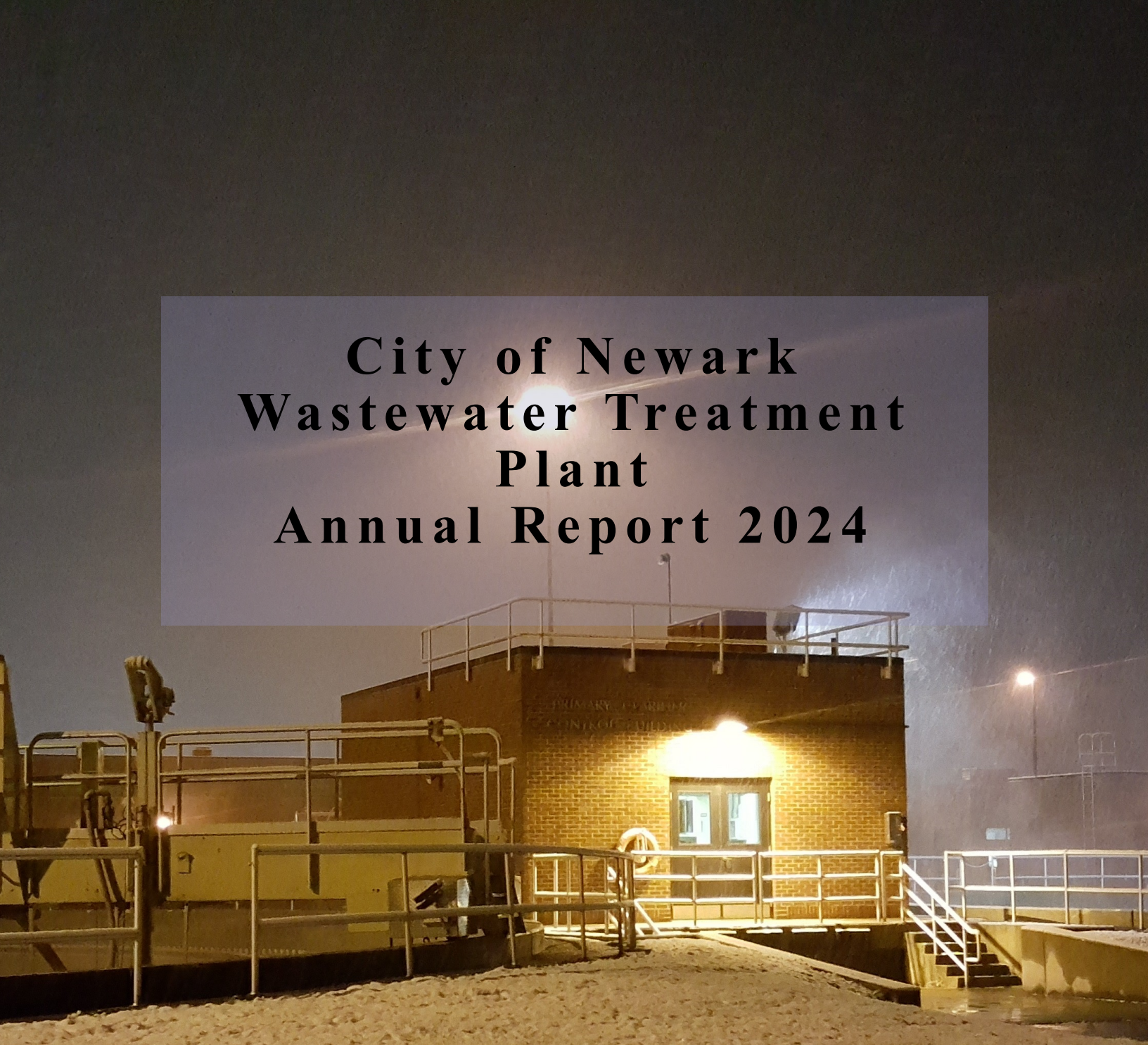
City of Newark Wastewater Treatment Plant Annual Report 2024



Mission: Protect public health and the environment by efficiently treating wastewater, ensuring clean and safe water for our community, and promoting sustainable practices for a healthier future.

Introduction

The Newark Wastewater Treatment Plant exemplifies the City's dedication to meeting community needs while prioritizing environmental protection.

Originally constructed in 1948, the facility has undergone several modifications to better serve residential, commercial, and industrial users. In 1984, facing stricter treatment requirements and a Clean Water Act deadline set by the U.S. EPA for July 1, 1988, the City initiated plans for cost-effective upgrades. Not only was the deadline met, but the project also significantly improved the Licking River's water quality, enhancing both aquatic habitats and recreational opportunities.

Over the years, the plant has continued making major capital improvements. Notable projects completed in 1999 and 2000 included the construction of a new Influent Screen Building and the implementation of a Supervisory Control and Data Acquisition (SCADA) system. The Screen Building introduced fine screening and advanced waste processing for disposal, while the SCADA system provided real-time operational data, allowing for more precise and efficient plant management.

Further advancements were made in 2007 with the completion of the Electrical Switchgear and Substation/Septic Receiving Projects. The new septic receiving unit features an automated screening and compaction system, along with a swipe-card-controlled truck scale that streamlines waste tracking and billing. Additionally, a new Electrical Building was constructed to house the switchgear and the plant's existing generator.

