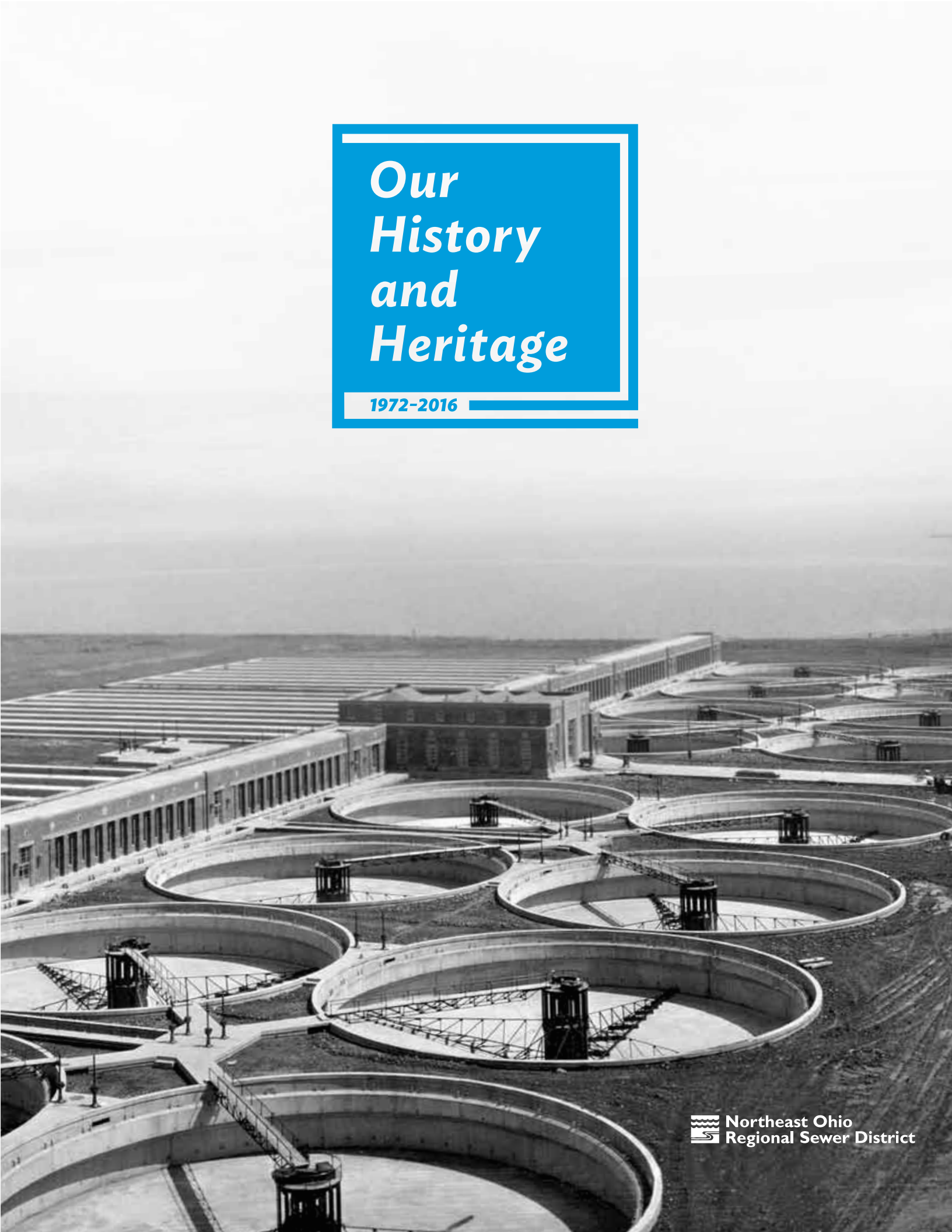
Our History and Heritage

1972–2016



Northeast Ohio Regional Sewer District

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Northeast Ohio Regional Sewer District:
Our History and Heritage 1972-2016

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FRONT COVER: Easterly Wastewater Treatment Plant
BACK COVER: Planting plan for one of the Sewer District's Green Infrastructure projects

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CORE VALUES

Lake Erie, Cleveland

The History of Providing Clean Water in Northeast Ohio

This first section is not just an overview of the District's history, but of wastewater treatment's evolution in greater Cleveland since the city's incorporation in 1836. At that time, civic leaders were satisfied with discharging raw sewage into Lake Erie and the Cuyahoga River simply to divert it away from public scrutiny.

But as people continued to settle in Cleveland, growing amounts of sewage began to mix with the same water that citizens drew from for drinking. The combination was deadly, causing water-borne illnesses that claimed hundreds of lives. The shocking number of fatalities encouraged the development of the wastewater-treatment process, which put an end to the disease and suffering.

The District's debut occurred in a different context, however. In the late 1960s, evidence that Cleveland's industrial prosperity had resulted in environmental neglect reached a breaking point. Burning rivers were only one sign of society's collective abuse of area waterways. Water quality deteriorated to the point that it could no longer be ignored. Under these circumstances, the Regional Sewer District was created.

Where there is water, there is life; a great industrial city is born

The Cuyahoga River and Lake Erie were the two primary features that led Moses Cleaveland to stake land at the mouth of the Cuyahoga in 1796. Along with the low banks, dense forests, and high bluffs, Mr. Cleaveland felt these features presented an ideal location for the capital city of the Western Reserve. Given the extent to which the village of Cleveland developed and prospered, history has proven Mr. Cleaveland an accurate visionary.

The business district of our early city exploited the river, where steamers, schooners, and canal boats exchanged imports and exports. The steel industry took off, and John D. Rockefeller began his oil empire on the shores of Lake Erie. Prosperity ensued, but polluted waters followed close behind.

Until 1856, most Clevelanders got their water from springs, wells, and cisterns, or in barrels filled with water from area waterways. Then city leaders built a new public water system to supply unfiltered Lake Erie water to a limited portion of the city. Twenty years later, the sewage and filth of a growing city added to the problem of industrial waste, thereby turning the water supply into a health risk. Several times, the intake pipes were relocated farther from the shoreline and sewer outlets to reduce the incidence of typhoid fever and other water-borne diseases, but the benefits of those changes were short-lived.

As early as 1881, Mayor Rensselaer Herrick declared Cleveland's riverfront "an open sewer through the center of the city." Despite a lack of public support, there began a series of public works to improve the quality of Cleveland life, including the construction of a public water system and drainage sewers.

One of the first sewer pipes that transported waste to the lake was the Easterly Interceptor (constructed in 1905), which ran parallel to the lake shore. At this time, the Cuyahoga River had 50 sewers emptying into it, along with a large quantity of manufacturing waste.

Lake Erie and the Cuyahoga pay the price

Until 1911, officials intended to ultimately collect sewage from the entire city in the Easterly Interceptor and discharge it into the lake, untreated. In 1911, city officials seriously considered the lake's future. They had doubts about the economy and wisdom of transporting sewage many miles from the westerly and southerly portions

Aerial view of Cleveland, 1937

of the city to the main easterly outlet, especially if the sewage required treatment. They hired R. Winthrop Pratt to conduct a study of water supply and sewerage for the area *(see page 34)*. As a result of the study, they decided to collect and treat sewage and industrial waste from four general districts: Westerly, Easterly, Southerly, and Low Level. These districts were the forerunners of today's Westerly, Easterly, and Southerly service areas.

