of general budget items.

Participation by others consists of monies collected from developers and individuals for the extension of drainage service to new customers and from governmental agencies for replacement and expansion of system facilities. As shown in Table 30, future revenues from these sources are estimated by the Board in the 2017 through 2026 Capital Improvement Program according to capital project and amount to $329,121,000, most of which is provided by the COE.

The Sewerage and Water Board is currently receiving funds from the COE sponsored and congressionally authorized SELA Project. This funding will allow additional construction of projects which were identified in the 1970s, but which have not been completed because of funding limitations. The identified projects are to be funded either 100 percent from federal funds or 65 percent from federal funds and 35 percent from local funds. The payback period for the local share is 30 years and is anticipated to begin in 2020.

ABILITY TO FINANCE PROPOSED CAPITAL EXPENDITURES

Drainage Department future operating and capital cost requirements are to be met by the revenue sources previously discussed. In 2015, the three-mill, six-mill, and nine-mill ad valorem taxes were the principal source of operating funds for the Drainage Department.

Revenues

Projected operating income of the drainage system is shown in Table 31. Projections include proceeds from the three-mill, the six-mill, and the nine-mill ad valorem tax and other revenue and are based on the 2016 assessed taxable value. It is assumed that the projected revenue from the ad valorem taxes will remain constant during the study period due to the roll-back provisions of Louisiana state law.

Other sources of income include interest earned from the investment of funds held for future use; sales of three-mill, six-mill, and nine-mill ad valorem tax bonds; and participation by others. Projections of interest income, which vary according to the balance of funds held for future use, are shown in a later section of this report.

The projection of millage revenue for 2017 through 2021 is based on 4.66, 4.71, and 7.06 mills for three-mill, six-mill, and nine-mill taxes, respectively.

Operation and Maintenance Expenses

A summary of projected operation and maintenance expenses for the period 2017 through 2021 is shown in Table 32. Estimates of future expenses are based on anticipated future operating conditions and allowances for inflationary factors.

Projections of future operating and maintenance expenses for the study period are based on the Board's amended 2017 Operating Budget and an analysis of the current and anticipated operating conditions and trends.

Debt Service Requirements

Future debt service requirements of the Drainage Department are made up of principal, interest, and reserve fund payments for currently outstanding and future drainage revenue bond issues. As of December 31, 2016, outstanding debt obligations consisted of $11,100,000 of Drainage Revenue Bonds, Series 2014.

It is assumed that no future debt will be issued during the 2017 – 2021 study period.

The Drainage Department has borrowed from the DPW. It is anticipated that this amount will be reimbursed during the study period.

Adequacy of Revenues to Finance Proposed Capital Improvements

Total revenue requirements for the Drainage Department recognized for purposes of this report include operation and maintenance expense, allowance for claims, debt service costs on major capital improvements financed through the sale of bonds, and expenditures for capital improvements not financed from bond proceeds. Table 34 examines the financing of the major capital improvement program and Table 35 summarizes the financing of operation and maintenance expense, debt service costs on outstanding and proposed bonds, and the transfer of operating funds for major capital improvement financing.

Capital Projects Funding

Table 34 presents the major capital improvement financing plan which summarizes the projected source and application of funds over the five-year study period. The amount of Funds Available at Beginning of Year, shown on Line 1, is $42,299,000. This amount is based on audited data provided by the Board.

Projected revenue bond proceeds are shown on Line 2; however, it is projected that the Board will not have the capacity to issue additional bonds during the study period. In addition, it is anticipated that the Board will not have the capacity to finance the major capital improvement program with operating revenue as shown on Line 3.

Other sources of funds available to meet major capital improvement expenditures are Participation by Others and interest income. Participation by Others, as shown on Line 4 includes anticipated funding by the COE and FEMA as well as others. Interest earnings recognize an assumed 1.0 percent average annual interest rate and are shown on Line 5. Line 6 of the table shows the projected major capital improvement funds available each year.

As of December 31, 2016, the Board had $15,209,300 obligated for open contracts and capital jobs as shown on Line 7 of Table 34. Line 8 show the projected Major Capital Additions to be funded as shown in Table 29. Due to constraints on revenue, it is anticipated that a portion of the capital projects in 2021 will need to be deferred until an additional revenue source has been identified. This deferral is shown on Line 9.

The Total Application of Funds is shown on Line 12 of Table 34. The net End of Year Balance is shown on Line 13.

Operating Fund

Money deposited in the Drainage System Fund is obtained primarily from the three-mill, six-mill, and nine-mill ad valorem tax as shown on Line 1 of Table 35.

