



SESD

Wastewater Treatment
For a Cleaner Environment



Annual Report

2024



Board Members

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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

Deborah L. Duhamel, P.E. | City Engineer, City of Salem



SESD | We Keep the Environment Clean
Providing Wastewater Management & Treatment Services Since 1925

Proper wastewater treatment protects where you live, work, and play.

Water flushed or sent down the drain in homes, businesses, and commercial buildings must be cleaned. If not properly treated, the chemicals, human waste, and other contaminants end up in our waterways. At SESD, we serve local municipal sewer departments by collecting and treating wastewater containing contaminants.

In support of this essential community service, we:

PROCESS

25

Million Gallons of
Wastewater a Day

MAINTAIN

29

Miles of Interceptor &
Force Main Pipes

SERVE

190k

Residents &
Businesses



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*A Report from the
Executive Director*

This South Essex Sewerage District (SESD) Annual Report for 2024 highlights some of the key efforts and activities that the District focused on last year. The year began in an emergency situation as a large diameter critical conveyance pipe beneath the foundation of our Operations building failed, and partially treated wastewater was literally flooding our basement. The pipe was quickly taken offline, but during January and February of last year, all hands were on deck to repair the pipe, and three other adjacent pipes of similar age and in risk of failure. With a change order and \$4.4 million in emergency funding from the Massachusetts State Revolving Loan Fund, these critical pipes were repaired and all back in service by March of 2024.

My focus for the remainder of the year has been planning how to address the next 20 years of need at SESD. Efforts have included preparation of a Facilities Plan for the Wastewater Treatment Plant and preparation of a Capital Improvement Plan for SESD's collection system. These two planning documents are being integrated into a District-wide CIP and associated Financing Plan, which together we are calling the Centennial Plan, named in recognition of the 100-year anniversary of the Acts of 1925 that formed the District. This Plan will identify the necessary work, phasing plan and financing approach that we can implement. We have also created a new website and logo and enhanced outreach to the public and with public officials – all to communicate the criticality of what we do here and our role in preserving public health and water quality. With our new logo and tag line of “Wastewater Treatment for a Cleaner Environment,” we are stressing what we do matters, and that we need financial resources to progress our mission.

The pipe failure noted above is a clear example of why investment into our facilities is so important. Much of our treatment equipment is approaching 30 years old, and some of our significant conveyance pipes are over 100 years old. We do a good job keeping the equipment maintained and operational, but it is necessary to have a plan to continue to assess and renew our treatment facilities and pipes.

The District is subject to Proposition 2 ½, limiting our annual budget increase to 2.5%. With recent significant price increases for treatment chemicals, labor, and insurance; an upcoming projected 40% increase in residuals disposal costs due to PFAS; and the need to fund the Centennial Plan, it is not possible to fund the ongoing operations and required upgrades beneath this 2.5% threshold.

In 2025, the goal is to complete the Centennial Plan, finalize a path forward to implement it, and develop a solution to make the necessary investments to sustain our operations given our current limitations under Proposition 2 ½. All of us at SESD work hard to keep the environment clean and serve our Member Communities while positioning the District for a sustainable future.

