South Essex Sewerage District

Annual Report

2022

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SESD
South Essex Sewerage District

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."

This issue is in remembrance of

Todd Howcroft

a dedicated District employee

A REPORT FROM OUR EXECUTIVE DIRECTOR

This South Essex Sewerage District (District) Annual Report for 2022 highlights some of the key District activities and accomplishments over the past year. It also summarizes critical performance and financial metrics to provide information for our Member Communities and stakeholders.

Last year, the plant performed well with no permit exceedances for any regulated pollutants. The District's Operations Department provided uninterrupted staffing and made necessary process adjustments to maintain a high level of treatment performance. The District's Maintenance Department continued to tackle and complete significant and complicated equipment rehabilitation projects as well as address day-to-day maintenance issues – leveraging our Computerized Maintenance Management System to keep track of the myriad of details. Our Administration Team completed all of the necessary management and financial processes. And finally, our Technical Support Team and Laboratory were busy in supporting all of the District's initiatives. Work also progressed on construction and capital upgrades: the District is half way through a multi-year project to rehabilitate the District's buried Primary Clarifiers in a project funded in part by a low interest State Revolving Fund loan.

This year, the District is facing challenges with increasing chemical and residuals disposal costs and inflation, which have increased our operational costs substantially over the last two years. This is a challenge, as the District caps its operating budget increase at 2½% each year, similar to other municipalities. The District is identifying innovative ways to cope with this budgetary pressure.

In September 2022, the District kicked off a Wastewater Facilities Management Plan to identify required plant improvements over the next twenty years. Concurrently, the District staff are preparing a Financing Plan to accompany the Facilities Plan. Together, these comprise our SESD Centennial Plan, named in recognition of the 100-year anniversary of the Acts of 1925 that formed the District. This planning is critical to identify future District-wide needs and an approach to address them in an affordable manner.

In 2023, the goal is to continue working on the Facilities Plan and Finance Plan and to prepare a District Strategic Plan to focus and prioritize our efforts to sustain our operations. All of us at the District work hard to serve our Member Communities and protect Salem Harbor's water quality while positioning the District for a sustainable future.