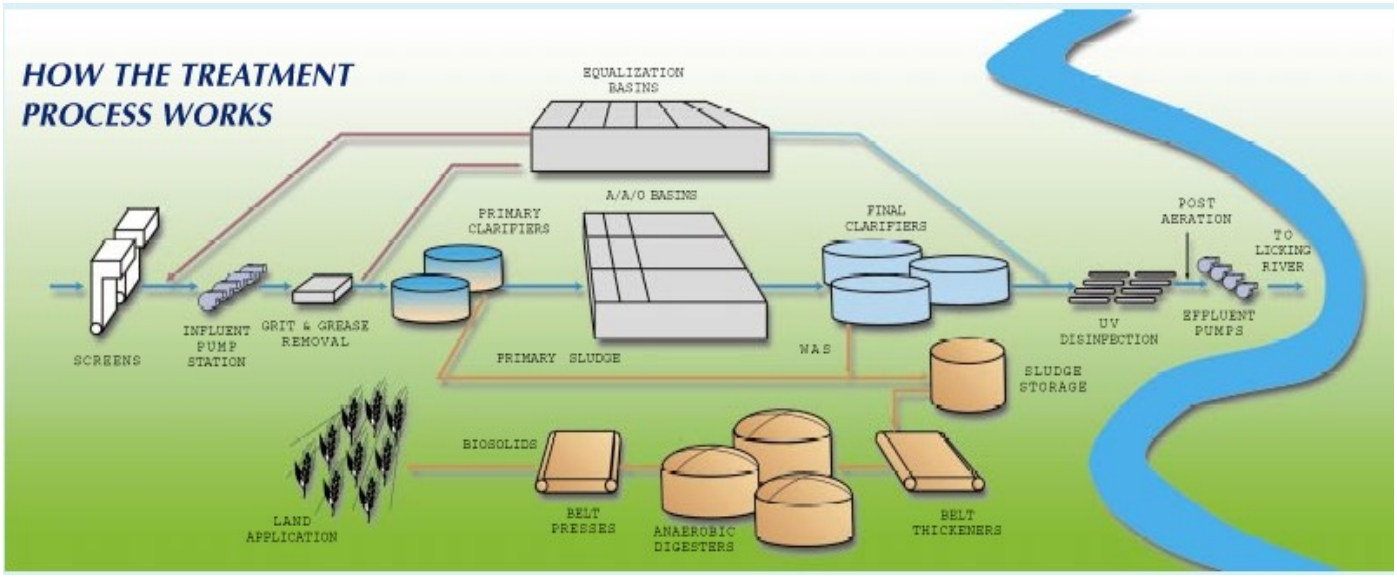
In 2006, the Licking River Interceptor Project was completed. This included a new 54-inch interceptor and two siphons at the confluence of the North and South Fork Licking Rivers. Combined with the existing 42-inch sewer line, these improvements increased flow capacity during rain events, reducing Combined Sewer Overflows (CSOs) in alignment with EPA regulations. Ongoing efforts to separate and eliminate CSOs led to the construction of a $25 million high-rate treatment (HRT) system on the west side of the plant. Operational since early 2011 and substantially completed in 2012, the project received a $5 million ARRA stimulus grant.

Additional upgrades followed, including:

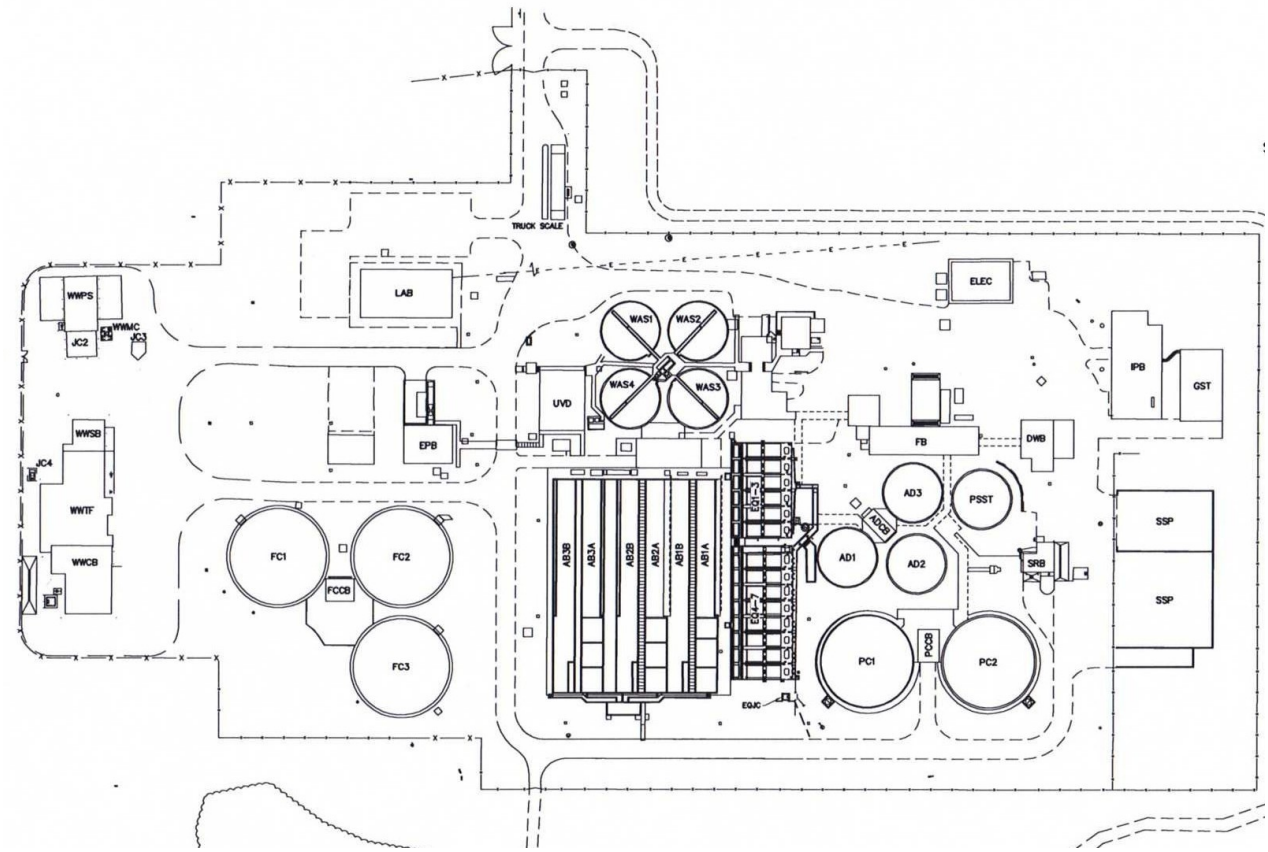
- **2013-2014:** Aeration blowers and diffusers were modernized for increased efficiency, reducing energy consumption while ensuring full treatment capacity during generator operation.
- **2017:** A solar array was installed to provide renewable energy for the plant.
- **2020:** The Anaerobic Digesters project was completed, replacing lids with concrete covers and installing new heating, mixing, and electrical systems. These improvements enhance waste reduction while optimizing the reuse of nutrient-rich biosolids for land application on local farms.
- **2022:** The Ultraviolet (UV) Disinfection System was replaced after 24 seasons of operation. The new Trojan Signa unit requires 60% less electricity and is easier to maintain than its predecessor.