David Michelsen, P.E.
Executive Director



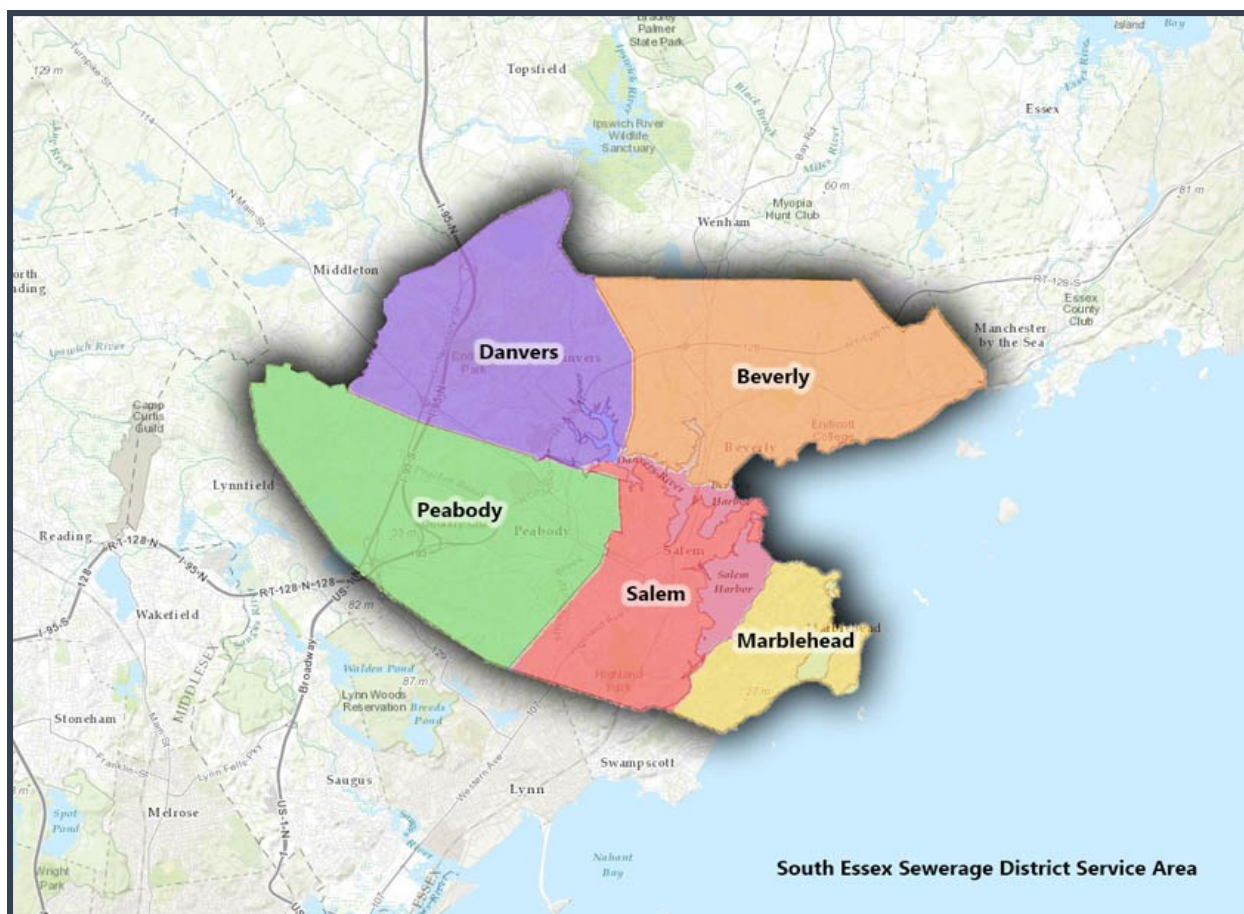
100 Years of Wastewater Experience and Innovation

SESD was established in 1925 to build, maintain, and operate a sewerage system to collect, convey, treat, and dispose of residential, commercial, and industrial wastewater.

Our wastewater collection and conveyance system includes 29 miles of interceptor and force main pipelines, pumping stations, and associated metering and sampling facilities. In addition to homes and businesses, we serve approximately twenty significant industrial users (SIUs) that discharge to the sewer system.

SESD does not directly bill individual users. We annually assess costs to each municipal member based on their use of our treatment facility. So each community only pays for the cost of meeting their wastewater treatment needs.

SESD is governed by a six-member Board representing our member communities who set policy and oversee the management of a staff of sixty employees.





This year, the National Association of Clean Water Agencies (NACWA) held their National Environmental Achievement Awards ceremony during their winter conference. At the awards ceremony and reception on January 29, 2025, our Executive Assistant, Executive Director, Manager of Administration & Finance, Engineers, and Superintendents at SESD, along with our branding agency, Mayo Designs, were awarded the **Public Information & Education E-Media Award** for our updated website and logo. The Public Information & Education Award honors agencies across the nation for their inventive efforts to educate the public on the effects of wastewater treatment and pollution control on the environment.