Other revenue available for system operations is shown on Line 2. Miscellaneous revenue includes rental income, gain or loss on the sale of assets and other miscellaneous income. Interest Income available to the operating fund which is included in Line 2, is estimated to be 1.0 percent of the average of the beginning and end of year Net Annual Balance, except as the average is affected by identifiable nonrecurring major receipts, transfers, or expenditures during the year. Interest from the Bond Reserve Fund, also included in Line 2, is estimated to be 1.0 percent. Total Operating Revenue is shown on Line 3 of Table 35.

Operation and Maintenance expense, shown on Line 4 of Table 35, consists of the expenses previously projected in Table 32, plus additional costs associated with existing facilities, the permanent pump stations, the SELA canals, and new green infrastructure. These additional expenses total $5,600,000 in 2018 and increase to $10,024,900 by 2021. Line 5 includes the estimated allowance for claims and bad debt expense which is assumed to be 0.5 percent of projected revenue. Projected Net Operating Revenue from system operations is shown on Line 6.

Lines 7 through 9 present debt service requirements on currently outstanding and proposed senior revenue bonds. Existing debt includes the Series 2014 bonds. As previously mentioned, it is projected that the Board will not have the capacity to issue additional bonds during the study period.

In July of 2006 the Board entered into a Cooperative Endeavor Agreement with the State of Louisiana to secure proceeds from the State's Gulf Opportunity Tax Credit Bond Loan Program to assist in payment of debt service requirements from 2006 through 2008. The Board has borrowed $77,465,247 on this agreement. No principal or interest was payable during the initial five-year period of the loan, but after that period, the loan began to bear an interest rate of 4.64 percent. Payments for the drainage portion of principal and interest began in July 2012 and are shown on Line 10 of Table 35.

Line 11 reflects the estimated SELA repayments that will begin in 2020. Total debt service is shown on Line 12.

Anticipated non-operating revenue is shown on Line 13.

Line 14 reflects the projected transfer of accumulated net earnings from system operations to assist in major capital financing. Typically, such accumulated net earnings may be used to help recover portions of the annual costs of system operations or to assist in major capital improvement financing. Line 15 reflects repayment from the Water Department and repayment to the DPW as well as repayment to claimants.

The General Resolution requires an Operating Reserve Fund of 90 days of the previous year's operation and maintenance expense; however the SWBNO's Financial Management Policy requires an Operating Reserve Fund of not less than 180 days. Line 16 indicates the projected annual transfers available to meet this requirement throughout the study period.

Line 17 indicated the estimated Net Annual Balance from operations remaining at the end of each year.

The balance of operating funds available at the beginning of the year 2017, shown on Line 18, is comprised of current cash assets and reflects a balance of $18,661,200. The End of Year Balance, which is exclusive of the operating reserve fund, is shown on Line 19 and drops to a deficit of $5,172,300 by 2021 which indicates that the existing source of revenue for the Drainage Department will not be sufficient to fund operation and maintenance expense and required debt service payments by 2021.

Lines 20 through 24 demonstrate that the Board is maintaining an operating reserve equal to at least 180 days of the previous year's operation and maintenance expense through 2019; however the balance drops to a negative balance of 8 days by 2021.

Bond Coverage Requirements

A requirement of the Drainage Bond Resolution provides that revenues derived from the nine-mill ad valorem tax should provide an amount sufficient to provide for the interest and principle payment on the Series 2014 bonds. As shown on Line 25 of Table 35 the projected revenue from the nine-mill ad valorem tax will provide sufficient revenue to meet coverage requirements on existing debt during the study period.

The Drainage Bond Resolution also provides that additional parity bonds may be issued, but only after certain conditions have been met. One condition is that the revenues derived from the nine-mill ad valorem tax for the most recently completed calendar year prior to the year of issuance are equal to at least one and one-third (1-1/3) times the maximum debt service on all bonds outstanding and the additional bonds.

Due to the constraints to meet operation and maintenance expense and required debt service payments on existing debt during the study period, the Drainage Department does not have the revenue capacity to issue additional debt. In addition, the revenue from the nine-mill ad valorem tax does not provide the debt capacity needed to fund the five-year capital improvement program; therefore a portion of capital improvements must be deferred as previously mentioned. Therefore, in

order to completely fund the five-year capital program, an alternative funding source would need to be identified for the Drainage Department.

Black & Veatch suggests that when a new funding source is identified, the Board work with its bond counsel and financial advisor to refund all outstanding debt at that time and issue new debt reflecting a general bond resolution that includes the new funding source and all other revenue in the coverage calculation and reflects covenants more consistent with the 2014 water and sewerage resolutions. It is anticipated that the Board will have the capacity to debt finance more projects under the new resolution.