Through continuous investment in infrastructure and technology, the Newark Wastewater Treatment Plant remains committed to providing efficient, environmentally responsible service to the community.

The diagram below illustrates the wet stream and solids handling processes of the treatment plant:

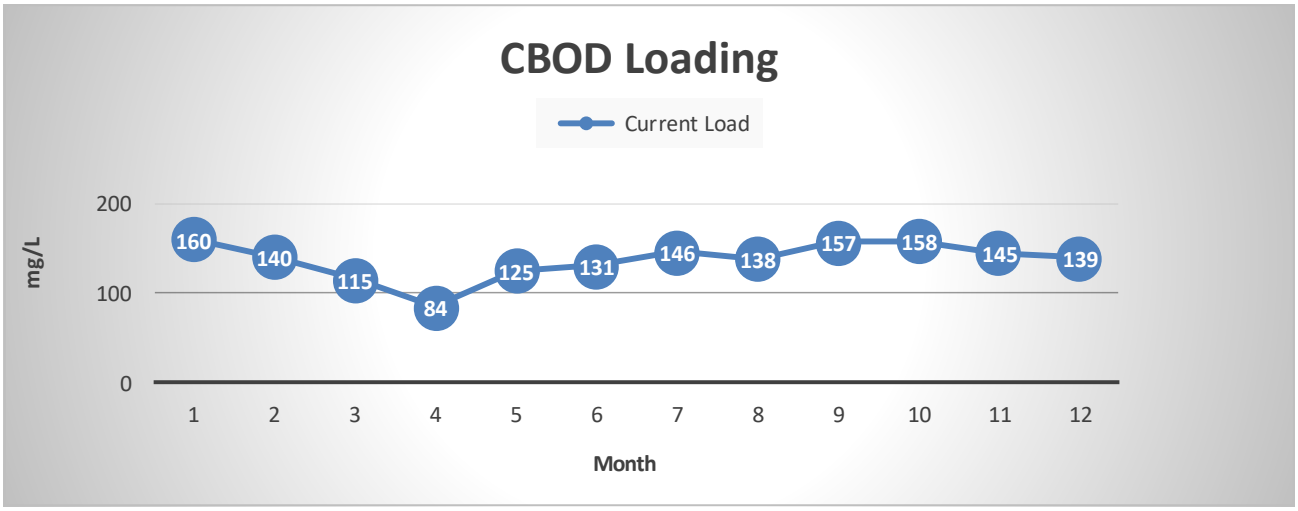


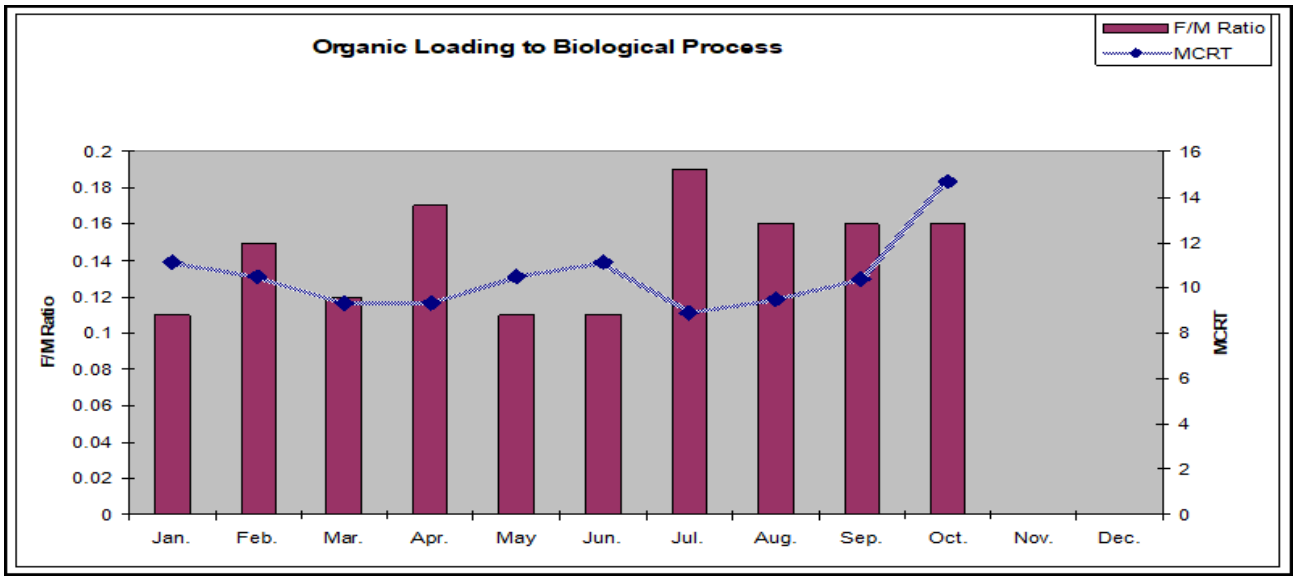
The following diagram represents an actual plant overview:

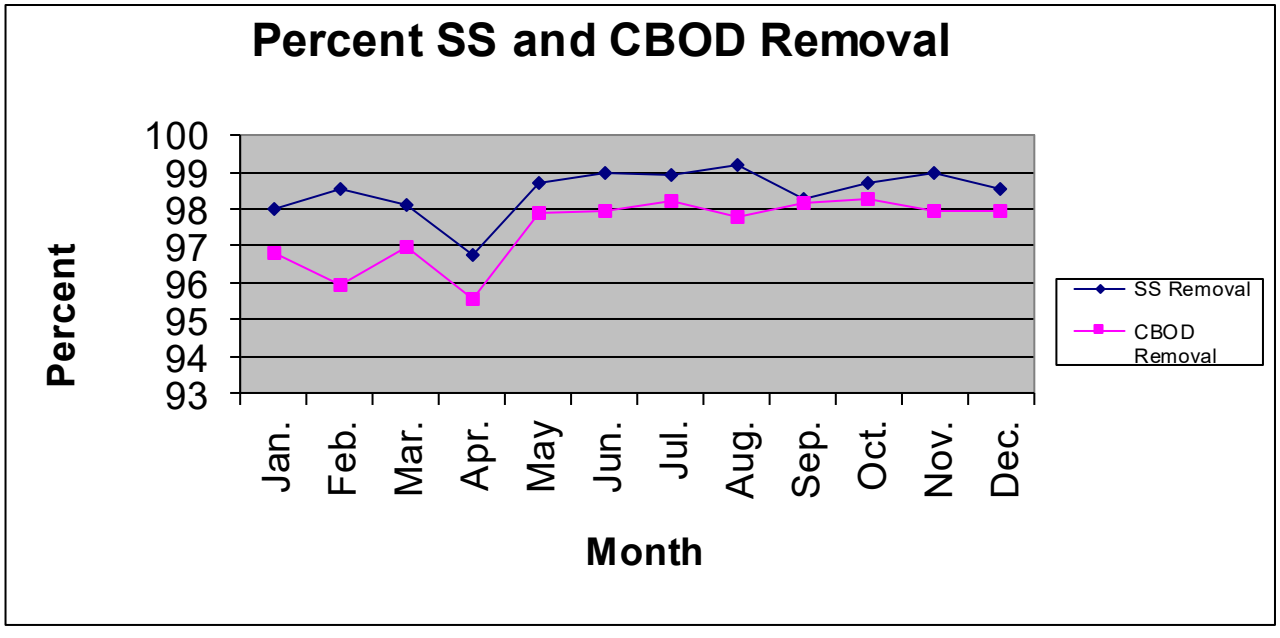


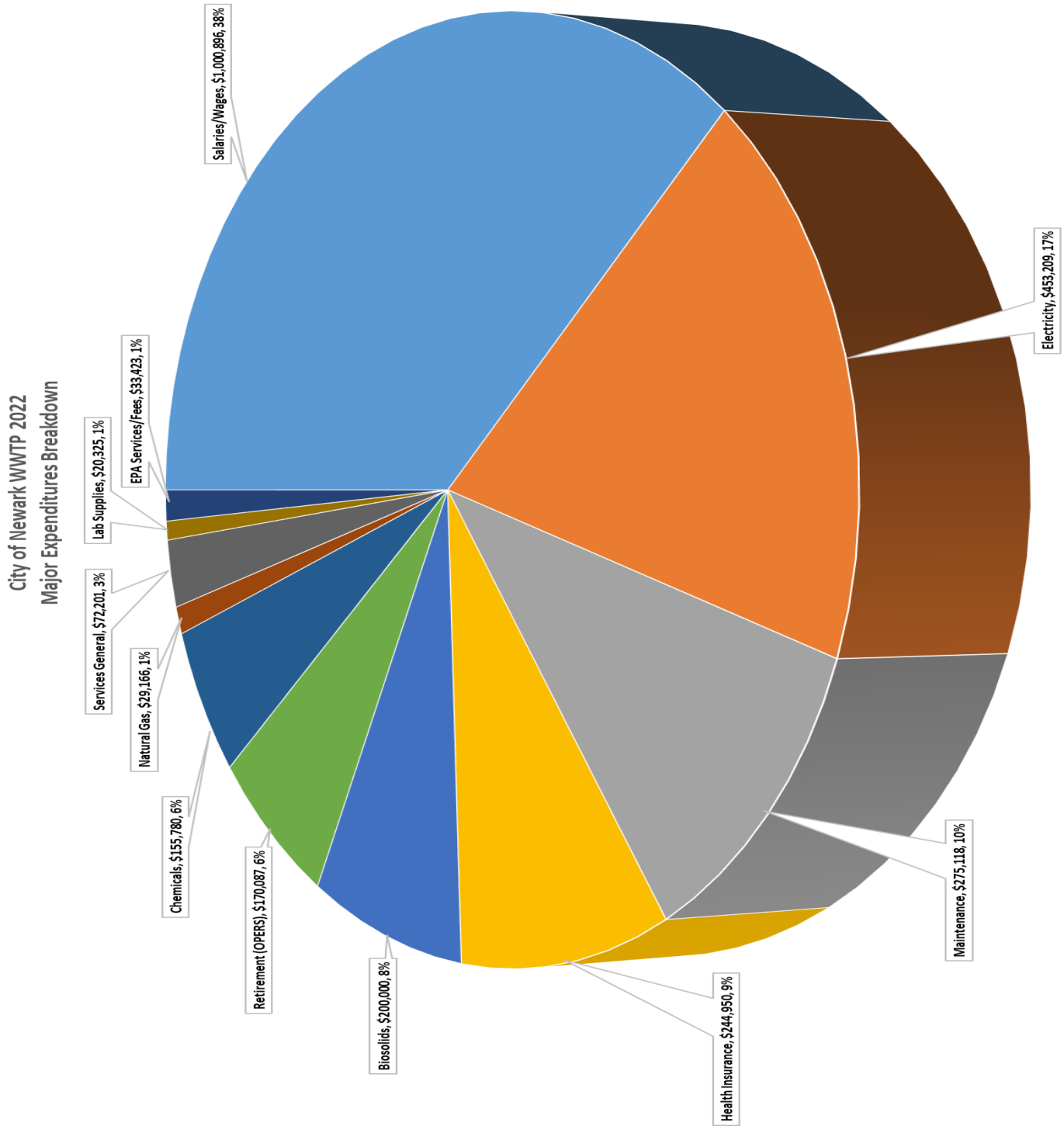
	Effluent Flow Totalizer (MG)	Effluent Flow Daily Average (MGD)	Influent TSS (MG/L)	Settled TSS (MG/L)	Effluent TSS (MG/L)	TSS Removal (%)
January 2024	242.1	7.81	153.67	62.50	3.08	97.99
February 2024	202.512	6.98	167.85	62.00	2.45	98.54
March 2024	245.924	7.93	136.83	54.50	2.63	98.08
April 2024	374.191	12.47	147.00	56.33	4.78	96.75
May 2024	255.559	8.24	145.17	48.83	1.91	98.69
June 2024	212.607	7.09	149.00	85.67	1.51	98.99
July 2024	192.583	6.21	140.00	54.46	1.50	98.93
August 2024	189.971	6.13	176.33	64.50	1.43	99.19
September 2024	174.02	5.80	223.17	55.67	3.90	98.25
October 2024	207.91	6.71	216.92	46.67	2.78	98.72
November 2024	216.316	7.21	218.83	48.50	2.26	98.97
December 2024	243.65	7.86	148.83	46.50	2.18	98.53

	Influent cBOD (MG/L)	Settled cBOD (MG/L)	Effluent cBOD (MG/L)	cBOD Removal (%)	Influent Ammonia (MG/L)	Effluent Ammonia (MG/L)	Ammonia Removal (%)	F:M Ratio
January 2024	159.70	108.18	5.13	96.79	13.96	2.65	97.26	0.12