The New England Water Environment Association (NEWEA) Annual Conference was held at Boston Marriott Copley Place in downtown Boston, MA. At the awards ceremony luncheon on January 29, 2025, our Executive Director, David Michelsen, received the prestigious **Elizabeth A. Cutone Executive Leadership Award**. The Award is given annually to an individual who has demonstrated key executive leadership of a water, wastewater or other environmentally focused organization and through that person's leadership made significant advances in one or more elements of the Award criteria.



In partnership with Greenscapes North Shore Coalition's "Keeping Water Clean" program, SESD is coming to an Elementary or Middle School near you to demonstrate the effects of non-flushables on our sewer pipes and treatment facility. Things like food, oil, wipes, etc. should never be flushed or drained down sinks or pipes - these cause nasty clogs and damage equipment that costs ratepayers more money in water and sewer fees to cover the repairs. **Only flush the Four P's!**

Learn more at <https://www.sesd.com/for-the-community/preventing-backups/>

Did You Know?

Our new logo has five blue hues surrounding the water droplet which symbolize our wastewater treatment service area of Beverly, Danvers, Marblehead, Peabody, and Salem.



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*Division 2: Engineering
Project Highlights*

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

In 2024 the Engineering staff were responsible for three (3) capital construction projects and four (4) studies for a total of approximately \$10.7 million of new work under study and construction. Several of the projects are highlighted below:

Contract No. 18-1: Primary Clarifier Concrete Restoration

This project is wrapping up with final completion expected in March 2025. Deteriorated concrete was restored in all seven of the primary clarifiers; clarifier chains and flights have been replaced and the clarifiers have been re-commissioned. This project was funded by a loan from the Massachusetts State Revolving Fund program. The overall cost of these capital improvements will be approximately \$17.4 million dollars.

Wastewater Facilities Management Plan

The Wastewater Facilities Management Plan was undertaken to establish a road map for facilities upgrade activities to be incorporated into SESD's Centennial Plan. The facilities plan is approximately 95% complete and the recommendations are integrated into a 20-year plan that prioritizes needs and establishes approximately 57 projects in four phases. The financial analysis is currently underway including the development of projected capital and operating costs. The Wastewater Facilities Management Plan should be completed in May 2025.



Contract 22-1: Plant Water System Replacement Project

The new plant water system replaces the original plant water system that has been in service since the secondary treatment system was constructed in 1998. The new system, seen left, includes five (5) pumps with variable speed drives, an automatic backwash strainer, process piping upgrades and new controls. Construction is nearing completion, and the pumps are currently being commissioned with a final completion date in April 2025. The overall project cost is \$2,337,000 with a \$200,000 grant being provided by the MassDEP Clean Energy Program.



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*Division 2: Engineering
Project Highlights Cont'd*

Contract 23-1: Danvers Pump Station Standby Generator Replacement Project

The Danvers Pumping Station's standby generator is being replaced since it has reached the end of its useful life. The project includes a new standby diesel generator, automatic transfer switch and controls. The design, permitting and bid and award have been completed, and the contractor has completed most of the required submittals. The construction cost is approximately \$628,000. The construction is anticipated to be completed in August 2025.

Collection System Capital Improvement Plan

SESD has contracted with an engineering consultant to prepare a Capital Improvement Plan (CIP) for the District's collection system infrastructure. The purpose of the plan is to identify, prioritize, and develop costs for replacing and rehabilitating collection system assets. The recommendations from three separate investigations will be included in the CIP. The three investigations include the Danvers/Beverly Force Main Condition Assessment, Water Street Interceptor Condition Assessment and the Peabody/Salem Interceptor Condition Assessment. The overall Collection System CIP includes 13 projects that have been prioritized into four phases based on criticality and consequence of failure. Planning-level capital costs have been estimated for each project. When complete, the Collection System Capital Improvement Plan will be integrated into SESD's Centennial Plan.

Three of the high priority projects include:

- Bass River Siphon Chambers Rehabilitation
- Beverly Harbor Crossing Force Main Replacement
- Marblehead Force Main (Landward Portion) Replacement





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**Division 2: 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 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 Federal and State discharge permit requirements and assure our discharge does not negatively impact the water quality of Salem Sound.