David Michelsen, P.E. | *Executive Director*

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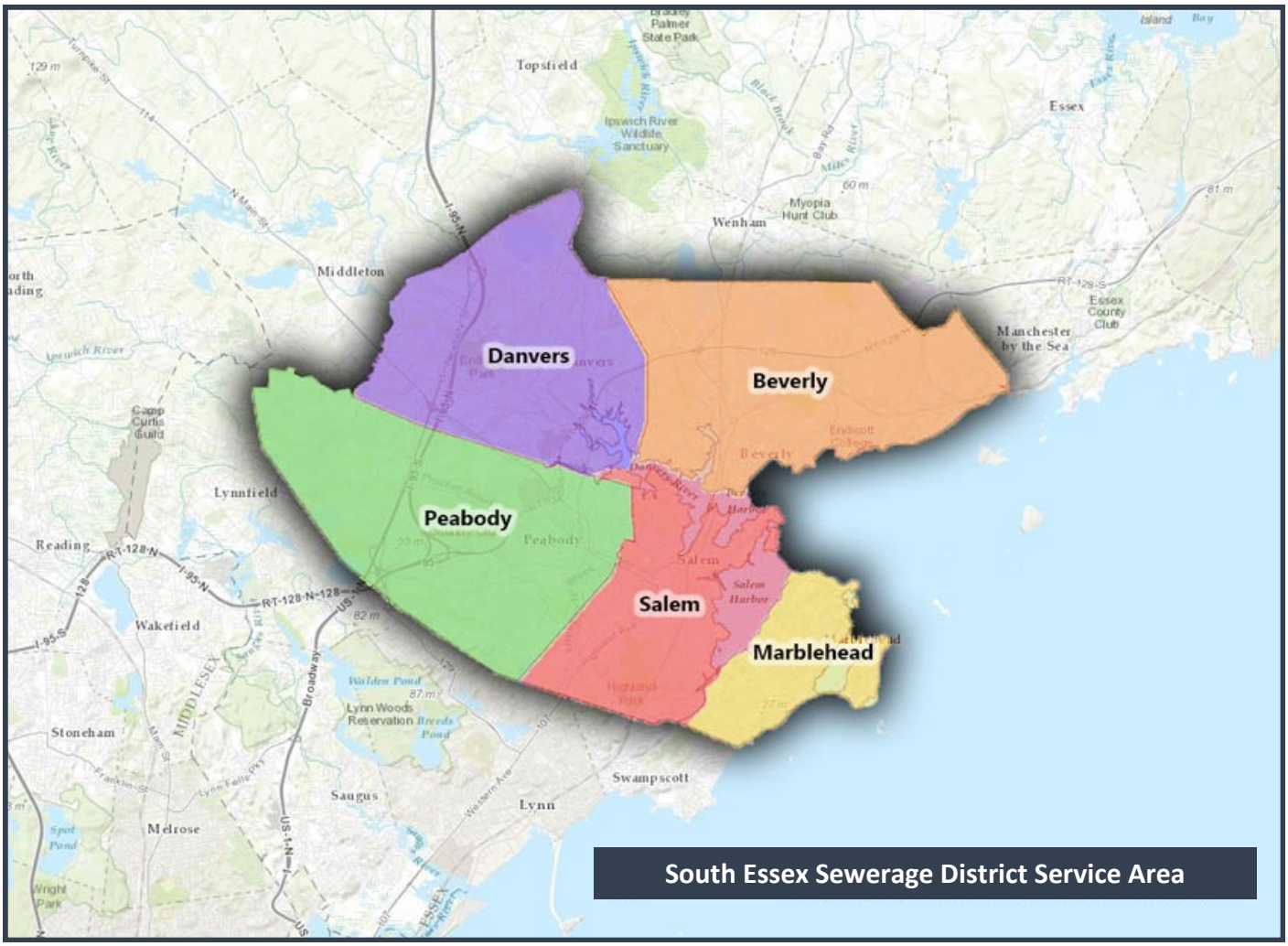
SESD
South Essex Sewerage District

OUR HISTORY

SESD 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.



South Essex Sewerage District Service Area

COMMUNITY OUTREACH

We all work as a team to establish and host plant tours for local schools and wastewater professionals alike. By developing relationships with our community at large, we hope to further our Mission of water quality stewardship in ways that increase connection, understanding, and ultimately lead to changes in behavior that will help our water systems survive through the uncertain times ahead.

As we develop our 20-year infrastructure plan, we anticipate our continued efforts will help us all to understand the importance of our plant operating 24-hours a day — no matter what — so our water is clean and safe in the environment around us.

Please, come join us in these conversations—it's a team effort to keep what goes down our sinks, showers, and toilets and into the ocean clean! Book a tour of our facility, request an educational seminar, and more online at www.sesd.com/contact-us/.

ENERGY MANAGEMENT

On January 25, 2023, at the New England Water Environment Association (NEWEA) Annual Conference, the South Essex Sewerage District received an Energy Management Achievement Award for 2022. The award recognizes more than ten years of active energy management and reduction work by the District.

The District thanks all of its employees, whose dedication and attention to energy use made this possible. We are honored to receive this award and will continue our efforts to be a steadfast and efficient steward of the environment.

ENGINEERING

The **Engineering Department** consists of three full-time positions including the District Engineer, Project Manager, and Health and Safety Leader. Engineering is responsible for providing technical support to the other District divisions and overseeing the District's engineering studies and capital projects.

In calendar year 2022 Engineering staff were responsible for one active capital upgrade construction project for concrete restoration of the treatment plant's underground primary clarifiers. The staff also initiated the detailed design of an upcoming capital construction project for the replacement of the facility's plant water system, as well as two engineering studies which are highlighted below.