February 2024	140.49	90.25	5.69	95.95	15.43	3.88	95.96	0.09
March 2024	115.17	73.50	3.51	96.96	13.04	2.27	97.66	0.07
April 2024	84.45	68.16	3.76	95.55	6.65	0.43	99.55	0.08
May 2024	125.08	79.28	2.65	97.88	10.46	0.18	99.81	0.07
June 2024	130.58	104.71	2.70	97.93	12.78	0.24	99.76	0.09
July 2024	145.68	106.73	2.63	98.20	14.21	0.33	99.66	0.10
August 2024	138.00	119.54	3.07	97.77	14.48	0.31	99.68	0.11
September 2024	157.33	95.92	2.89	98.16	16.92	0.42	99.57	0.10
October 2024	157.58	77.56	2.77	98.24	13.36	0.71	99.28	0.07
November 2024	145.25	76.54	3.02	97.92	14.63	0.19	99.80	0.07
December 2024	138.75	78.38	2.83	97.96	13.88	0.63	99.36	0.06


CBOD Loading
Current Load
mg/L
200
100
0
160
140
115
84
125
131
146
138
157
158
145
139
1
2
3
4
5
6
7
8
9
10
11
12
Month


Organic Loading to Biological Process
F/M Ratio
MCRT
F/M Ratio
MCRT
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
16
14
12
10
8
6
4
2
0
Jan.
Feb.
Mar.
Apr.
May
Jun.
Jul.
Aug.
Sep.
Oct.
Nov.
Dec.


