

# *South Essex Sewerage District*



## *Annual Report 2021*



WELCOME

**South Essex Sewerage District**

***Board Members***

Michael R. Parsons, P.E. | *Chairman*

Michael P. Collins, P.E. | *Director of Engineering, City of Beverly*

Stephen M. King Jr., P.E. | *Representative of the Town of Danvers*

Amy S. McHugh | *Representative of the Town of Marblehead*

Robert J. Langley, P.E. | *Director of Engineering, City of Peabody*

David H. Knowlton, P.E. | *City Engineer, City of Salem*

***“It is the mission of the South Essex Sewerage District to protect the public health of the District’s residents and enhance the quality of the region’s water resources by providing safe, efficient and reliable wastewater collection, conveyance, treatment and disposal.***

***This mission is accomplished by an organization of people dedicated to professionalism, stewardship and quality that anticipates and responds to the changing environmental and economic needs of the communities and other entities it serves.”***

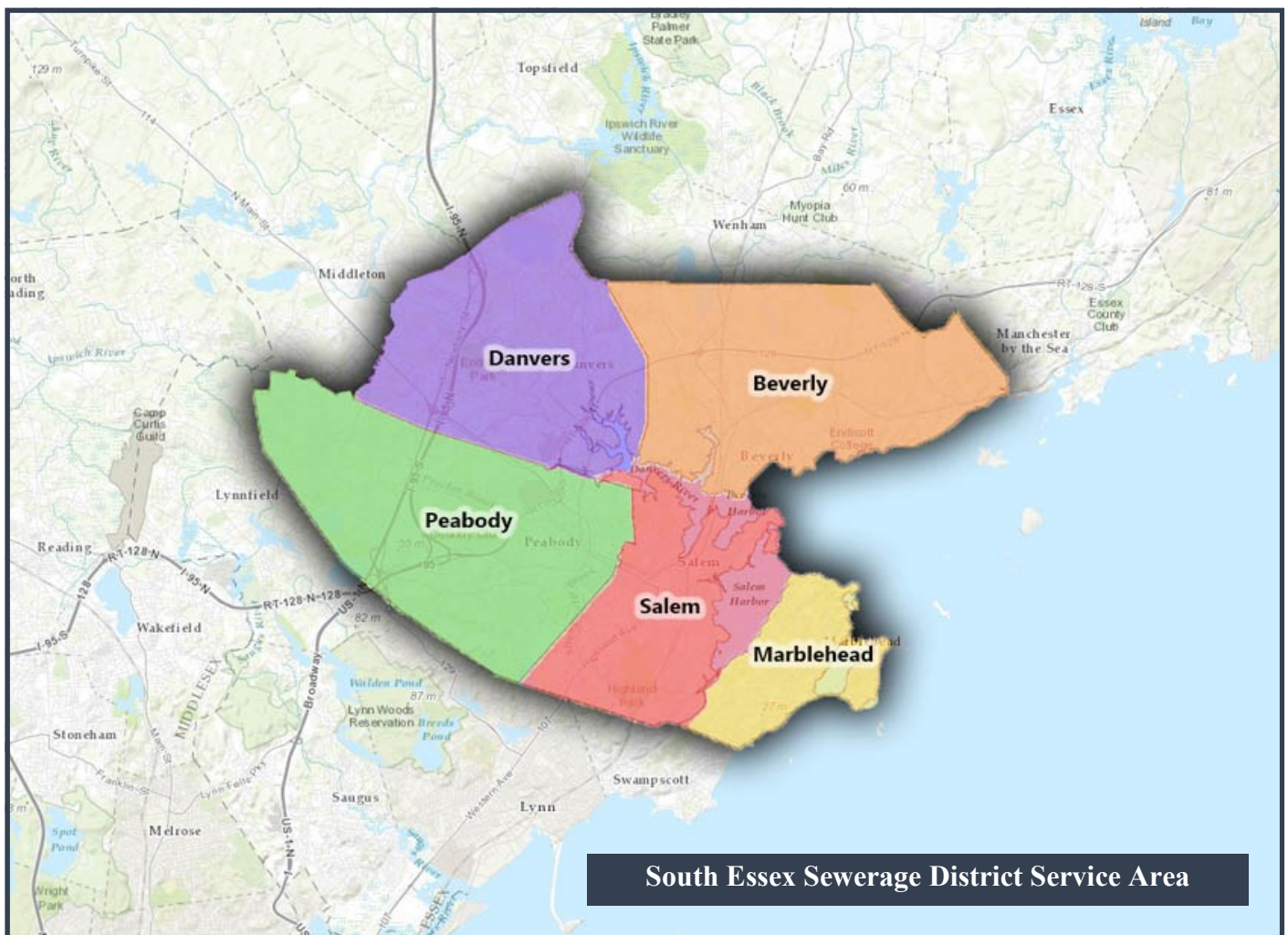


## OUR HISTORY

**SES D was established in 1925 to build, maintain, and operate a sewerage system for Beverly, Danvers, Peabody, Salem and the state and county institutions located in Danvers and Middleton, Massachusetts.**

**Since its establishment, services have expanded to include the town of Marblehead, as well as Gordon College in Wenham, and Ferncroft Village in Middleton.**

**The District is governed by a six-member Board representing our member communities who set policy and oversee the management of a staff of sixty-one full-time positions.**





# Annual Report 2021



## A REPORT FROM THE EXECUTIVE DIRECTOR

The South Essex Sewerage District has prepared this Annual Report for 2021. This report presents the highlights of the District's accomplishments over the past calendar year and a summary of key performance and financial metrics in an effort to provide information to our Member Communities and Stakeholders.

The District continued to be impacted this year by the Covid-19 pandemic – even after the vaccine was made available. We managed to avoid any significant plant operational or maintenance impacts, or serious employee health impacts, for which we are thankful. We continued to manage and operate in a flexible manner to meet the challenges of the pandemic and the associated employee impacts, cost inflation, and supply chain disruptions. The District was able to maintain operations and remained in compliance with its NPDES permit. The hard work of our staff is commendable and appreciated.