Table 26

Drainage Department
Statement of Historical Revenue

Revenue Source	2012	2013	2014	2015	2016
	$	$	$	$	$
Three-mill Ad Valorem Tax	12,497,723	13,175,711	13,481,526	14,139,193	16,043,825
Six-mill Ad Valorem Tax	12,630,977	13,317,505	13,626,539	14,290,667	16,215,799
Nine-mill Ad Valorem Tax	18,933,290	19,962,114	20,425,388	21,421,102	23,762,398
Two-mill Ad Valorem Tax	0	0	0	0	7,526
Interest Earned	109,748	92,615	203,832	202,579	253,938
Other	1,103,330	1,099,908	1,277,250	4,313,845	1,065,829
Total Revenue	45,275,067	47,647,853	49,014,535	54,367,386	57,349,315

Table 27

Drainage Department
Historical Operation and Maintenance Expenses (a)

	2012	2013	2014	2015	2016
	$	$	$	$	$
Personal Services	18,544,593	18,836,845	17,096,914	25,494,930	21,132,530
Services & Utilities	11,165,440	11,258,057	11,460,611	10,324,968	10,240,962
Supplies & Materials	1,909,601	1,937,679	1,523,346	1,511,946	1,682,711
Special Current Charges	800,572	578,960	756,295	372,914	364,893
Furniture & Equipment	66,823	91,674	62,057	109,745	102,528
Repairs & Facility Maintenance	0	0	0	0	0
Total Operation and Maintenance	32,487,029	32,703,215	30,899,222	37,814,502	33,523,624

(a) Historical operation and maintenance expenses do not include the non-cash portion of provision for claims as recorded in the Comprehensive Annual Financial Report. Estimates of future Water Department claims payable are included in Table 35.

Table 28

Drainage Department
Capital Expenditures
2016

C.P. #	Project	Actual Expenditures
		$
	Canals	
418	Normal Extensions & Replacements	44,887
439	Major Drainage Participation in DPW Projects	131,945
466	Louisiana Avenue Canal (SELA)	13,067,979
471	SELA Program Management	2,460,361
476	Hollygrove Canals (SELA-A)	10,972
478	S. Claiborne-Lowerline to Monticello Street	297,717
480	FEMA Review of Change Orders-Drainage	2,606,076
486	Napoleon Canal Improvements (SELA-B)	123,632
497	Florida Ave. Canad - DPS#19 to Peoples Ave. (SELA-B)	921,077
498	Dwyer Intake Canal (St. Charles to Dwyer DPS) (SELA-A)	50,952
499	Jefferson Avenue Canal	557,141
	Total Drainage Canals	20,272,739
	Pumping Stations	
511	Normal Extensions & Rep./Stations	225,489
574	Hurricane Katrina Expenses for Drainage System	0
575	Drainage Hurricane Recovery Bonds	1,044,941
	Total Drainage Pumping Stations	1,270,430
	Power Projects and General Budget	
600	Drainage Share of Power Projects	9,673,519
703	Drainage Reserve for Emergency	1,097,286
800	Drainage Share of General Budget Items	6,953,788
	Total Power Projects and General Budget	17,724,593
	Total Drainage Department	39,267,762

Table 29

Drainage Department
Projected Capital Improvements (a)

C.P.#	Project	2017	2018	2019	2020	2021	Total
		$	$	$	$	$	$
	Reinvestment in Assets						
418	Normal Ext. & Replacements	730,000	730,000	730,000	730,000	730,000	3,650,000
511	Normal Ext. & Replacement - Stations	15,700,000	13,310,000	17,686,000	20,103,400	14,640,000	81,439,400
600	Drainage Share of Power Projects	37,027,700	16,066,000	14,418,000	14,237,600	12,430,000	94,179,300
703	Drainage Reserve for Emergencies	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	10,000,000
800	Drainage Share of General Budget Items	16,481,000	8,357,000	7,784,000	6,506,000	6,965,000	46,093,000
	Total Routine Capital Improvements	71,938,700	40,463,000	42,618,000	43,577,000	36,765,000	235,361,700
	Major Capital Improvements						
439	Mains, Over 36" in Street Dept. Contracts	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	10,000,000
453	Improvements to Metairie Relief Canal	5,500,000	0	0	0	0	5,500,000
466	Louisiana Ave. Canal	250,000	500,000	500,000	0	0	1,250,000
471	SELA Program Management	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	7,500,000
478	S. Claib - Lowerline to Monticello St.	575,000	500,000	0	0	0	1,075,000
483	Airline & Monticello Canal Improvements	0	0	50,000	228,000	22,800,000	23,078,000
486	Napoleon Avenue Canal Improvements	300,000	250,000	0	0	0	550,000
492	Donner Canal Improvements	250,000	2,500,000	2,500,000	0	75,000,000	80,250,000
496	General De Gaulle Canal	0	35,000,000	3,375,000	0	0	38,375,000
497	Florida Avenue Canal - DPS #19 to Peoples	910,000	300,000	0	0	0	1,210,000
498	Dwyer Intake Canal	25,000	0	0	0	0	25,000
499	Jefferson Avenue Canal	530,000	515,000	0	0	0	1,045,000
512	Expansion of DPS #15	0	0	1,200,000	14,500,000	0	15,700,000
535	DPS #6	5,151,400	264,000	264,000	1,504,000	0	7,183,400
573	DPS #13 Improvements	0	0	0	440,000	7,000,000	7,440,000
575	Drainage Hurricane Recovery Bonds	1,600,000	0	0	0	0	1,600,000
576	COE Storm Proofing Projects						0
578	Permanent Pump Stations at the Laek Elaine DPS Repairs	0	0	200,000	0	0	200,000
	Total Major Capital Improvements	18,591,400	43,329,000	11,589,000	20,172,000	108,300,000	201,981,400
	Total Drainage Department Improvements	90,530,100	83,792,000	54,207,000	63,749,000	145,065,000	437,343,100