Industrial Users

SESD permits 27 industrial users: 21 of these are Significant Industrial Users (SIU) and 6 are General Permitted Industries who are required to comply with our pre-treatment guidelines. Personnel in the Monitoring/Enforcement Department inspect and enforce restrictions on all industrial dischargers in our service area. We currently maintain 490 industries in our database.

During the calendar year 2024, 647 Industrial inspections were conducted. There were 143 miscellaneous industries inspected, consisting of five year inspections, permit renewals, new industries, as well as 483 pH spot checks, and 21 SIU annual inspections.

After incorporating public comments, changes proposed to SESD's Sewer Use Regulations were approved by the EPA and SESD Board in May 2023. As of December 2024, all 27 industrial users have received new permits with updated local limits and new Sewer Use Regulations. Learn more at <https://www.sesd.com/what-we-do/industrial-pretreatment-permitting/>

Testing Performed in 2024

<u>Description</u>	<u>Estimated # of Tests</u>
1. pH	3,800
2. Settleable Solids <i>(Three locations in plant)</i>	1,000
3. Settled Sludge Volume <i>(Aeration Tanks)</i>	800
4. Dissolved Oxygen	1,200
5. Temperature	500
6. Chlorine Residual <i>(Three locations in plant)</i>	2,200
7. Bacteria <i>(Fecal Coliform, Enterococci)</i>	3,650
8. Total Solids <i>(Process grab samples)</i>	1,300
9. Total Suspended Solids <i>(Process grab samples)</i>	2,400
10. Total Suspended Solids <i>(Community, Process & Industry samples)</i>	2,400
11. Biochemical Oxygen Demand <i>(Community, Process & Industry samples)</i>	2,000



Protecting Beaches and Waterways

SESD's effluent discharge is governed by a permit issued by the USEPA under the Clean Water Act (CWA) known as a National Pollutant Discharge Elimination System (NPDES). The permit contains limits on the quantity and quality of the water SESD can discharge, monitoring and reporting requirements, and other provisions to ensure that the discharge does not impair water quality or people's health. It provides a standard for how SESD should operate to maintain a safe discharge to protect the water quality of Salem Sound.

The **Operations Division** consists of twenty-four full-time positions, twenty of whom are professionally licensed wastewater treatment Operators. The staff ensure 24-hour, 365 days of safe operation of our secure wastewater treatment facility.

- Superintendent of Operations (Grade 7)
- Assistant Superintendent of Operations (Grade 7)
- 6 Chief Operators (Grade 7)
- 12 Operators (Grade 4+)
- 4 Operator's Assistants

In 2024, 37.5 inches of rain fell, 40% of which was in January and March. SESD treated 8.95 billion gallons of wastewater flow, an average of 24.5 million gallons of flow per day, resulting in a 15% decrease in flow from last year. Operations concentrated its focus on process equipment and tank rotation for construction projects and optimization of sludge processing equipment to reduce the amount of residuals generated for disposal.

Learn more at <https://www.sesd.com/what-we-do/wastewater-treatment/>

Plant Performance Report - 2024

Influent TSS	231 mg/l	Average Per Day
Influent BOD	178 mg/l	Average Per Day
Effluent TSS	19 mg/l	Average Per Day
Effluent BOD	12 mg/l	Average Per Day
Effluent Flow	24.5	Million Gallons Per Day
Effluent Flow	8.95	Billion Gallons Total in 2024
Fecal Coliform	13 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	78.6 Tons	Average Per Day
Sludge Total	28,796	Tons in 2024



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Division 4: Maintenance
Notable Accomplishments

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

These projects were accomplished using our own labor force, resulting in significant cost savings for SESD.