Percent SS and CBOD Removal
Percent
100
99
98
97
96
95
94
93
Jan.
Feb.
Mar.
Apr.
May
Jun.
Jul.
Aug.
Sep.
Oct.
Nov.
Dec.
Month
SS Removal
CBOD Removal


City of Newark WWTP 2022
Major Expenditures Breakdown
Salaries/Wages, $1,000,896, 38%
Electricity, $453,209, 17%
Maintenance, $275,118, 10%
Health Insurance, $244,950, 9%
Biosolids, $200,000, 8%
Retirement (OPERS), $170,087, 6%
Chemicals, $155,780, 6%
Natural Gas, $29,166, 1%
Services General, $72,201, 3%
Lab Supplies, $20,325, 1%
EPA Services/Fees, $33,423, 1%

Human Resources: To maintain a highly skilled and motivated workforce that is well-trained and informed to operate the plant efficiently and effectively.

Position	Name	Years of Service
Industrial Waste Inspector	Randy McDaniel Class II Water Reclamation Operator	36.8
Chemist	Nancy Taylor Class III Water Reclamation Operator Class IV Lab Analyst	34.8
Instrumentation Technician	Jeff Krauskopf Class I Water Reclamation Operator	32.5
Maintenance Supervisor	Jay Fisher Class I Water Reclamation Operator	22.3
Laboratory Technician	Angela Reischman Class II Lab Analyst	20.1
Maintenance Mechanic/ Operator	Fred Nance	14.1
Facilities Manager	Scott Knighton Class IV Water Reclamation Operator	12.3
Electro-Mech. Technician	Keith Doles	9.8
Assistant Facilities Manager	Eric Mitchell Class III Water Reclamation Operator Class II Water Operator	8.8
Operator	Chris Robison Class I Water Reclamation Operator Class I Water Operator	5.5
Operations Technician/ Operator	Christopher Sims Class III Water Reclamation Operator	5.5
Operator	Colton Curry	4.0
Operator	Gay Dornbirer Class I Water Reclamation Operator	3.6
Operator	Ben Petersheim	2.0
Operator	Jaden Blosser	0.3
Operator	Cornelius Gray	0.1

Operations: To maximize the efficiency of the wastewater plant while achieving the highest level of treatment our facility can provide.

Trojan Signa UV Disinfection

As indicated by the data on page 4, the treatment operation maintained full compliance in removing CBOD, ammonia, and suspended solids while successfully treating over 2.7 billion gallons of wastewater.

Our wastewater treatment plant employees are the backbone of our community's health and environmental sustainability. Their dedication, expertise, and tireless efforts ensure that our water systems operate efficiently, protecting public health and preserving natural resources. Through their hard work, they maintain complex treatment processes, respond to challenges with professionalism, and uphold the highest standards of safety and compliance. Their commitment to innovation and continuous improvement helps our facility run smoothly, meeting regulatory requirements while safeguarding the environment. We deeply appreciate their resilience, teamwork, and unwavering dedication to this critical service, which benefits every resident and business in our community.

Projects Completed in 2024

- Replaced #4 influent pump motor
- Repaired 2 sludge storage mixers
- Replaced administration building HVAC unit
- Installed new NPW flow meter
- Replaced #3 aeration tank mixer
- Replaced grit transfer pump motor
- Installed spray bars for dewater belts
- Replaced downstream level indicator in Screen Building
- Replaced shorted out wiring going to aeration basins

2025 Projects List

- Replace dewatering well pump
- Replace #1 influent pump wear rings
- Continue painting projects
- Continue replacement of aging equipment
- Repair concrete throughout the plant site
- Complete Master Plan Study for the Wastewater Plant
- Upgrade security and process control cameras throughout the plant
- Replace aging Fire Alarm System
- Upgrade dissolved oxygen sensors
- Install new Grit Pump
- Replace influent sampler
- Replace exhaust fan and rooftop unit on dewater building

Environmental Laboratory and Industrial Pretreatment

- *To provide accurate and timely data for plant operational control, industrial pretreatment monitoring and regulatory reporting*

- *To ensure industrial facilities discharging to the Newark WWTP comply with local, state and federal*

Highlights of 2024

The Newark Environmental Lab continues to provide data for WWTP process control, provide industrial surveillance, monitor discharge of a defunct City Landfill on Watson Rd., and enable investigative studies of the collection system. In 2024, a total of 20,229 lab tests were performed in-house. The following shows sample type, and number of analyses (including replicates).

- Quality Control 4015
- Process Control 7938
- Industrials 7359
- River 192
- HRT 221
- Landfill 252
- Benchscale Digester 252

Per OEPA, the recommended Quality Control analysis rate should be at least 10%. The Newark Environmental Lab exceeded that benchmark by producing a QA/QC rate of 24.76%

DMR-QA Study 44

In 2024, the Newark Environmental Laboratory participated in USEPA's DMR-QA Study 44. This mandatory laboratory proficiency study uses a single blind approach by sending participating laboratories samples of known value for various parameters. The Study Provider knows the value of each standard, but the participating laboratories do not know the value prior to analysis. After analysis, the labs submit the results for grading. A total of 31 parameters are required of the City of Newark based on pollutants listed in our NPDES permit. Analysis of the DMRQA samples occurs by the laboratory routinely responsible for each parameter reported to OEPA on the WWTP's monthly operating report. Newark uses a combination of in-house testing as well as contract labs to compile all the monitoring required by our NPDES Permit. Parameters routinely analyzed in-house include: E. coli, Hexavalent Chromium, 5-day cBOD, Hardness, Total Dissolved Solids, Ammonia as Nitrogen, Orthophosphate as P, Total Phosphorus as P, Total Suspended Solids, Oil and Grease, and pH. Other parameters required by our NPDES permit include metals, biomonitoring, cyanide, and nitrates. This additional testing is performed by our contractors.