Contract No. 18-1: Primary Clarifier Concrete Restoration

The purpose of the project is to remove deteriorated concrete above the water line within the 50-year-old tanks and influent and effluent channels and restore the concrete with a protective mortar product and epoxy coating to protect the tank from further hydrogen sulfide corrosion. In addition to the concrete work, the sludge collection system will be refurbished, which will improve long-term operational reliability. The District awarded this contract to Methuen Construction Company, Inc. in June 2021 and the project is anticipated to be complete in late 2024. In 2022 an unforeseen condition impacted the progress of work within the clarifiers. During the spring and summer, the condition was resolved, and work resumed inside the tanks in September. At the close of 2022, two (2) of the seven (7) primary clarifiers are nearly complete and are ready for startup in early 2023. This project is funded by the Commonwealth of Massachusetts State Revolving Fund (SRF) loan program. Figures 1 & 2 depict the progress of work in Tank No. 1. The overall cost of these capital improvements will be approximately $13 million dollars.

ENGINEERING

Contract No. 22-1: Replacement of Plant Water Pump System

In January of 2022 the District started the design of a replacement plant water system. The existing plant water system, which was installed in 1993, has reached the end of its useful life and needs replacement. The new plant water system will include five (5) new pumps, a new control panel, and a new water strainer. The energy efficiency of the new system will be greatly increased by the elimination of outdated pressure reducing valves and the installation of variable frequency drives (VFDs), which, when paired with the new control system, will also provide increased operational flexibility. The installation of the new system is anticipated to result in an electrical cost savings of up to $55,000 annually. The engineer's construction cost estimate for the project is approximately $900,000. The District applied for and received a $200,000 state energy grant to help with costs. The project is expected to go out to public bid for construction in 2023.

Engineering Study E2041 — Wastewater Facilities Management Plan

In the fall of 2022 the District contracted with AECOM to prepare a twenty (20) year wastewater facilities plan for the treatment plant and remote pumping stations. The purpose of this Wastewater Facilities Management Plan is to establish a road map for the District's capital spending and facilities upgrade activities for the next 20-year planning cycle. The overall goals of the plan include an assessment of the District's assets and facilities, assessment of treatment processes, residuals management, odor control practices now and in the future, and assessment of impacts from climate change. An alternatives analysis will be completed and recommendations for improvements at the WWTP and remote pumping stations will be prioritized. The recommendations will then be incorporated into a multi-phased capital improvements plan. The study is scheduled to be complete in 2024.

Engineering Study E2045 — Danvers Force Main, Bass River Siphons, and Beverly Force Main Condition Assessment Investigation

On the heels of Contract 20-1: Danvers Siphon Rehabilitation, which was completed in late 2021, the District's engineering staff have been working closely with CDM Smith to finalize an agreement for the investigation of several high priority pipelines: the Danvers Force Main, the Bass River Siphon, and the Beverly Force Main. In addition to being critical infrastructure, these pipelines are a high priority due to water crossings, their age, and other factors. These assets must be inspected to assess their condition and determine if, or when, rehabilitation may be required. Inspections will be completed using multi-sensor pipeline inspection tools which will take measurements to determine pipe condition. The project is anticipated to take approximately 12 months. A report will be prepared with recommendations made on rehabilitation methods required for these critical assets. The project is planned to kick off in early 2023.

LABORATORY & 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 the *Operations* and *Monitoring/Enforcement* departments. Analyzed results are used to control the treatment process and to verify that the plant is performing to meet our NPDES discharge permit requirements and assure our discharge does not negatively impact local water quality.

Industrial Users

The District permits twenty-seven Industrial users: (21) Significant Industrial Users or SIUs, and (6) General Permitted Industries 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. We currently maintain 504 industries in our database.

During the calendar year 2022, (505) Industrial inspections were conducted. There were (79) miscellaneous industries inspected, consisting of five year inspections, non-SIU permit renewals, and new industries, as well as (405) SIU pH spot checks & (21) SIU annual inspections.

The District is currently updating our Industrial Pretreatment Program (IPP). The update is required by our NPDES Permit and has been approved by the EPA. Once the update is completed and published, the District will update our Sewer Use Regulations (SUR) to make them comply with the new IPP Program.

Testing Performed in 2022

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

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

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

2022 was a dry year in regards to rain and total wastewater flow. The District treated 8.358 Billion Gallons of flow, while only receiving 32 inches of rain (25% lower rain total than the 10 year average).