(a) The improvements for 2017-2021 are based on the amended 2017 capital budget and 2017-2026 capital improvement program.

Table 30

Drainage Department
Projected Participation by Others (a)

C.P.#	Project	2017	2018	2019	2020	2021	Total
		$	$	$	$	$	$
418	Normal Extensions & Replacements	230,000	230,000	230,000	230,000	230,000	1,150,000
483	Airline & Monticello Canal Improvements	948,000	30,000,000	500,000			31,448,000
492	Donner Canal Improvements			112,788,000			112,788,000
496	General De Gaulle Canal	70,000,000	70,000,000				140,000,000
511	Normal Ext. & Replacement -DPS	13,457,000					13,457,000
535	DPS #6		160,000	320,000	320,000		800,000
676	Modifications to Power Generating System HMGP	29,478,000					29,478,000
	Total	114,113,000	100,390,000	113,838,000	550,000	230,000	329,121,000

(a) The improvements for 2017-2021 are based on the amended 2017 capital budget and 2017-2026 capital improvement program.

Table 31

Drainage Department
Projected Operating Revenue

Year	Ad Valorem Tax Revenue			Other	Total
	Three-Mill	Six-Mill	Nine-Mill		
	$	$	$	$	$
2017	15,331,200	15,496,200	23,125,700	1,600,000	55,553,100
2018	15,331,200	15,496,200	23,125,700	1,616,000	55,569,100
2019	15,331,200	15,496,200	23,125,700	1,632,000	55,585,100
2020	15,331,200	15,496,200	23,125,700	1,648,000	55,601,100
2021	15,331,200	15,496,200	23,125,700	1,664,000	55,617,100

Table 32

Drainage Department
Projected Operation and Maintenance Expenses

	2017 (a)	2018	2019	2020	2021
	$	$	$	$	$
Personal Services	27,615,700	28,444,200	29,297,500	30,176,400	31,081,700
Services & Utilities	13,382,700	13,784,200	14,197,700	14,623,600	15,062,300
Supplies & Materials	2,198,900	2,264,900	2,332,800	2,402,800	2,474,900
Special Current Charges	476,800	491,100	505,800	521,000	536,600
Furniture & Equipment	134,000	138,000	142,200	146,400	150,800
Repairs & Facility Maintenance	0	0	0	0	0
Total Operation and Maintenance	43,808,100	45,122,400	46,476,000	47,870,200	49,306,300

(a) Represents the amended operating budget approved on September 20, 2017.

Table 33

Drainage Department
Debt Service Requirements

Debt Issue		2017	2018	2019	2020	2021
		$	$	$	$	$
Nine-Mill Tax Bonds						
Series 2014		2,024,100	2,063,400	2,069,200	2,066,200	2,062,100
Total Nine-Mill Debt Service		2,024,100	2,063,400	2,069,200	2,066,200	2,062,100
Projected Bonds						
	Amount of Issue					
	$					
2017	0	0	0	0	0	0
2018	0		0	0	0	0
2019	0			0	0	0
2020	0				0	0
2021	0					0
Total Projected Debt Service		0	0	0	0	0
Total Debt Service		2,024,100	2,063,400	2,069,200	2,066,200	2,062,100

Table 34

Drainage Department
Capital Improvement Program Financing

Line No	Description		Fiscal Year Ending December 31,				
		2017	2018	2019	2020	2021	Total
		$	$	$	$	$	$
1	Funds Available at Beginning of Year	42,299,000	51,141,800	68,840,300	131,264,800	67,167,200	42,299,000
2	Revenue Bond Proceeds	0	0	0	0	0	0
3	Operation Fund Transfers	0	0	0	0	0	0
4	Participation by Others	114,113,000	103,401,700	117,253,100	566,500	236,900	335,571,200
5	Interest Income	469,200	602,600	1,004,600	997,400	339,000	3,412,800
6	Total Funds Available	156,881,200	155,146,100	187,098,000	132,828,700	67,743,100	381,283,000
7	Obligated Contracts & Capital Jobs	(15,209,300)	0	0	0	0	(15,209,300)
8	Major Capital Additions	(90,530,100)	(86,305,800)	(55,833,200)	(65,661,500)	(149,417,000)	(447,747,600)
9	Deferred Capital Improvements	0	0	0	0	81,900,000	81,900,000
10	Bond Issuance Expense	0	0	0	0	0	0
11	Revenue Bond Reserve Fund	0	0	0	0	0	0
12	Total Application of Funds	(105,739,400)	(86,305,800)	(55,833,200)	(65,661,500)	(67,517,000)	(381,056,900)
13	End of Year Balance	51,141,800	68,840,300	131,264,800	67,167,200	226,100	226,100