City officials decided to test the various methods of sewage treatment. Accordingly, the Easterly Sewage Testing Station was established on the shore of the lake, next to the Easterly Interceptor outlet. Officials wanted to use this test site to determine the most effective method of treating the sewage so it could be safely discharged into the lake without causing unsanitary and unsightly conditions. Processes tested included hand-cleaned bar screens, grit chambers, sedimentation basins, roughing and trickling filters, and sludge-treatment tanks.

Design and construction of full-sized preparatory works with chlorination facilities and a second submerged outfall for Easterly began in 1919. The plant was completed and began operation in 1922. That same year, the Westerly Wastewater Treatment Plant began operating as a primary treatment facility, followed by the Southerly Wastewater Treatment Plant in 1927. By 1930, Westerly and Southerly had been upgraded to provide higher levels of treatment, and the Easterly plant had become the subject of additional studies. With the intake for the proposed Nottingham water filtration plant just four miles from Easterly's outfall, considerable improvement in the

plant's treatment capacity was necessary. The result was upgrading Easterly to become Cleveland's first activated-sludge plant, which went online in 1938.

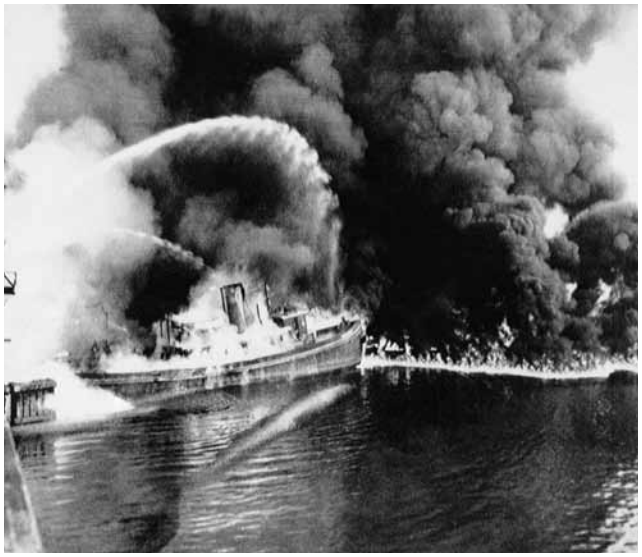
Because Easterly was adjacent to the affluent community of Bratenahl, sludge from the plant was pumped to the Southerly plant for treatment. A 13-mile pipeline that ran under the City of Cleveland transported the sludge from Easterly to Southerly. The treatment plants were further upgraded and expanded through the years, with major improvements at Westerly in 1932, 1937, and 1956, and upgrades to Southerly in 1930, 1938, 1955, and the early 1960s. Because of the comprehensive nature of its initial design, Easterly remained substantially unchanged until the late 1970s.

Despite these improvements over the next four decades, not enough was done to adequately treat wastewater in a booming industrial city. Compounding matters, no industrial discharge regulations existed. The increased production and use of persistent toxic chemicals during and after World War II raised environmental concerns beyond those that accompanied the industrial and sewage pollution of earlier years.

Forewarned by Rachel Carson's 1962 book *Silent Spring,* which stated that chemicals such as DDT accumulate in the food chain and cause reproductive and developmental health defects, local members of the League of Women Voters helped form the League's Lake Erie Basin Committee in 1963 to educate the public about such threats. Nevertheless, during the 1960s and early 1970s, the cumulative effects of neglect reached a new low.

The infamous river fire sparks environmental awareness and the birth of the District

Then, on June 22, 1969, it happened. After enduring years of abuse, the Cuyahoga River caught fire and thrust Cleveland into the national spotlight. The 1969 fire was benign compared to previous incidents—a 1912 blaze that killed five men and a fire in 1952 that resulted in $1.5 million worth of damage to surrounding structures and water vessels. Comparatively, the 1969 fire on the Cuyahoga caused just $85,000 in damage and no fatalities, but timing, as they say, is everything. In 1969, the Cuyahoga's burning captured the public's imagination and ignited a growing environmental movement. More than a century after the river's pollution was first noted, it became an international symbol of environmental neglect.



One of several Cuyahoga River fires, in 1952. The 1969 fire became a symbol of environmental neglect.

Cleveland Mayor Carl Stokes, a long-time advocate for environmental responsibility, criticized the federal government and vowed to fight for a cleaner river. The August 1, 1969, issue of *Time* magazine detailed Stokes's fury in an article about the river's burning titled "The Price of Optimism." Even the Federal Water Pollution Control Administration reported that the lower Cuyahoga had "no visible life."

Congress had to do something about the sorry condition of America's water systems. In 1970, a groundbreaking piece of environmental legislation, the National Environmental Policy Act (NEPA), passed in Congress, helping to establish the Environmental Protection Agency (EPA). In 1972, Congress passed the Federal Water Pollution Control Amendments, which formed the basis for what would become the Clean Water Act of 1977.

The objective of the Act was to restore and maintain the chemical, physical, and biological integrity of the nation's waters. To achieve this objective, the Clean Water Act set two national goals. The first was to eliminate the discharge of all pollutants into the navigable waters of the United States by 1985. The second goal was to achieve an interim water quality that would protect fish, shellfish, and wildlife and recreation by July 1, 1983. Within this framework, Congress gave the EPA administrator the legal tools to help advance water-pollution control, while continuing to recognize the primary rights and responsibilities of the states to prevent, reduce, and eliminate pollution.

DISTRICT TIMELINE

1969

Cuyahoga River fire on June 22 focuses national attention on Cleveland's pollution problems.

1970

Congress passes the National Environmental Policy Act.

Ohio Water Pollution Control Board (predecessor of the Ohio EPA) files a court action against the City of Cleveland claiming inadequate and improper disposal of wastewater.

1971

Congress passes the Safe Drinking Water Act.

Suburbs, concerned about pending sewer rate hikes, join in the suit against Cleveland.

1972

Federal Water Pollution Control Amendments (which will lead to the 1977 Clean Water Act) pass to improve water quality.

Ohio EPA established.

United States and Canada sign the Great Lakes Water Quality Agreement.

Judge George J. McMonagle's April 4 court order outlines the formation of the Cleveland Regional Sewer District (CRSD).

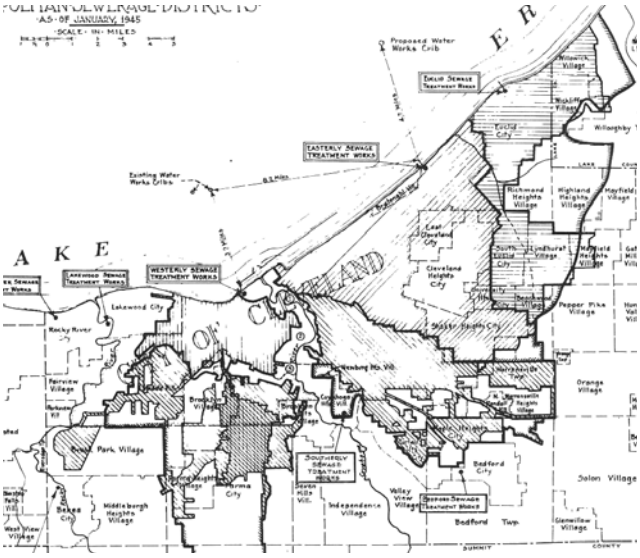
Bonds sold for $29.8 million to purchase three treatment plants and large interceptor sewers.