Plant Performance Report - 2022

Influent TSS	256 mg/l	Average Per Day
Influent BOD	190 mg/l	Average Per Day
Effluent TSS	16 mg/l	Average Per Day
Effluent BOD	11 mg/l	Average Per Day
Effluent Flow	23.01	Million Gallons Per Day
Effluent Flow	8.358	Billion Gallons in 2022
Fecal Coliform	17 CFU / 100 ml	Average Per Day
Enterococci	13 Colonies / 100 ml	Average Per Day
Chlorine Residual	0.02 mg/l	Average Per Day
Sludge Daily	91.04 Tons	Average Per Day
Sludge Total	33,243	Tons in 2022

MAINTENANCE

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

- Superintendent of Maintenance
- Asst. Superintendent of Maintenance
- Scheduler, Planner, CMMS Administrator
- (2) Instrumentation/Electrical Specialists
- Lead Instrumentation/Electrical Technician
- Instrumentation/Electrical 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

Notable Accomplishments

These projects were completed using our own labor force, resulting in significant cost savings for the District.

- Designed, purchased, and installed a new Air Handling Unit for the Sodium Bisulfite Chemical Building.
- Completed an overhaul of the Danvers No. 2 Sewage Pump.
- Purchased and Installed a new Oxygen Generation Cooling Water Pump to complete an overhaul of the cooling water pumping system.
- Refurbished Odor B Fans No. 2, 4, 6, and 7. The function of this fan system is to exhaust odorous air from the Primary Process for treatment.
- Repaired Odor G Fan casing by welding fractures and installed a new motor for No. 1 Odor G Fan. The function of this fan system is to exhaust odorous air from the Sludge Processing areas for treatment.
- Purchased and installed a new Odor C Fan. The function of this fan system is to exhaust odorous air from the Secondary Process for treatment
- Staged and overhauled the No. 3 Peabody/Salem Influent Pump Station Climber Screen.
- Refurbished the Blended Scum Skimmers No. 1 & 2 which helped the District process scum more effectively.

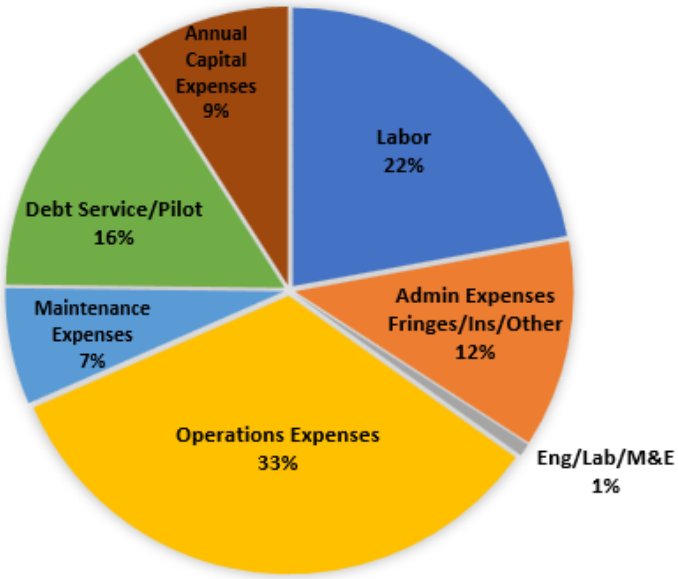
ADMINISTRATION & FINANCE

The Division consists of five full-time positions:

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

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 2022 highlights include:

- Assets exceeded liabilities by $175.6 million representing a decrease in net position of $136,000 from FY 2021. The largest portion of the net position, $177.1 million, reflects the District's investment in capital assets (excluding debt).
- From FY 2012 through FY 2023, the District has included $19.47 million of funds for its Capital Improvement Program as part of its annual budget.
- FY 2022 budgeted member assessments totaled $25,675,485 representing an increase of 1.83% from the FY 2021 budgeted amount of $25,214,713.



- The Operations Division accounts for the majority of the fiscal operating budget as it is responsible for power, fuel, chemical, and residuals disposal expenditures.

South Essex Sewerage District

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