Table 35

Drainage Department
Analysis of Ability of Forecasted Revenue to Finance Projected Revenue Requirements

Line No	Description	Fiscal Year Ending December 31, 2017	2018	2019	2020	2021
		$	$	$	$	$
1	Tax Revenue	53,953,100	53,953,100	53,953,100	53,953,100	53,953,100
2	Other Revenue	1,831,900	1,887,000	1,883,400	1,829,400	1,708,100
3	Total Operating Revenue	55,785,000	55,840,100	55,836,500	55,782,500	55,661,200
4	Operation & Maintenance	(43,808,100)	(50,722,400)	(55,572,000)	(57,495,100)	(59,331,200)
5	Non-Cash Expense Accruals	(2,047,200)	(2,100,500)	(2,155,400)	(2,212,000)	(2,270,300)
6	Net Operating Revenue	9,929,700	3,017,200	(1,890,900)	(3,924,600)	(5,940,300)
	Debt Service					
	Senior Lien Revenue Bonds					
7	Existing	(2,024,100)	(2,028,400)	(2,028,600)	(2,036,000)	(2,039,100)
8	Projected	0	0	0	0	0
9	Subtotal	(2,024,100)	(2,028,400)	(2,028,600)	(2,036,000)	(2,039,100)
10	Gulf Opportunity Zone Act Loan	(407,600)	(407,600)	(407,600)	(407,600)	(407,600)
11	SELA Capital Repayment	0	0	0	(3,800,000)	(10,000,000)
12	Total Debt Service	(2,431,700)	(2,436,000)	(2,436,200)	(6,243,600)	(12,446,700)
13	Other Non-Operating Revenue	969,200	969,200	969,200	969,200	969,200
14	Transfer to Construction	0	0	0	0	0
15	Due from (to) Other Departments	(921,000)	0	0	0	0
16	Transfer to Operating Reserve Fund	0	(1,268,000)	(852,400)	(597,900)	(237,100)
17	Net Annual Balance	7,546,200	282,400	(4,210,300)	(9,796,900)	(17,654,900)
18	Beginning of Year Cash Balance (a)	18,661,200	26,207,400	26,489,800	22,279,500	12,482,600
19	End of Year Balance	26,207,400	26,489,800	22,279,500	12,482,600	(5,172,300)
20	Beginning of Year Cash Balance	18,661,200	30,340,400	30,622,800	26,412,500	16,615,600
21	Operating Reserve Fund	4,133,000	0	0	0	0
22	Net annual Balance	7,546,200	282,400	(4,210,300)	(9,796,900)	(17,654,900)
23	End of Year Balance	30,340,400	30,622,800	26,412,500	16,615,600	(1,039,300)
24	Days of O&M Cash on Hand	253	248	207	127	(8)
	Debt Service Coverage					
	Reflecting All Ad Valorem Tax Revenue					
25	Annual Test	1142.5%	1140.1%	1140.0%	1135.8%	1134.1%

(a) Reflects beginning of year balance in unrestricted and undesignated cash and cash equivalents and cash and cash equivalents designated for capital projects, less operating reserve requirement.