Highlights of this year include a solid year of permit compliance by the Operations Division, even with the challenges of treating high flows through the course of a very wet summer; a productive year with the Maintenance Division, including the completion of several complex equipment rehabilitation projects, as well as the continued expansion of the use of our Computerized Maintenance Management System; and a busy year from our Technical Support Division and Laboratory. Of special note this year is the near completion of three significant construction projects: 1) Contract No. 15-2 which was a plant systems upgrade project that included new high head pump variable speed drives, new boilers, piping system upgrades and other work; 2) Contract No. 16-2 to replace the Beverly Pump Station Bar Rack; and 3) Contract No. 20-1 which entailed rehabilitating the sewer siphon pipes beneath the Danvers River with a cured-in-place fiberglass structural lining.

As for 2022, the District will focus on maintaining our Operations and Maintenance improvements, work on additional plant upgrades construction projects, and will kick off the SESD Centennial Plan. The SESD Centennial Plan, named in honor of the 100 year anniversary of the Acts of 1925 that formed the District, entails capital and financial planning for the next 20 years of District-wide improvements and is critical to identify future treatment needs and an approach to address them.

All of us at the District work hard to serve our Member Communities, providing day-to-day wastewater treatment while positioning ourselves for a sustainable future.

**David L. Michelsen, P.E.**

## ENGINEERING

The **Engineering Department** consists of three full-time positions including the District Engineer, Project Manager, and Health and Safety Leader/Manager. Engineering is responsible for technical support of other divisions and capital projects. They are currently directing three different capital projects, including the completion of wastewater treatment plant upgrades, highlighted below.