First CRSD Board of Trustees' meeting, in July.

1973

District receives first federal construction grant.

Construction of Northwest Interceptor begins.



Map of Cuyahoga County's "Political Subdivisions and Metropolitan Sewerage Districts," 1945

It was in this national context that the Regional Sewer District was created—but local politics and government also played a formative role in the District's birth.

Local influences leading to the District's creation

The City of Cleveland, which owned the three treatment plants and the major interceptors conveying sewage to them, had begun charging connected communities for sewage treatment in 1938 to help pay for improvements. Cleveland charged suburban customers higher rates, reasoning that the suburbs were benefiting most from the expanding sewer system. Over time, the suburbs complained about the price inequity. In the late 1960s, the State of Ohio began to demand improvements to the city's sewage disposal operation to reduce pollution in the Cuyahoga River and Lake Erie.

The suburbs owned their local sewage collection systems, most of which fed into Cleveland's interceptors. Several of them refused to pay for their share of improvements unless Cleveland relinquished their rate-setting and absolute control over sewage disposal. Some suburban communities believed they weren't getting good service from Cleveland and were no longer willing to have their residents pay the higher rates. The treatment facilities owned by the city continued to decline, accelerated by the overall lack of revenue needed to make improvements.

This lack of action by the City of Cleveland and the

suburbs resulted in the inability of the Division of Water Pollution Control (a department within the City of Cleveland) to adequately treat wastewater flows in the area, which in turn posed a threat to the environment and created problems with the new federal laws and regulations. To prompt action from the city, the Ohio Water Pollution Control Board (OWPCB, later replaced by Ohio EPA) issued a ban on new sewer connections in the City of Cleveland. The City refused to enforce the sewer ban, and the stage was set for confrontation.

On September 3, 1970, the dispute resulted in a lawsuit filed in Cuyahoga County Common Pleas Court. The suburbs and OWPCB challenged Cleveland's control of the system and its adequacy. The OWPCB charged that the City of Cleveland was inadequately treating wastewater at its three facilities, thereby polluting waters of the state. It was also alleged that the City had failed to complete improvements to these facilities and had refused to enforce OWPCB's sewer ban. Cleveland contended that these problems were caused by the increased sewage flows to its plants resulting from growth in the suburban communities, not the City. Cuyahoga County Common Pleas Court Judge George J. McMonagle ordered an injunction in late 1970, and set a hearing for December 1, 1971.

Also in March 1971, several of the suburban communities filed suit against the City of Cleveland, contesting sewage-service rate increases proposed by the City to fund improvements required by the OWPCB. The case was consolidated with the case filed by the State on Cleveland's motion that the suburban communities be joined as parties in the OWPCB's action. The judge extended the sewer ban to include the suburbs. The court then consolidated the two cases and held hearings to resolve the problems at hand.

Future District Executive Director Erwin J. Odeal, who was present as an observer for Three Rivers Watershed District (an environmental agency), recalled, "McMonagle got hold of it and really pushed the case along." After a hearing, the judge decided the matters before the court should be tried shortly thereafter during a two-week trial that included testimony from the Governor's office, Attorney General of Ohio, United States EPA, OWPCB, Regional Planning Commission, Three Rivers Watershed District, Cuyahoga County Commissioners, Citizens League, and a number of other professional organizations and citizen action groups.

Armed with information from Raymond Kudukis, head of Cleveland Mayor Ralph Perk's transition team and future

Judge George J. McMonagle (center) issued the court order that led to the Sewer District's creation.

District Board President, Judge McMonagle advised both parties that Chapter 6119 of the Ohio Revised Code might serve as a model for a regional district. This agency would be governed by its own board of appointed trustees and legal counsel, and would not be directly dependent on any existing governmental entity.

Judge McMonagle was quite a visionary in foreseeing that a regional organization would be the most effective solution to providing wastewater treatment in Northeast Ohio. He had a personal passion for the environment and was a fishing enthusiast who lived by the lake. His dedication to taking care of local waterways was sincere and lifelong.

The problem of Cleveland's equity in the treatment facilities and interceptors was then solved when the newly proposed District agreed to purchase them for $29.8 million. This "equitable adjustment" also allowed Mayor Perk to avoid raising municipal income taxes. The timeliness of this financial agreement, combined with the high cost the City would have had to pay for mandated improvements, led to a negotiated settlement.

Thus, on April 4, 1972, Judge McMonagle ruled that, to best provide for the wastewater treatment needs of Greater Cleveland, steps should be taken to establish a regional sewer district pursuant to Chapter 6119 of the Ohio Revised Code. McMonagle issued a court order instructing the Cuyahoga County Commissioners (as a representative governmental body in the Greater Cleveland area) to file a petition for the creation of a regional sewer district.

DISTRICT TIMELINE

1974

District takes over Sewer Control and Industrial Waste departments from City of Cleveland, as well as operation of Beech Hill, Bonnieview, and Wilson Mills pump stations.

President Ford signs the bill creating the Cuyahoga Valley National Recreation Area.

1976

District's combined sewer overflow (CSO) control system is monitored and operated by a "computer-based real-time data-acquisition system" for the first time.

District assumes control of Laboratory Services at 3090 Broadway Avenue.

First bond sale of $33 million.

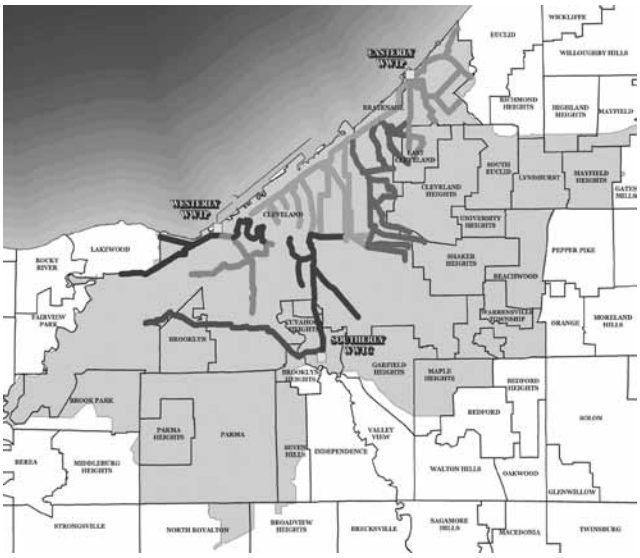
1977

Cuyahoga Valley Interceptor construction begins. The 22-mile-long interceptor carries flow to Southerly upon completion in 1984.

Clean Water Act

1978

$118.5 million bond sale.