Appendix

Table 2 - Assessment of East Bank Sewage Stations

	DATE	FACILITY NAME	LOCATION	STATUS
1	05/08/17	Chickasaw	Chickasaw at Metropolitan	Two (2) pumps total; both operational
2	05/08/17	K-Mart	Desire at Gentilly	Two (2) pumps total; both operational
3	05/08/17	Station 23	4500 Mithra	Two (2) pumps total; both operational
4	05/08/17	Station 17	4975 Spain at Selma	Two (2) pumps total; both operational
5	05/08/17	Station 22	5705 Perlita	Two (2) pumps total; both operational
6	05/08/17	Station 19	3730 Jumonville at Milton	Two (2) pumps total; both operational
7	05/08/17	Station 21	6670 Memphis At Filmore	Two (2) pumps total; both operational
8	05/08/17	Station 18	Vicksburg at Florida	Two (2) pumps total; both operational
9	05/08/17	City Park	5701 Marconi Drive	Two (2) pumps total; both operational
10	05/08/17	Station 20	328 37th Street	Two (2) pumps total; both operational
11	05/08/17	Station 4	5899 Fleur de Leis	Two (2) pumps total; both operational
12	05/08/17	Lakewood South	Country Club Drive near Marconi	Two (2) pumps total; both operational
13	05/08/17	Station 6	242 S Solomon at Palmyra	Three (3) pumps total; each operational
14	05/08/17	Station 3	8720 Olive near Eagle	Two (2) pumps total; both operational
15	05/08/17	Station 1	7336 Cohn	Two (2) pumps total; one (1) out of service: • Valve malfunction at pump, repairs scheduled • Station to be rebuilt
16	05/08/17	Station 14	4000 Clara	Two (2) pumps total; both operational
17	05/08/17	Station 5	3912 Erato St	Two (2) pumps total; both operational
18	05/08/17	Station 15	2431 Palmyra near Rocheblave	Three (3) pumps; each operational
19	05/08/17	Station 8	Corner of N. Broad and Toulouse	Two (2) pumps total; both out of service: • No emergency discharge connection • Station being rebuilt in new location • Temporary pumps operating onsite
20	05/08/17	Station 9	2540 Annette at Law	Two (2) pumps total; both operational
21	05/03/17	Station 16	3751 N Miro at Pauline	Two (2) pumps total; both operational
22	05/03/17	Station 24	5027 N Tonti at	Two (2) pumps total; one (1) pump out of service:

			Forstall	• Mechanical issue with pump system, repairs scheduled
23	05/03/17	Station 25	2245 Charbonnet	Two (2) pumps total; one (1) pump out of service: • Mechanical seal failure is issue, repair scheduled • Surrounding soils eroding, potential issues from settling may occur
24	05/03/17	Station 26	2244 St Maurice at Tonti	Two (2) pumps total; one (1) pump out of service: • Mechanical issue with pump system, repairs scheduled
25	05/03/17	Station B	4725 St Claude Avenue	Two (2) pumps total; both operational: • Older station, interior and exterior paint peeling, fresh coats recommended
26	05/03/17	Southern Scrap	Southern Scrap Rd	Two (2) pumps total; both operational
27	05/03/17	France & Florida	Harbor Rd	Two (2) pumps total; both operational
28	05/03/17	MECO	2701 France Road	Two (2) pumps total; both operational
29	05/03/17	American Marine	3855 France Road	Two (2) pumps total; both operational: • Older station, fresh paint of exterior recommended • Access to station is at times restricted due to location
30	05/03/17	Victoria @ Gentilly	3620 Victoria	Two (2) pumps total; both operational
31	05/03/17	Dodt	8118 Chef Menteur Highway	Two (2) pumps total; both operational
32	05/03/17	Plum & Orchid	7300 Chef Menteur Highway	Two (2) pumps total; both operational
33	05/03/17	Wilson	7709 Wilson Avenue	Two (2) pumps total; both operational
34	05/03/17	Crowder	5500 Crowder Road	Two (2) pumps total; both operational: • Older station, fresh paint of exterior recommended
35	05/03/17	Castle Manor	4950 Gawain at Dwyer	Two (2) pumps total; both operational
36	05/03/17	Cerise	5001 Cerise	Two (2) pumps total; both operational: • Older station, fresh paint of exterior recommended
37	05/03/17	Lakewood Terrace	5057 Warren Drive	Two (2) pumps total; both operational: • Roof replacement work ongoing
38	05/03/17	McCoy	McCoy at Gentilly	Two (2) pumps total; both operational: • Older station, no exterior cover for pump valves • No emergency discharge connection at station • Station frequently floods during heavy rains
39	05/03/17	Amid	6800 Almonaster Road	Two (2) pumps total; both operational
40	05/03/17	Lake Forest	10451 Lake Forest Blvd	Two (2) pumps total; both operational: • Newly built station, recently turned over to S&WB management • Perimeter fencing installed backwards • Emergency discharge installed in an awkward location and should be rotated to make better