### Contract No. 20-1: Danvers Siphon Rehabilitation

The District initiated a condition assessment in 2018 which determined that this siphon rehabilitation project was required. Corrosion caused by the surrounding soils and saltwater environment created concern that without rehabilitation, untreated sewage could enter the Porter River, impacting the environmental ecosystem of the river, creating public health concerns, and impacting recreational uses of the river. This project used Cured-In-Place Pipe Lining (CIPPL) — as seen to the right — to fully restore the structural integrity of the pipelines, remove the risk of a pipe failure and the potential for sewage exfiltration. The project extends the service life of the pipelines for 50 years or longer. The use of CIPPL did not require trench excavation or disturbance to the river, adjacent properties or environment. The project was awarded to Michels Pipeline in August 2021, and the lining work was completed in December 2021.



This project was funded by the Commonwealth of Massachusetts State Revolving Fund (SRF) loan program. This program offers affordable loan options to cities and towns to improve water supply infrastructure and drinking water safety; and to help them to comply with federal and state water quality requirements that deal with wastewater treatment plants and collection systems, while addressing issues such as watershed management priorities, stormwater management, and green infrastructure.





## ENGINEERING

### **Contract No. 18-1:**

#### **Primary Clarifier Concrete Restoration**

The District, in conjunction with AECOM Technical Services, Inc. and Corrosion Probe, Inc., conducted a planning study and preliminary design for the rehabilitation of the primary clarifiers that were formerly constructed in the 1970s. As part of the study, AECOM developed a recommended repair alternative to remove deteriorated concrete and apply a new concrete coating system over the existing concrete above the water line within the tanks and the associated influent and effluent channels. The new coating system is designed to prevent further hydrogen sulfide corrosion. New collector chains will be installed, and refurbishment of the sludge collection system will improve long-term operational reliability. The District awarded this contract to Methuen Construction Company, Inc. in June 2021. The overall project is anticipated to take 28 months to complete. This project is also funded by the Commonwealth of Massachusetts State Revolving Fund (SRF) loan program.



### **Contract No. 15-2:**

#### **Wastewater Treatment Plant Upgrades**

Now in its final stages, this contract with Methuen Construction was executed in July 2020. Equipment improvement and replacement projects at the treatment plant have mostly been completed, and the closeout phase has begun.

Significant upgrades include the installation of a globe valve in the air compressor cooling loop to reduce plant water and energy consumption, replacement of the boilers in the Process Building, replacement of the high head effluent pump variable frequency drives, replacement of the air conditioning unit for the Effluent Pump Station, replacement of plant water and sprinkler piping in the Primary Pump Room and tunnels, and replacement of the hydrogen peroxide bulk storage tanks. This project improves our plant's overall reliability and condition.



## LABORATORY AND MONITORING/ENFORCEMENT

The **Laboratory and Monitoring/Enforcement Department** consists of six full-time positions: Supervisor, Industrial Pre-Treatment Inspector, Pre-Treatment Technician, Chief Lab Technician, Senior Lab Analyst, and Lab Technician.

*Laboratory* personnel collect samples throughout the plant and receive samples from *Operations* and *Monitoring/Enforcement*. Analyzed results are used to control the treatment process and to verify the plant is performing to meet our NPDES discharge permit requirements and assure our discharge does not negatively impact local water quality.



### “Wipes Clog Pipes” Web Education Program

In the fall of 2021, we launched an online education program to reach residents and businesses located in the District.

The focus of this program is the preventable damage caused by “flushable” wipes.

To highlight this costly issue, we created an information page on our website that addresses the harm caused by non-flushable waste. With current media coverage, sanitary wastewater videos, and photography, the Wipes Clog Pipes page is a one-stop educational resource for all. Please visit our website for additional information:

[www.sesd.com/public-information/sypdfw](http://www.sesd.com/public-information/sypdfw)

### Permitted Industries

The District permits twenty-six Industrial users who are required to comply with our pretreatment guidelines. Personnel in the *Monitoring/Enforcement* Division inspect and enforce restrictions on all wastewater dischargers in our service area. In addition to permitted industries, this includes light manufacturing, commercial, food processing, and other facilities.