Cleveland Regional Sewer District Interceptors and service area, 1972

On June 15, 1972, the Court declared that the Cleveland Regional Sewer District was organized as a subdivision of the State of Ohio.

The Cleveland Regional Sewer District originally served the City of Cleveland and 38 suburban communities. The purpose of the organization, as described in the original Plan of Operation, was "to establish a total wastewater control system for the collection, treatment, and disposal of wastewater within and without the District."

One of the District's first acts was to assume ownership and operation of the City of Cleveland's three wastewater treatment facilities and the existing interceptor system. The next step was to set up an equitable user charge, dividing the Sewer District into Subdistrict I (City of Cleveland) and Subdistrict II (suburban communities). Both subdistricts were to pay the same user charges relating to the operation and maintenance of the treatment facilities, interceptor sewers, and combined sewer overflows. Subdistrict II residents were to pay an additional adjustment, which included debt service for the District on bonds issued to pay the $29.8 million settlement with the City of Cleveland, as well as the local portion of the construction of interceptors serving the suburban communities. Subdistrict I residents would pay an adjustment covering construction costs related to interceptors serving only the City of Cleveland.

A seven-member Board of Trustees representing Cleveland, Cuyahoga County, and the suburbs was given the authority to govern the District and set sewer rates. In

addition to ownership of Cleveland's facilities and control over their operation and financing, the District assumed a regulatory role over all industrial sewage discharges in the District to meet EPA requirements.

The District's early days

From 1972 to 1974, the Cleveland Regional Sewer District employed very few staff. The Board was appointed in keeping with the court order, and Raymond Kudukis served as the first Board President. In turn, the Board appointed Andrew T. Ungar as the first Director of the Sewer District. Along with Ungar, the Board appointed Lucian Rego as General Counsel and Anthony C. Amato as Comptroller (chief finance officer). Thomas W. Cooper was then brought in as the first Chief of Operations, and James P. Harris was hired as Chief Engineer.

These five men served as the first full-time employees of the District, along with Iris Cleveland, who served as Ungar's executive secretary. With the District's upper management firmly in place—and no additional staff—the Sewer District entered into a two-year contract with the City of Cleveland that enabled them to use Cleveland's Operations & Engineering staff.

The Sewer District officers spent their first year in an office at the City of Cleveland Public Utilities Building at 1200 Lakeside Avenue. In 1973, they moved to the Rockwell Building at 801 Rockwell Avenue.

Once their contract with Cleveland expired in 1974, the District hired its own staff. They assumed many of their Cleveland employees would join them, but a number decided to seek employment elsewhere. The District proceeded to change job descriptions and increase responsibilities.

In 1974, the District assumed responsibility for the Sewer Control and Industrial Waste departments from the City of Cleveland, prompting a second wave of upper management hiring. Kenneth A. Pew was brought over from the Clean Water Task Force (a city group housed in the Department of Public Utilities and the Division of Water Pollution Control) to manage Sewer Control. Jim Weber was brought over to handle Industrial Waste and Dale F. Patrick was hired as Assistant Chief of Operations. In 1974, Ungar recruited Erwin J. Odeal from the Three Rivers Watershed District. A young civil engineer, Odeal had extensive knowledge of pollution matters and was instrumental in helping to get the public to understand that "all sewage flows downhill and respects no boundaries."

ORIGINAL MEMBER COMMUNITIES

Beachwood
Bratenahl
Brecksville
Broadview Heights
Brook Park
Brooklyn
Brooklyn Heights
Cleveland
Cleveland Heights
Cuyahoga Heights
East Cleveland
Euclid
Garfield Heights
Gates Mills
Highland Heights
Independence
Lakewood
Linndale
Lyndhurst
Maple Heights
Mayfield
Mayfield Heights
Middleburg Heights
Newburgh Heights
North Randall
North Royalton
Oakwood
Parma
Parma Heights
Richmond Heights
Riveredge Township
Seven Hills
Shaker Heights
South Euclid
University Heights
Valley View
Walton Hills
Warrensville Township
Warrensville Heights

ADDITIONS TO THE SERVICE AREA

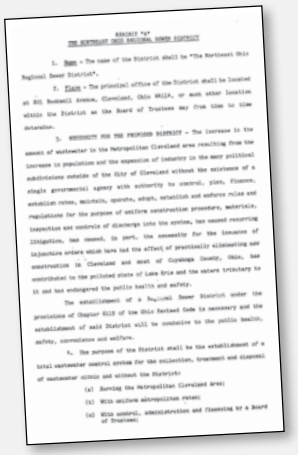
Construction of new interceptors has provided capacity to enlarge the District's service area over the years. In addition to the 38 original communities inherited from the City of Cleveland, the District has accepted flows from these additional municipalities:

Bath Township
Bedford
Bedford Heights
Berea
Boston Heights
Columbia Township
Glenwillow
Highland Hills
Hudson
Macedonia
Northfield
Northfield Center Township
Olmsted Falls
Olmsted Township
Orange
Pepper Pike
Richfield Township
Richfield Village
Sagamore Hills Township
Solon
Strongsville
Twinsburg
Twinsburg Township
Willoughby Hills

DISTRICT TIMELINE

1979

Cleveland Regional Sewer District officially becomes the Northeast Ohio Regional Sewer District.



1980

Cuyahoga Valley Interceptor accepts first flow.

1983

District begins development of first Computerized Maintenance Management System.

Northwest Interceptor becomes fully operational.

1985

Construction begins on Heights/Hilltop and Southwest Interceptors.

Administration office purchase and renovation.

Ohio EPA approves Pre-treatment Program.

1985-87

Great Lakes Water Quality Agreement is revised, requiring the development of Remedial Action Plans in polluted areas. **The Cleveland Harbor in the shipping channel of the Cuyahoga River is one of 43 areas of concern.**

Throughout these changes, the City of Cleveland continued to provide billing services as it does today, except for a few specific communities.

In 1976, the District finally assumed control of Laboratory Services, which was located at 3090 Broadway Avenue. Alex Balazs became the first District lab manager. William B. Schatz, recruited by Ungar and Lou Rego from the City's law department, was very knowledgeable about construction law, and once Rego decided to leave, the Board appointed Schatz General Counsel.

Andrew Ungar left shortly before the District moved administrative operations to the Statler Building in 1980. The Board appointed Lou Corsi as Executive Director and Erwin Odeal as Deputy Director. Corsi had held a number of positions with the City of Cleveland, including Director of Public Utilities.

Federal money helps the District meet federal mandates

The environmental movement spawned by the burning river created the circumstances for federal funding. As part of the Clean Water Act, grant money was offered to eligible wastewater treatment agencies struggling to make the strides necessary to meet newly-implemented water pollution mandates. To secure grant money, wastewater agencies had to develop detailed, cost-effective plans and environmental studies.

"Andy Ungar's main focus was qualifying for federal grant money," explained former Deputy Executive Director Ken Pew. "His attitude was, 'If the feds have money, we need to figure out how to apply and get it first'." In 1974, Erwin Odeal came in, and with his staff further helped secure federal money by preparing the facilities plans and grant applications.