In 2024. all of the parameters required by the DMRQA Study, both in house and contracted, were graded as "acceptable" for accuracy.

Industrial Pretreatment Program

The Newark Environmental Lab analyzed 1,870 industrial samples for various parameters as part of the City of Newark's Industrial Pretreatment Program. This Program is mandated by the Code of Federal Regulations, and is designed to protect the WWTP from toxicity that could be discharged from our industrial users. Toxic loads can kill off the bacteria used to treat wastewater at the WWTP, resulting discharge of untreated sewage to the Licking River.

Large industrial users can also discharge high amounts of treatable waste, so each industry that has a significant discharge to the City's sewer is billed based on pounds of cBOD, Solids, and Ammonia that are present in their wastewater. This bill is in addition to the standard water and sewer bill that all customers pay based on cubic feet of water used. While these parameters are present in all wastewater, even residential sewage, industrial contributions that are higher than the residential "background" levels can increase the amount of money required to effectively treat these waste streams.

Generally speaking, increased cost translates into more electricity required to achieve effective aeration, as well as increased trucking costs to haul biosolids (the end product of treatment) offsite. By billing industries for the pounds of "high strength" wastewater each discharges, the City can recoup some of the cost of treatment in a fair and consistent manner. In 2024, $327,221.70 was generated through Surveillance and Surcharge Fees to offset some of the increased cost of treatment.

Each industry is also charged a flat surveillance fee based on the number of times samples are collected at each facility. Frequent sampling of each significant industrial user helps to establish a waste profile of each industry's "baseline" discharge. Any departures from baseline are usually detected promptly and appropriate action is taken before the WWTP experiences a problem.

Changes at the Industries

Tamarack has eliminated production of cultured products (yogurt, sour cream-based dips, and cottage cheese), and is adding coffee creamer to it's production line. Additional construction at the facility was required to accommodate new storage tanks for canola oil and sucrose, as well as new manufacturing equipment. This construction also re-routed plumbing, and allowed the City to select a new sample point that is comprised of only industrial wastewater. The previous sample point was a mix of sanitary waste and industrial water. Coffee creamer production should commence in mid 2025, and Tamarack's TSS and cBOD concentrations will most likely increase.

International Paper experienced a sewer pipe collapse that stopped almost all wastewater flow from the facility. After inspection of the cave in, IP determined the best course of action was to abandon the existing pipe, and re-plumb the wastewater discharge to another point on the property. A new oil and water separator was installed, and the City's sample point was moved to collect wastewater from the discharge of the new separator.

Buckeye Linen had some issues with the structure of it's building, prompting the Fire Marshall to prohibit occupancy on the factory floor. This forced Buckeye Linen to cease operations during the second quarter of 2024 until the structure was reinforced per the Fire Marshall's requirements. Full production resumed after this problem was addressed.

Staffing Changes at WWTP

The Industrial Pretreatment Program saw some personnel changes in 2024. Long-time employee Randy McDaniel, the Industrial Waste Inspector, chose to retire after 36 years with the City of Newark. Randy has been a tremendous asset to the Industrial Pretreatment Program, and will be missed. His years of knowledge, attention to detail, and well-known ability to create innovative solutions for tough sampling situations in the field has made him a highly valued employee. Randy was well-liked by co-workers as well as personnel at the various industries that he sampled throughout Newark.

In 2024, Eric Mitchell, was promoted from the Operations Technician position to Wastewater Facilities Assistant Manager. Plant Operator Chris Sims has become our new Operations Technician, and is in the process of learning Sample Collection, Laboratory Techniques, and other various duties that he will be managing in his new job.

After careful consideration, the decision was made to abolish the job title of Industrial Waste Inspector, and fill the position with a second Operations Technician. This will allow more flexibility when extra personnel are needed throughout the various areas of our facility; industrial sampling, laboratory, maintenance, and operations.