### Testing Performed in 2021

<u>Description</u>	<u>Estimated # of Tests</u>
<b>1. pH</b>	<b>3,800</b>
<b>2. Settleable Solids</b> <i>(Imhoff Cone – Comb. Inf., Pri. Eff., Sec. Eff.)</i>	<b>1,100</b>
<b>3. Settled Sludge Volume</b> <i>(Settleometer – Aeration Tanks)</i>	<b>800</b>
<b>4. Dissolved Oxygen</b>	<b>1,200</b>
<b>5. Temperature</b>	<b>500</b>
<b>6. Chlorine Residual</b> <i>(Head, End, Dechlor)</i>	<b>2,200</b>
<b>7. Bacteria</b> <i>(Fecal Coliform, Enterococci)</i>	<b>3,650</b>
<b>8. Total Solids</b> <i>(Process grabs)</i>	<b>1,300</b>
<b>9. Total Suspended Solids</b> <i>(Process grabs)</i>	<b>2,400</b>
<b>10. Total Suspended Solids</b> <i>(Community, Process &amp; Industry composites)</i>	<b>2,500</b>
<b>11. Biochemical Oxygen Demand</b> <i>(Community, Process &amp; Industry composites)</i>	<b>2,100</b>



# Annual Report 2021



## OPERATIONS

### Permit Driven, Quality Delivered

The District's effluent discharge is governed by a permit issued by the EPA under the Clean Water Act (CWA) known as a National Pollutant Discharge Elimination System permit (NPDES).

The permit contains limits on quantity and quality of the water the District can discharge, monitoring and reporting requirements, and other provisions to ensure that the discharge does not impair water quality, safety of plant workers, or people's health. It essentially provides a standard for how the District should operate to maintain a safe discharge for rate payers and receiving waters.

The **Operations Division** consists of twenty-four full-time positions:

- Superintendent of Operations                      - (12) Operators
- Assistant Superintendent of Operations       - (4) Facilities Attendants
- (6) Chief Operators

The staff ensure 24-hour, 365 days of safe operation of our secure wastewater treatment facility.

In 2021, the Operations Division treated a record 11.242 Billion Gallons due to high rainfall; the District received almost 60 inches of rain, which is 16 inches above our average annual rainfall.

### Plant Performance Report - 2021

Parameter			
Influent TSS	195 mg/l	48,317 lbs.	Average Per Day
Influent BOD	135 mg/l	33,797 lbs.	Average Per Day
Effluent TSS	19 mg/l	5,279 lbs.	Average Per Day
Effluent BOD	11 mg/l	3,119 lbs.	Average Per Day
Effluent Flow	30.80 Million Gallons Per Day		11.242 Billion Gallons in 2021
Fecal Coliform	30 CFU / 100 ml		Average Per Day
Enterococci	34 Colonies / 100 ml		Average Per Day
Chlorine Residual	0.03 mg/l		Average Per Day
Sludge Daily	82.06 Tons		Average Per Day
Sludge Total	29,925 Tons in 2021		

## MAINTENANCE

SESD worked closely with an Operations and Maintenance consultant from Jacobs Engineering Group to enhance our work flow and job performance. In the past year, the following was accomplished:

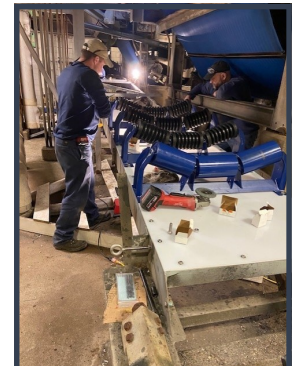
- An automated monthly maintenance report was created to pull data and metrics directly from the maintenance management database.
- Generated over 1,600 work orders.
- Created over 500 preventative maintenance activities.
- More than half of all work orders were preventative maintenance activities.
- Placed 650 purchase orders.
- Increased our parts database from 3,500 to 5,500 inventory items.