To quality for federal grants, wastewater treatment plants had to present designs and be ready to bid the contracts. The $555.5 million the District received under the U.S. EPA construction grants program (from 1972 to 1990) funded wastewater treatment plant upgrades and new interceptor construction.

Meanwhile, Ungar was building a solid reputation for the District as a governmental agency that paid its bills on time. He proclaimed, "If somebody does work for us, we pay them. We don't jerk them around." His attitude helped the District establish a reputation for paying promptly and attracting contractors.

In contrast, a number of other public entities had a

reputation for not paying invoices on time. At this time too, Cleveland's political climate was in turmoil. Mayor Dennis Kucinich was elected and the City defaulted on its bonds. In a subsequent bond offering, CRSD fared miserably. Because of this, the District wanted to separate itself from the City of Cleveland. A "re-branding" was in order. Judge McMonagle approved a name change, and in 1979, the Cleveland Regional Sewer District became the Northeast Ohio Regional Sewer District. (A slogan was created, too: "We're new—we're NEO!")

Around this time, Director Lou Corsi became ill and Erwin Odeal became Acting Director. Corsi retired and passed away in 1983, and the Board formally appointed Odeal Director.

By 1988, the federal government was requiring all wastewater treatment facilities to provide secondary treatment. Deadlines were imposed to keep agencies on track, and all District facilities met the deadline, except for Westerly. (Many large metropolitan area wastewater treatment agencies, particularly those with ocean discharges—such as Miami, San Francisco, and New York—were nowhere near secondary level treatment in 1988 and did not meet the deadline.)

The federal grant program came to an end in 1990. While many financial needs remained, it had succeeded in getting wastewater treatment agencies started on the long process of rehabilitating treatment facilities and infrastructure to meet more stringent environmental regulations.

Construction program takes off

Design of the Northwest Interceptor, Heights/Hilltop Interceptor (HHI), Cuyahoga Valley Interceptor (CVI), and Lakeview Dam had all been initiated by the City of Cleveland. The Northwest Interceptor was already under construction when the District assumed ownership in 1972, and it was complete by the early 1980s. Construction of HHI and the Southwest Interceptor (SWI) began in the early 1980s and continued through the mid-1990s.

After the HHI and SWI were designed, the EPA required that the District conduct an environmental impact study. The study delayed construction but was required for the District to receive federal grant funding. The SWI was temporarily derailed by "the four sisters"—plants in Middleburg Heights, Strongsville, Brookpark, and Berea. In addition, an east leg was never built because North Royalton, Strongsville, and Medina decided they could continue to operate their own plants in that area.

Mining cars remove debris during construction of the Heights/ Hilltop Interceptor, 1988

Despite the challenges, the environmental impact studies were approved and grant applications began by the fall of 1984. Since these two projects were the highest ranked under the State of Ohio's project priority system, and the District would receive the federal grant funding for several years, the District agreed to segment these projects and build them over a longer time period.

From the 1970s to the 1980s, the District constructed the Northwest and Cuyahoga Valley Interceptor programs. From the 1980s until 2000, it tackled the Southwest and Heights/Hilltop Interceptor programs.

Clean Water State Revolving Fund offers some relief

When the federal (U.S. EPA) grant program ended in 1990, the government replaced it with the Clean Water State Revolving Fund program. Under this program, the U.S. EPA provides grants to all 50 states and Puerto Rico to capitalize state loan funds. The states, in turn, make loans to communities for high-priority water-quality projects. In Ohio, the program that processes these low-interest federal loans is the Water Pollution Control Loan Fund (WPCLF), administered by the Ohio EPA.

Since 1991, the District has received a total of $975.5 million in low-interest loans. The first loan was for HHI, for $18.4 million. Beginning in the mid-2000s, the District received approximately $40 million per year through the State Revolving Fund program. As a result of the most

DISTRICT TIMELINE

1986

District adopts Title 3 Separate Sanitary Sewer Code.

District begins operating Berea WWTP.

1988

Construction of Environmental & Maintenance Service Center begins.

Computerized Maintenance Management System goes online.

1989

Cuyahoga River Community Planning Organization formed to help with the Remedial Action Plan.

1990

District receives its last federal construction grant.

Heights/Hilltop Interceptor accepts first flow.

$13.5 million Environmental & Maintenance Services Center opens in Cuyahoga Heights.

1991

First intercommunity relief sewer, Pearl Road, accepts flow.

1992

Cuyahoga River Remedial Action Plan Stage One Report released, summarizing existing pollution problems and sources.

recent rate study, the District intends to utilize the loan program for the majority of capital funds required during 2017-21 rate period. Loan awards during 2017 alone are estimated to be $435 million.

This source of funding, though never approaching the savings of grant money, became limited. In 2007, the Ohio EPA established state-wide and per-community limits on how much money it would loan, because demands for loans across the state began to increase. As a result, any single entity can only borrow up to $25 million per year, whereas previously the amount that entities could borrow was unlimited.

Other sources of funding

Special appropriation grants fund special projects that are specifically identified in the State and Tribal Assistance (STAG) account of the U.S. EPA appropriation bills. Congress identifies the recipient and amount of each grant. These special projects implement the planning, design, and construction of a variety of water and wastewater infrastructure projects.

The District received $90.6 million in special appropriations between 1995 and 2005. In 1995, the District worked with U.S. Representative Louis Stokes to secure $60 million in special appropriations to convert Westerly from a failed physical-chemical plant to a new biological wastewater treatment plant.

From 1997-2005, the District received $30.6 million in special appropriation grants to cover the Doan Brook Watershed Study and pay for improvements in the Easterly/Doan Brook service area and at the Easterly Wastewater Treatment Plant.

Even though there are no longer any set streams of grant funds, the District continues to take advantage of potential funding sources, including the U.S. Army Corps of Engineers and the Water Resources Development Act.

Internal changes

During the 1980s, the centralized management style that had been established in the 1970s continued, as District employees worked to fulfill the requirements of the original court order. But significant change in the organization was spurred by the threat of privatization in 1996. A number of public agencies throughout the country had fallen victim to private companies promising to run them at lower cost, and the District was determined not to be one of them.

The first area of focus was the Operation & Maintenance department, because District leaders felt that core business was most vulnerable. A consulting firm was selected to perform a competitiveness assessment and charged with giving an overview of the organization's fiscal health and providing a gap analysis to identify ways in which wastewater-treatment agencies could reduce their costs.

One troubling realization was that privatizers advocated just barely meeting plant permit limits—instead of exceeding expectations, to which the District had always aspired. That meant that excellence would be supplanted by doing work that was "just good enough."

It turned out that the District did not need to compromise its standards. Its 1997 Plant Competitiveness Initiative paved the way to doing more with less, mainly by developing a smaller, better-trained, more-flexible workforce and effectively using technology as a tool.

In negotiations with the unions pertaining to the initiative, the District promised that no employee would be laid off due to this reorganization. An ample number of long-timers allowed for staff reductions, simply by not replacing retiring employees. Still, that didn't prevent anxiety about job stability from spreading.