Collection System Improvements

- Completed an entire overhaul of the Danvers No. 2 Sewage Pump.
- Purchased and installed new Variable Frequency Drives for Beverly Pump Station No. 3 Sewage Pump.
- Purchased and installed new Variable Frequency Drives for Peabody/Salem Influent Pump Station No. 1 and No. 2 Sewage Pumps.
- Completed an overhaul of the Beverly Pump Station No. 1 Climber Screen Motor and Brake System.
- Installed new Control Air Compressors at the Beverly Pump Station.
- Installed new Control Air Compressors at the Marblehead Pump Station.

Sludge Processing & Treatment Improvements

- Refurbished Primary Settling Tank Mechanical Equipment in conjunction with Primary Clarifier Restoration Capital Improvement Project.
- Purchased and installed a new Variable Frequency Drive for the Odor A No. 3 Carbon Fan.
- Completed a complete rehabilitation of the Odor C No. 3 Fan and Motor (see photo).
- Completed the 36,000 Hour Maintenance for the Combined Heat and Power (CHP) Engine.
- Removed and refurbished several 480 volt breakers from SESD Switchgear as an ongoing plant-wide improvement.
- Purchased and installed new LED Lighting Fixtures throughout all facilities for energy savings, better visibility and bulb longevity.

Odor C No. 3 Fan Rehabilitation Project





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*Division 1: Administration
& Finance*

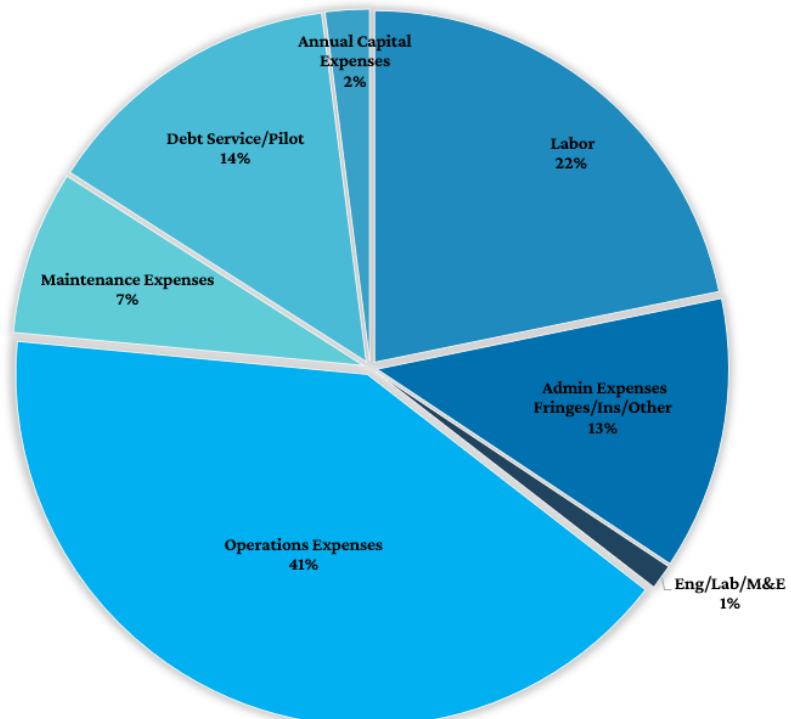
The Division consists of four full-time positions and one part-time position:

- Executive Director
- Manager of Administration and Finance (District Treasurer)
- Executive Assistant/Outreach Coordinator
- Staff Accountant (District Clerk)
- Part-Time Accounting Assistant

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

for reviewing and approving each fiscal year budget. A complete review of SESD's fiscal year financial performance may be found in SESD's Audited Financial Statements and Treasurer's Report. Some FY 2024 highlights include:

- Assets exceeded liabilities by \$171.2 million representing a decrease of \$1.9 million from FY 2023. The largest portion of the net position, \$169.8 million, reflects SESD's investment in capital assets (excluding debt), such as the treatment plant.
- From FY 2011 through FY 2024, SESD appropriated \$19.95 million for the Capital Improvement Program as part of its annual budgets.
- FY 2024 member community assessments totaled \$26,631,442 representing an increase of 1.85% from the FY 2023 budgeted amount of \$26,147,567.
- The Operations Division accounts for the majority of the fiscal operating budget as it is responsible for power, fuel, chemical, and residuals disposal expenditures.





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