### Notable Accomplishments

- Completed the overhaul of the No. 1 Horizontal Conveyor system.
- Purchased and installed four new plant Heating System Glycol Pumps.
- Provided savings to the District by fabricating Primary Clarifier Chain Sprockets in support of Contract No. 18-1: Primary Clarifier Restoration.
- Completed the overhaul of two of the District's Sludge Belt Filter Presses.
- Completed the overhaul of two of the District's Sludge Gravity Belt Thickeners.

The **Maintenance Division** consists of twenty-two full-time positions:

- Superintendent of Maintenance
- Asst. Superintendent of Maintenance
- Scheduler, Planner, CMMS Administrator
- Electrical Foreman
- Electrician
- Instrumentation Specialist
- Instrument Repair Technician
- Inventory Control Clerk
- Facilities Foreman
- HVAC Mechanical Technician
- Master Mechanic
- (3) Lead Mechanics
- (3) Mechanics
- Mechanic/Machinist
- Mechanic/Equipment Operator
- Mechanic Helper
- Maintenance Equipment Operator
- Maintenance Helper



## ADMINISTRATION AND FINANCE

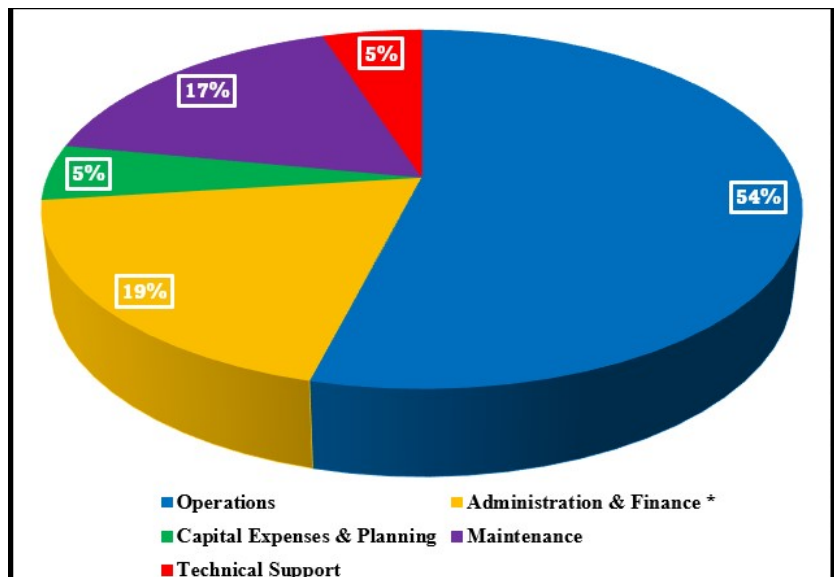
The Division consists of six full-time positions:

- Executive Director
- Manager of Administration and Finance (District Treasurer)
- Executive Secretary (District Clerk)
- Accounts Payable/Payroll/Personnel Clerk
- Senior Accounting Clerk (Assistant District Treasurer)
- Administrative Assistant

The District's **Administration and Finance Division** is responsible for the administration, finance and overall operational direction of the District. The division formulates and administers policies and procedures concerning all District functions. It also prepares the annual budget and member entity assessments based on their portion of flows and loads to the District's treatment plant. The District Board is responsible for reviewing and approving each fiscal year budget.

A complete review of the District's fiscal year financial performance may be found in the District's Audited Financial Statements and Treasurer's Report. Some FY 2021 highlights include:

- Assets exceeded liabilities by \$175.8 million representing an increase in net position of \$1.3 million from FY 2020. The largest portion of the net position, \$178.8 million, reflects the District's investment in capital assets (excluding debt).
- From FY 2011 through FY 2022, the District has included \$17.58 million of funds for its Capital Improvement Program as part of its annual budget.
- FY 2021 budgeted member assessments totaled \$25,214,713 representing an increase of 0.23% from the FY 2020 budgeted amount of \$25,155,728.
- The Operations Division consumes the majority of the fiscal operating budget as it is responsible for power, fuel, chemical and residuals disposal expenditures.



\* Administration & Finance includes insurance, pensions & other employee benefits.





**South Essex Sewerage District**

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