Another goal was to cross-train plant operators to be able to perform any job throughout the plant. Instead of Operators A, B, C, and D, everyone was assigned one title: Wastewater Plant Operator (WPO). This change was a real benefit for a number of Operations employees who found that their wages would increase along with their job performance. But others who were already cross-trained, and who had been making more money, were upset at no longer having a professional or monetary advantage. Those reactions, compounded by the massive training and education movement taking place, prompted many employees to retire. As a result, a plant like Southerly, with over 240 employees, over time shrank to about 150.

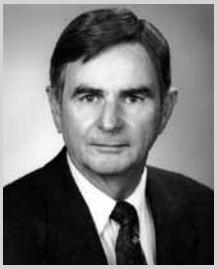
The next step after streamlining plant staff was to apply that approach to the support services and administrative levels. This second phase turned into the Support Services Competitiveness Initiative, with similar goals: do more with less and make better use of technology.

District leadership felt confident that the two initiatives would help prepare the organization for the challenges of the 21st century. Among the results was a reduction in staff to 569 employees in 2002 (from a high of 723 in 1990) and the installation of plant automation software that enabled computers to monitor and operate many processes.

SEWER DISTRICT BOARD MEMBERS

Richard R. Hollington	1972-73
Walter C. Kelley	1972-73
David B. Bailey	1972-75
Jackie Presser	1972-76
Raymond Kudukis	1972-78
Louis J. Bacci	1972-84
Mary J. Coleman	1972-84
Jack A. Hruby	1973-75
Nicholas DeVito	1973-79
Anthony Liberatore	1975-78
Gloria J. Battisti	1976-83
Louis V. Corsi	1978-79
David H. Kirschenbaum	1979-80
John Petrushka	1975-88
Charles R. Miller	1979-83
Jack M. Schulman	1979-84
Anthony C. Amato	1980-87
Edward J. Rawlings	1983-87
William J. Reidy	1983-1992
Lester C. Ehrhardt	1984-92
Edward H. Richard	1984-93
Ronald D. Sulik	1985-94, 2002-
Harry Alexander	1987-88
Rosemarie F. DeJohn	1987-97
Thomas J. Longo	1988-2010
E. Theophilus Caviness	1989-91
William H. Denihan	1991-94
Allan R. Mills	1992-97
Michael L. Nelson, Sr.	1992-2005
Brian E. Hall	1993-94
Sheila J. Kelly	1994-2014
Gary W. Starr	1994-2014
Michael G. Konicek	1994-2001
Andrew T. Ungar	1997-2002
Gerald M. Boldt	1997-2007
Darnell Brown	2001-
Anthony D. Liberatore, Jr.	2006-09
Dean E. DePiero	2007-2012
Walter O'Malley	2009-
Jack Bacci	2010-
Timothy DeGeeter	2012-
Robert A. Stefanik	2014-
Sharon A. Dumas	2014-

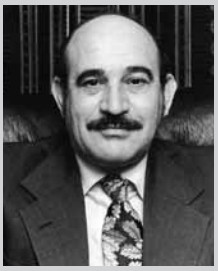
EXECUTIVE DIRECTORS 1972-2016



Andrew T. Ungar served as the District's first Director after its formation in 1972 until 1979. He served on the Board of Trustees from 1997 to 2002.

Mr. Ungar graduated from Ohio University in 1957 with a degree in Civil Engineering and spent two years in the Army Corps of Engineers. He served as Construction Superintendent for the Great Lakes Construction Company before working for the City of Lakewood as Director of Public Works.

Mr. Ungar's accomplishments at the District included the rehabilitation of all three treatment plants with federal grants. He was one of the founding members of the Association of Metropolitan Sewerage Agencies (AMSA), now known as the National Association of Clean Water Agencies (NACWA).



Louis V. Corsi served as the District's Director from 1979 to 1983, part of a career that included over 30 years in government service.

Mr. Corsi attended John Carroll University and received a law degree in 1951 from Cleveland Marshall Law School. Prior to his work with the District, he was appointed by Mayor Dennis Kucinich as Cleveland's Public Utilities Director, having previously served as an administrative aide. Mr. Corsi's other positions with the City included Income Tax Administrator and Commissioner of Parks and Properties. From 1974 to 1977, he served as City Manager of Bedford.

Erwin J. Odeal served the Sewer District—first as Director, then Executive Director—from 1983 to 2007. He previously served as Deputy Executive Director for five years, and, before that, as Engineer and Planning Engineer for four years.

Before joining the District, Mr. Odeal served as District Engineer for the Ohio Department of Health and as Engineer for the Three Rivers Watershed District.

Mr. Odeal devoted virtually his entire professional career to environmental planning and management for the benefit of Northeast Ohio. From his early 1970s work in regulating regional watershed planning, to the creation of the Sewer District, to the implementation of court-ordered regional projects, he was a dominant force for progressive action. At the same time, he established day-to-day operation of wastewater treatment facilities as a priority for the agency.

Mr. Odeal earned a Bachelor of Science degree in Civil Engineering from Cleveland State University and a Master of Science degree in Civil Engineering from the University of Akron. He is a registered Professional Engineer in the State of Ohio.

Mr. Odeal is past Treasurer of the Water Environment Federation. He is also past President of the National Association of Clean Water Agencies and past Chairman of the Water Environment Research Foundation.

Julius Ciaccia served the City of Cleveland's Clerk of Courts office for two years before his appointment as Assistant Director of Public Utilities in 1977. He became Acting Water Commissioner in 1979, Assistant to the Commissioner in 1981, and eventually Commissioner in 1988.

Mr. Ciaccia was appointed Director of the city's Department of Public Utilities in 2004 and began his tenure as the Sewer District's Executive Director in November 2007.

Under Ciaccia's direction, the Sewer District embarked on a series of internal improvements to increase efficiency, transparency, and oversight, and finalized its Project Clean Lake consent decree with the U.S. EPA and Ohio EPA to reduce combined sewer overflows.

Also during Ciaccia's tenure, the District launched a Regional Stormwater Management Program to address flooding, erosion, and water-quality problems throughout its defined service area. With its program, the District assumed responsibility for millions of dollars of necessary maintenance along streams across the region.

Mr. Ciaccia's professional affiliations include the American Water Works Association and other state and national committees and organizations. □

Another important ingredient in positioning the District for the next century was relying on teams and empowering front-line employees to make business decisions on their own. In effect, the District's focus had shifted from what it needed to do in the 1970s, 1980s, and early 1990s, to refining how it would conduct business in the mid-1990s forward.

Teams were assembled and assigned specific tasks, with charter agreements signed by senior management and the commissioned team. This approach was successful to varying degrees. Some employees complained that they were excluded from teams for personal reasons, and some senior management members were not comfortable handing over decision-making authority. The organization was moving into uncharted territory.

The expectations of team members were high, but their suggestions were not often accepted or implemented to the extent they had hoped. A number of senior employees left because they became too uncomfortable with the changes, while others reached retirement.