				connections
41	05/03/17	Wright Road	Wright Road at Lake Forest	Two (2) pumps total; both operational: • No emergency discharge connection at station
42	05/03/17	Bullard	5501 Bullard Road	Two (2) pumps total; both operational: • Newly built station, recently turned over to S&WB management
43	05/03/17	Pines Village	6155 Dwyer Road at Foch	Two (2) pumps total; one (1) pump out of service: • Pump failure from due to mechanical issues, repairs scheduled
44	05/03/17	America	6789 Dwyer Road at Westlake	Two (2) pumps total; both operational
45	05/03/17	Station A	1321 Orleans Avenue	Six (6) pumps total; all operational
46	05/05/17	Shorewood	14441 Morrison Road	Two (2) pumps total; both operational
47	05/05/17	Briarwood	13701 Morrison Road	Two (2) pumps total; both operational
48	05/05/17	Liggett	12501 Morrison Road	Two (2) pumps total; one (1) pump out of service: • Issues with discharge line, repairs scheduled
49	05/05/17	Berg	11501 Morrison Road	Two (2) pumps total; both operational
50	05/05/17	Weber	10141 Morrison Road	Two (2) pumps total; both operational
51	05/05/17	Burke	9001 Morrison Road	Two (2) pumps total; one (1) pump out of service: • Motor belt slippage, to be replaced
52	05/05/17	Lawrence	7900 Morrison Road	Two (2) pumps total; both operational: • Newly built station, recently turned over to S&WB control
53	05/05/17	Lamb	6450 Morrison Road	Two (2) pumps total; one (1) pump out of service: • Motor belt slippage, to be replaced
54	05/05/17	Gentilly Oaks	5000 Papania Road at Vienna	Two (2) pumps total; both operational
55	05/05/17	Eastover	6051 Eastover Drive	Two (2) pumps total; both operational
56	5/03/2017	Paris Road	Dwyer West of Paris Road	Two (2) pumps total; both operational
57	05/05/17	Venetian Isles #2	20711 Old Spanish Trail	Two (2) pumps total; both operational
58	05/05/17	Industrial Parkway	4200 Industrial Parkway	Two (2) pumps total; one (1) pump out of service: • Electrical issues with pump motor, repairs scheduled
59	05/05/17	Blvd X	4433 Chef Menteur Highway	Two (2) pumps, both out of service: • Two (2) new pumps being installed • Two (2) temporary pumps connected to forcemain
60	05/05/17	Alcee Fortier	Alcee Fortier Blvd at the Levee	Two (2) pumps total; one (1) out of service
61	05/05/17	Willow Brook	Willowbrook off of Michoud	Two (2) pumps total; both operational: • No emergency discharge connection at station.

62	05/05/17	Oak Island	14201 Michoud Blvd	Two (2) pumps total; both operational
63	05/05/17	Village de Lest	11324 Dwyer	Two (2) pumps total; both operational
64	05/05/17	Michoud	4400 Michoud Blvd	Two (2) pumps total; both operational
65	05/05/17	Folgers	14601 Gentilly Blvd	Two (2) pumps total; one (1) pump out of service: • Pump repairs scheduled

Table 3 - Assessment of West Bank Sewage Stations

	DATE	FACILITY NAME	LOCATION	STATUS
1	05/03/17	Memorial	2501 Memorial Park Dr.	Two (2) pumps total; one (1) pump out of service: • Check valve malfunctioning, has been a resolving issue at station
2	05/03/17	Garden Oaks	3201 Memorial Park Dr.	Two (2) pumps total; both operational: • No emergency discharge connection installed, foundation appears to be wilting
3	05/03/17	Park Timbers	4100 Lennox Blvd.	Two (2) pumps total; one (1) pump out of service: • Pump motor malfunctioned, sent to repair facility • Older station, fresh paint of exterior recommended
4	05/03/17	Tall Timbers	3800 Tall Pines Dr.	Two (2) pumps total; both operational: • Potential issues may occur from settlement of surrounding areas
5	05/03/17	Forest Isle	5631 West Forest Park Dr.	Two (2) pumps total; both operational: • Paving around station is settling, potential damage to station from settlement may occur • No emergency discharge connection installed
6	05/03/17	Blair	3800 Blair St	Two (2) pumps total; both operational: • No emergency discharge connection installed • Soils around station are eroding, causing settlement around station
7	05/03/17	Aurora	6000 Carlisle Ct	Two (2) pumps total; both operational: • No emergency discharge connection installed
8	05/03/17	English Turn I	2201 Stanton Rd.	Two (2) pumps total; both operational: • No emergency discharge connection installed. • Above ground concrete and brick station with below ground centrifugal pumps.
9	05/03/17	English Turn II	123 ½ Oak Alley	Two (2) pumps total; both operational: • No emergency discharge connection installed
10	05/03/17	English Turn III	400 English Turn Parkway	Two (2) pumps total; both operational
11	05/03/17	Lower Coast	3700 Old Woodland	Two (2) pumps total; both operational: • No emergency discharge connection installed
12	05/03/17	Woodland	4150 Woodland Dr.	Two (2) pumps total; both operational: • No emergency discharge connection installed
13	05/03/17	Eton	3440 Eton St	Two (2) pumps total; one (1) pump out of service: • Check valve at pump has malfunctioned, replacement required • Emergency discharge connection being installed
14	05/03/17	Huntlee	3201 Huntlee Dr.	Two (2) pumps total; one (1) pump out of service: • Vacuum pump currently being replaced
15	05/03/17	Holiday	2799 Holiday Dr.	Two (2) pumps total; both operational: • Emergency discharge connection to be installed in future • Soils around station are eroding, causing settlement around station
16	05/03/17	Bridge Plaza	2914 Vespasian St	Two (2) pumps total; both operational:

				• Lateral movement at emergency discharge connection appears to have occurred, potential issue • Older station, fresh paint of exterior recommended
17	05/03/17	Horace	3301 Lawrence St	Two (2) pumps total; one (1) pump out of service: • Mechanical bearings at pump have malfunctioned, repairs scheduled • Installation of two (2) emergency discharge connections at station is ongoing

Table 4 - Assessment of East Bank Drainage Stations

	DATE	FACILITY NAME	LOCATION	STATUS	NOTES
1	05/04/17	Station 1	2501 S. Broad St.	Eleven (11) pumps total; nine (9) operational, Constant Duty No. 1 and vertical pump #2 not in service.	Constant duty No. 1 has been out of service since the previous year's station assessment.
2	05/04/17	Station 6	345 Orpheum	Fourteen (14) pumps total; eleven (11) pumps operational, 2 constant duty pumps and pump 1 out of service.	All pumps are in the same operational status as reflected in the previous year's station assessment. There isn't an estimated date for repair of the 3 pumps out of service.
3	05/10/17	I-10 Station	I-10 Service Road	Four (4) pumps total; four (4) pumps operational.	Four (4) vertical pumps one (1) of which is a constant duty pump.
4	05/04/17	Station 7	5741 Orleans Ave at Marconi Dr.	Five (5) pumps total; three (3) pumps operational.	Pump C and B are out. Pump C has been out of service since the previous year's station assessment.
5	05/10/17	Canal Blvd	5500 Canal Blvd	Three (3) pumps total; all operational.	No change from previous year.
6	05/04/17	Station 2	444 N. Broad St.	Six (6) pumps total, 2 are constant duty; all operational.	No change from previous year.
7	05/04/17	Station 3	2251 N. Broad St.	Nine (9) pumps total; four (4) pumps out of service.	No change from previous year. Constant duty pumps 1, 2, 3 & 4 are out of service.
8	05/10/17	Pritchard	2901 Monticello	Three (3) pumps total; all in service.	No change from previous year.
9	05/10/17	Oleander	9400 Oleander	Three (3) pumps total; three (3) in service.	No change from previous year.
10	05/04/17	Station 4	5700 Warrington Dr.	Six (6) pumps total; all operational put one (1) pump not being used.	Pump 1 out of service because of a leak in the vacuum line.
11	05/10/17	Station 12	Robert E Lee and Ponchartrain Blvd	One (1) pump total, one (1) in service.	No change from previous year.
12	05/10/17	Station 16	Danube Rd. at Wales	Four (4) pumps total; all in service	No change from previous year.
13	05/10/17	Station 10	Citrus 9600 Haynes	Four (4) pumps total; all in service.	No change from previous year.
14	05/10/17	Station 14	Oneida at Haynes	Four (4) pumps total; all operational.	
15	05/05/17	Grant	Grant St. at Gentilly Blvd.	Six (6) pumps total; five (5) in service.	Two (2) pumps inside, both operational. Four (4) pumps outside, Three (3) operational.

					No change from previous year.
16	05/05/17	Elaine	3100 Elaine St.	Two (2) pumps total; both operational.	No change from previous year.
17	05/05/17	Station 17	2801 Florida Ave.	Two (2) pumps total; all in service.	Two (2) drainage pumps operating on one motor. Three (3) sewage pumps also at this facility; all operational. No change from previous year.
18	05/04/17	Station 5	Florida Ave.	Eight (8) pumps total, four (4) are constant duty pumps; two (2) constant duty pumps are out of service.	Six (6) pumps at old station, Two (2) pumps at new station.
19	05/04/17	Station 19	4500 Florida Ave.	Five (5) pumps total; all in service.	No change from previous year.
20	05/05/17	Station 20	6300 Intercostal Waterway at Terminal Rd.	Two (2) pumps total; one (1) operational, one (1) out of service.	Pump 1 out of service. No change from previous year.
21	05/05/17	Maxent	Alcee Fortier	Two (2) pumps total; both operational.	No change from previous year.
22	05/05/17	Station 15	Industrial Parkway	Three (3) pumps total; two (2) pumps operational.	#2 pump is out of service.
23	05/10/17	Dwyer	5801 Dwyer Rd.	Three (3) pumps total; all in service.	No change from previous year The diesel generator is out of service.

Table 5 - Assessment of West Bank Drainage Stations

	DATE	FACILITY NAME	LOCATION	STATUS	NOTES
1	05/05/17	Station 11	5301East Sixth St.	Five (5) pumps total; four (4) pumps operational.	Stations has four (4) major pumps and one (1) constant duty pump, one (1) major pump, D, out of service being rebuilt with no date for completion of repair. Pump B is also out of service.
2	05/05/17	Station 13	4201 Tall Spruce Dr.	Seven (7) pumps total; six (6) pumps operational.	Pump 4 is out of service.