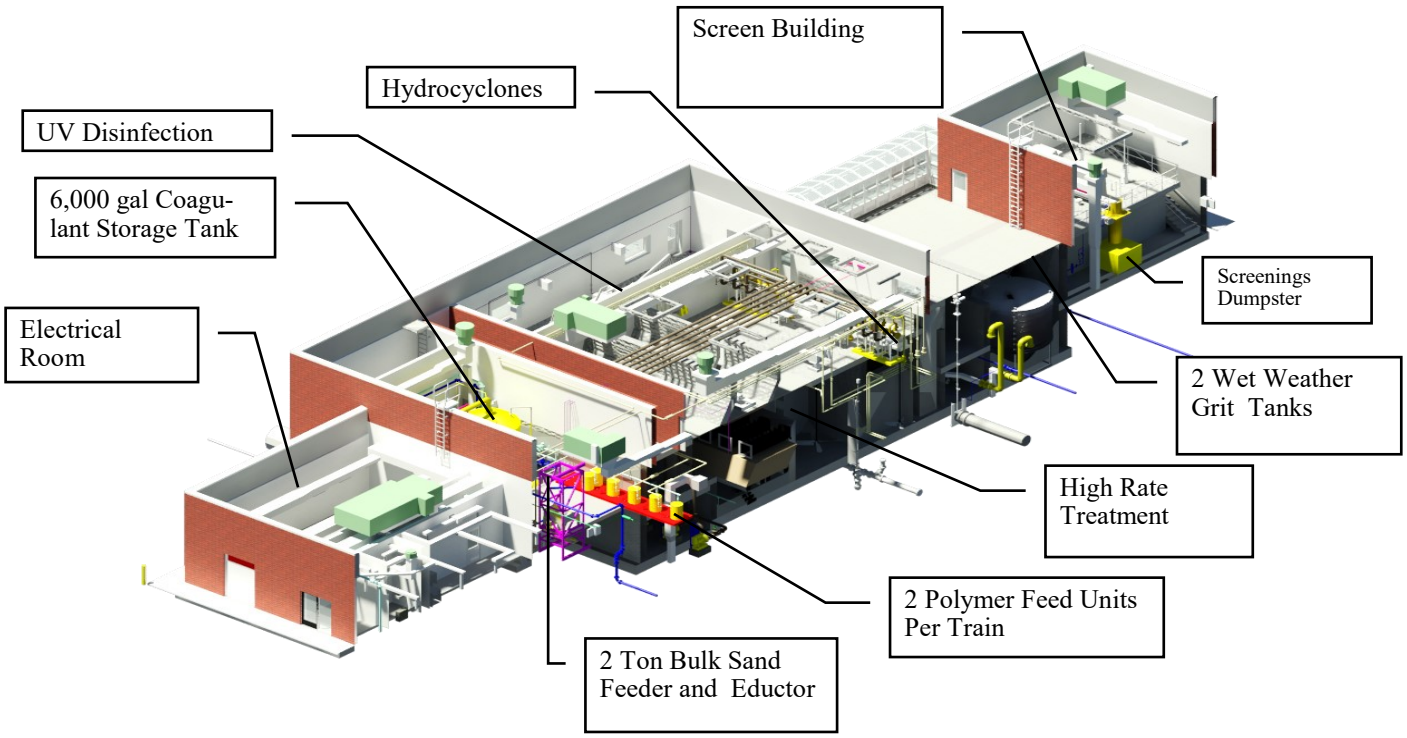
Randy McDaniel Filling Out Bench Sheets

2024 Completed Project List

- Ran extra samples for a phosphorus reduction study that used dust suppressor as a carbon source for our WWTP bacteria
- Switched Total Phosphorus and Ortho Phosphorus analysis from wet-chemistry ascorbic acid method to Hach TNT Vial method
- Added an additional sampler and three batteries to our sampling equipment inventory
- Began gathering data for the Master Plan Project. Additonal samples include Phosphorus (total and ortho), COD, Ammonia, and cBOD analyses of Plant Influent, Primary Clarifier Effluent, Plant Effluent, Thickener Belt Recycle, and Press Dewater Recycle wastestreams
- Continued employee training
- Continued inventory control program
- Identified other laboratory equipment that will be replaced as funds become available
- The Digester sampling frequency was reduced from three times per week to twice a week. This change reflects the stability we have seen with the digestion process within our plant, allowing minimal monitoring
- An OEPA Audit of Newark's Pretreatment Program was completed in September 2024. This audit consisted of a file review of Anomatic, Tamarack, and MPW to ensure all paperwork was in place, and OEPA's Pretreatment Program requirements were fulfilled

Goals for 2025

- Change E. coli analysis from the membrane filter method (direct count of CFU's) to the Most Probable Number method using the IDEXX system. The cost of mTEC agar used in the membrane filter method has increased significantly in recent years
- Continue employee training
- Replace Industrial Waste Inspector position with an Operations Technician
- Dispose of more hazardous chemical waste generated from lab operation, including FAA source lamps
- Continue inventory control program
- Continue with equipment replacement plan
- Continue updating SOPs, benchsheets and Quality Assurance Plan as needed
- Update Pretreatment Enforcement Plan
- Update sections of the Sewer Use Ordinance for July 2025 review



High-Rate Treatment

Our High-Rate Treatment facility began partial operations in 2011 while still under construction and was fully completed in 2012. This system treats wet weather flows that have been redirected here following planned improvements to the collection system. Previously, during heavy rainfall, when the collection system exceeded its capacity, excess flow was discharged directly into the river. To comply with EPA requirements to reduce these overflows, we now treat excess flows using a high-rate treatment system. This process includes influent pumping, screening, grit removal, coagulation and flocculation, disinfection, and the discharge of up to 28 million gallons per day of treated water into the Licking River.

Through the dedication and collaboration of our entire team, we are committed to making this facility a successful and effective operation.

Final Comments from the Facilities Manager:

This past year, we successfully completed numerous upgrades to the treatment plant while also maintaining our existing equipment. In the year ahead, we remain committed to upholding the high standards we have come to expect, while also preparing for the anticipated growth in our region. The dedication of the Wastewater Treatment staff ensures that clean, recreational water is returned to the Licking River.

Why do we invest so much time and effort in treating used water? After all, isn't water abundant? While three-quarters of the Earth's surface is covered by water, only 3% of it is freshwater. To make matters even more concerning, 77% of that freshwater is locked away in polar ice caps and glaciers, while another 22% exists as groundwater. This means that only a tiny fraction of the world's water is readily available for human use. We cannot afford to treat water as an infinite resource—it is a finite, precious necessity that requires careful stewardship.

Through the proper operation of its wastewater treatment plant, the City of Newark plays a small but vital role in safeguarding the nation's water supply. Preventing pollutants from entering local waterways helps protect water quality for both current and future generations. We must never take this invaluable resource for granted. As we move forward, our commitment to protecting and preserving water remains steadfast. The employees of the City of Newark Wastewater Treatment Plant can take pride in their achievements in 2024 and look ahead to the challenges and opportunities of preserving our water resources in 2025.

-Scott Knighton
Wastewater Facilities Manager