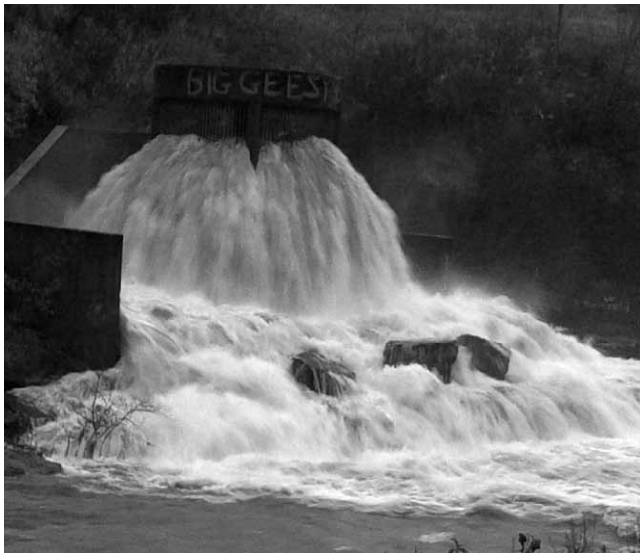
By the time the competitiveness goals were realized, the threat of privatization was not as ominous. Many privatization ventures from the late 1990s hadn't been as successful as anticipated.

A CSO long-term control plan

Combined sewers, primarily built in the late 1800s and early 1900s, carry both sewage and stormwater. (They are prevalent in older cities and inner ring suburbs.) When heavy flows of stormwater enter the combined sewers, control devices allow some of the flow—a combination of stormwater and sewage—to overflow into area waterways, preventing sewer and residential backups. This release, known as a combined sewer overflow (CSO), contains bacteria from human waste, industrial waste, and other pollutants swept from the ground's surface.

Part of the District's original court order addressed CSO. The interceptors that the District constructed helped decrease the incidence of CSO, but the U.S. EPA mandated further standards in controlling remaining overflows in the Federal 1994 Combined Sewer Overflow Control Policy. Unfortunately, federal funds were no longer available to pay for this additional work. Ratepayers would have to pay the entire bill through increased sewer charges.

The District continued its negotiations with the U.S. and Ohio EPAs, ultimately finalizing an agreement in 2010 outlining a 25-year plan to control and reduce CSO.



During heavy rains, a combination of rainwater and wastewater—"CSO"—discharges to the environment.

Looking at future business

With the end of federal funding in 1990 (and even with the State Revolving Fund program), there was a need to consider new revenue sources. There was also some unfinished business from the original court order—a plan to effectively address stormwater drainage—that the District needed to address.

Another reason for the District's interest in stormwater management was anticipation of the Stormwater Phase II Final Rule, which would force all municipal separate storm sewer systems ("MS4s") to implement programs and practices to control polluted stormwater runoff.

The District had completed its first Regional Plan for Sewerage and Drainage (RPSD) in 1978, identifying 138 storm drainage problem locations. However, solving the immediate problems regarding the collection, conveyance, and treatment of domestic, industrial, and storm flow in combined sewers had to take precedence.*

** The 1972 court order specifically ordered the District to construct one large intercommunity flood control facility, Lake View Dam, which had already been designed by Cleveland. The dam was built in Lake View Cemetery in 1978 and provides stormwater storage on Dugway Brook to protect areas on the brook downstream of Euclid Avenue. It is the largest totally concrete dam in Ohio (89 feet high and 520 feet long). The dam has been used by Cleveland SWAT teams for rappelling exercises, is a frequent stop on sightseeing tours, and served as a filming location in 2013 for* Captain America: The Winter Soldier.

DISTRICT TIMELINE

1993

The Ohio and Erie Canal Towpath opens in the Cuyahoga Valley National Recreation Area. The trail parallels 22 miles of the Cuyahoga River.

1994

An Ohio EPA survey of the Cuyahoga tributaries shows improving trends in chemical water quality and biological health.

Southwest Interceptor completed.

1995

District begins two-year study focusing on pollution sources in the Mill Creek area.

1997

Competitiveness Initiatives, focused on cross-training and employee development, begin.

2001

A 12-hour operator shift replaces the 8-hour shift. Operators favor the switch by a 2-1 margin and the change is formally adopted in 2002.

2003

George J. McMonagle Building opens to administrative employees.

2004

District launches its first Internet homepage.

2005

Communications & Community Relations department is created.

The RPSD included inspections of local streams to document problems such as streambank erosion.

In 1998, a concentrated effort began on a second RPSD to determine the future role the District should play in regional stormwater management. This RPSD identified 334 problem locations (more than double the number in 1978) and determined the scope of the next step, the Regional Intercommunity Drainage Evaluation (RIDE).

The RIDE study, completed in 2002, defined a 522-mile intercommunity storm drainage system representing the network of streams, trunk storm sewers, detention facilities, open channels, and other facilities that receive drainage from more than one community. The study evaluated 586 problems in 328 locations and found that many were intercommunity issues that could not be solved by individual communities alone. It became even more apparent that the District was uniquely equipped to tackle stormwater management, given its regional scope.

But assuming stormwater management would not be without its challenges. The Sewer District recognized that in addition to the complexities of dealing with 62 communities and the U.S. EPA and Ohio EPA over storm sewer overflows, storm sewers, and streams, any District-led stormwater management program would have to face the sensitive issue of establishing a wet-weather revenue source.

Despite the complexity of this issue, in 2007 the Board of Trustees agreed that the District should take the necessary steps to establish a stormwater management program, including research to determine revenue sources and jurisdictional issues.

Odeal builds a legacy

In 2000, the District broke ground to construct a new administration building at a ceremony honoring 95-year-old Judge George J. McMonagle. Three years later, the organization moved its administrative headquarters from the worn building at 3826 Euclid Avenue to a modern facility next door at 3900 Euclid.

At a cost of $22 million, the new building was designed to accommodate a growing Engineering department (which had been renting space in a separate building for several years) and increasing technological needs.

Nearing retirement, Odeal wanted to continue the administration building's residency in Cleveland as a symbol of the District's commitment to the city. He named the new headquarters after Judge McMonagle, who died a year before the building was completed.

Although the District received some negative media coverage for the building's alleged grandiosity, civic leaders agreed that it was an attractive, though modest, addition to the midtown corridor.

Ground was broken for the George J. McMonagle Building in 2000. It was completed in 2003.

Communicating the District's value

Although the District employed a Public Information Officer (PIO) during its early years, the position's focus was primarily community involvement. The District invited the public to open houses at the plants and participated in environmental festivals such as Earth Day. Press releases to the media mostly announced the beginning and ending of major construction and the election of new Board officers.

In 1997, a Communications Manager assumed some of the PIO's former responsibilities, and the focus shifted to internal communications, publications, video projects, and the internet. The District continued to produce annual reports highlighting how its work had improved water quality, but it was clear that the majority of the public still really had no idea what the District did.

Odeal felt that the solution to this problem could be realized through education, since schoolchildren take information home to their parents. The District cultivated relationships with local schools, integrated science and math projects into their curricula, and donated supplies and materials to students who needed them.

Recognition and respect from the general public remained elusive. (Most people take wastewater treatment for granted. They expect the toilet to flush, and the only time they really think about it is when it doesn't.)

After years of operating under the radar, Odeal recognized the need to increase the District's visibility. The Board and Senior Staff realized that if the public does not understand the District's work, they probably will not want to pay for it.

As a result, in 2005, Odeal created a new department, Communications & Community Relations (CCR), with a separate budget and a clear directive to develop a strategic program to better communicate to the media and the public the District's mission and value.

In 2007, CCR embarked on a community-awareness campaign called "Where Does It Go?" to highlight the District's role in protecting greater Cleveland's fresh water resources. Today, the "Your Sewer District . . . Keeping our Great Lake great" and "Great Lake. Great Future." campaigns further emphasize this valuable work.

As the District committed itself to broader communication and outreach goals, it developed in-house talent to meet its growing media-production needs. In 2013, CCR produced *Clean Water Works*, an annual technical magazine offering a detailed look at the science and specialty fields involved in wastewater treatment. A quarterly newsletter, *Underground,* communicates construction-related updates for residents in affected communities.

In 2008, the District held its first annual Open House for the public. Since then, in an effort to make it the organization's signature community outreach and education event, the District has expanded its offerings and invited community partners to participate. The 2016 Open House welcomed over 2,100 guests.

DISTRICT TIMELINE

2007

Board gives approval to promote stormwater management.

Erwin Odeal retires after 24 years as Director and Executive Director and 33 years with the District.

Julius Ciaccia becomes Executive Director, the fourth director in the District's 35-year history.

2008

The District adopts ethics policy, safeguarding against conflicts of interest and improper conduct

District leads a collaborative effort with local agencies to implement a "nowcast" beach advisory system.

2009

"Year of the River" marks 40th anniversary of the 1969 fire on the Cuyahoga.

District implements Wellness Program for a healthier workforce.

Small Business Enterprise program (renamed Business Opportunity Program in 2011) offers local companies more opportunities to compete for District work.

2010

Trustees adopt the Regional Stormwater Management Program with a 7-0 vote and the Project Clean Lake consent degree with a 5-2 vote.

2011

Groundbreaking of $198-million Euclid Creek Tunnel launches 25-year Project Clean Lake program.

The annual Open House has become the District's signature educational outreach event.

The pervasiveness of Facebook and Twitter in corporate marketing is now taken for granted, but throughout the past decade many utilities were slow to embrace social media in their customer outreach strategies. By promoting digital engagement, the District has been recognized as an industry leader for creative, customer-friendly social media content that reflects a broader communication strategy. In-house content and account management improves the District's ability to respond in real-time, and saves the expense of outsourcing these services; the ability to respond quickly has helped foster a sense of trust and transparency with those who follow District social media.

Ciaccia takes the helm

In 2007, Odeal retired, and Julius Ciaccia, Director of Cleveland's Department of Public Utilities, took over as Executive Director. Almost immediately, he and the Board of Trustees began a critical review and improvement of policies and procedures, to ensure alignment with the District's mission and customers' expectations. Through a series of audits and internal review, the District established and improved policies and practices that ensure efficient project management, Board oversight, public involvement and information, and ethical decision-making.

Contracting processes of the District were revamped, ensuring accountability from consultants and contractors, and providing checks and balances. By identifying and analyzing risks and executing continuous quality and systems-improvement programs, the District's Internal

Audit team and Board of Trustees ensure that the organization meets its policy and procedural obligations as a public utility. In 2011, the Ohio Auditor of State released a performance audit for the District that praised many business practices instituted under Ciaccia since 2007.

Since 2010, the District's Business Opportunity Program has provided local and regional minority- and woman-owned and small businesses greater opportunities to work with the District. Bringing new companies into the District's procurement process has enhanced competitive bidding, and in 2014 alone, the District awarded more than $40 million in contracts to MBE, WBE, and SBE firms.

Throughout Ciaccia's tenure, the District's annual capital budget has increased from $60 million to about $220 million. Increases in expenditures and debt can negatively impact credit rating, but the District's ability, through strong financial management, to manage capital costs, has contributed to continued high credit ratings.

Project Clean Lake

Under Ciaccia's leadership, the District finalized its consent decree with the U.S. and Ohio EPAs to drastically reduce pollution discharges into local waterways. Project Clean Lake is a 25-year, $3 billion investment in CSO-control measures to reduce sewer overflows into Lake Erie and the Cuyahoga River. At the heart of the plan is the construction of large-scale storage tunnels and treatment plant enhancements. In addition, the District has identified more than $50 million in green infrastructure opportunities to reduce CSO, and the consent decree allows flexibility to assess even more as the plan progresses. The result will be a 98% capture rate and a reduction of four billion gallons of annual overflow. The first of seven large tunnels, the Euclid Creek Tunnel, was finished in 2015 *(see page 23)*.

Construction program transformed

Under Project Clean Lake, the District needed to increase its capital project delivery to three times what it was used to. Knowing that this investment would increase to over $200 million annually for 25 years, the organization developed and implemented new standards and skills—supported by a new electronic workflow system—to meet the requirements of the large construction program. The District also put in place a controls team dedicated solely to monitoring construction workflow, scheduling, and standards, to improve efficiency and accountability.

Good Neighbor Ambassadors work in communities affected by ongoing sewer-construction projects.

Between 2011 and 2016, the District consistently delivered projects for less than the contract value. Current estimates indicate that Project Clean Lake is realizing a savings near $650 million off its initial $3 billion estimate. The District's construction-overhead cost averages about three percent, compared to industry standards as high as 10 percent. Projects are closely tracked with key performance indicators (KPIs), used to gauge and improve performance of the program. The KPIs are reported to the Trustees and the public each month and are available on the District's website.

The scope and success of this in-house program-management initiative is unmatched throughout the wastewater industry in the United States.

Good Neighbor program

In 2014, the District launched its Good Neighbor program to expand outreach to residents and businesses in neighborhoods impacted by Project Clean Lake and stormwater-management construction. Good Neighbor Ambassadors serve those communities before, during, and after major projects, ensuring resident engagement and providing regular communication to address problems and concerns. In addition to the program's value to residents and businesses, the program provides job and career-development opportunities to unemployed and under-employed individuals in these communities.

DISTRICT TIMELINE

2011

Cuyahoga County Court of Common Pleas Judge Thomas J. Pokorny rules that the District has the authority to implement the majority of its Regional Stormwater Management Program.

2012

"Mackenzie," a 1,500-ton tunnel boring machine, is lowered into the ground to begin digging the Euclid Creek Tunnel.

2013

The District and Cleveland Metroparks celebrate the dedication of the Watershed Stewardship Center at West Creek in Parma. The District also purchases beach-cleaning machines for Metroparks-operated Euclid Beach and Edgewater Park.

Mackenzie completes her three-mile Euclid Creek Tunnel excavation.

The Ohio Eighth District Court of Appeals strikes down the District's Stormwater program.

Southerly's Renewable Energy Facility is completed.

2014

Good Neighbor Ambassador outreach program ensures residents' involvement before, during, and after construction in their neighborhoods.

The District launches new internal and external Customer Service initiatives to support its mission.

Trustees approve title changes for the Board-appointed members of the Leadership Team—Chief Executive Officer, Chief Operating Officer, Chief Legal Officer, and Chief Financial Officer.

"Before" and "after" photos of an emergency bank stabilization along Mill Creek and Warner Road, a 2013 stormwater construction project.

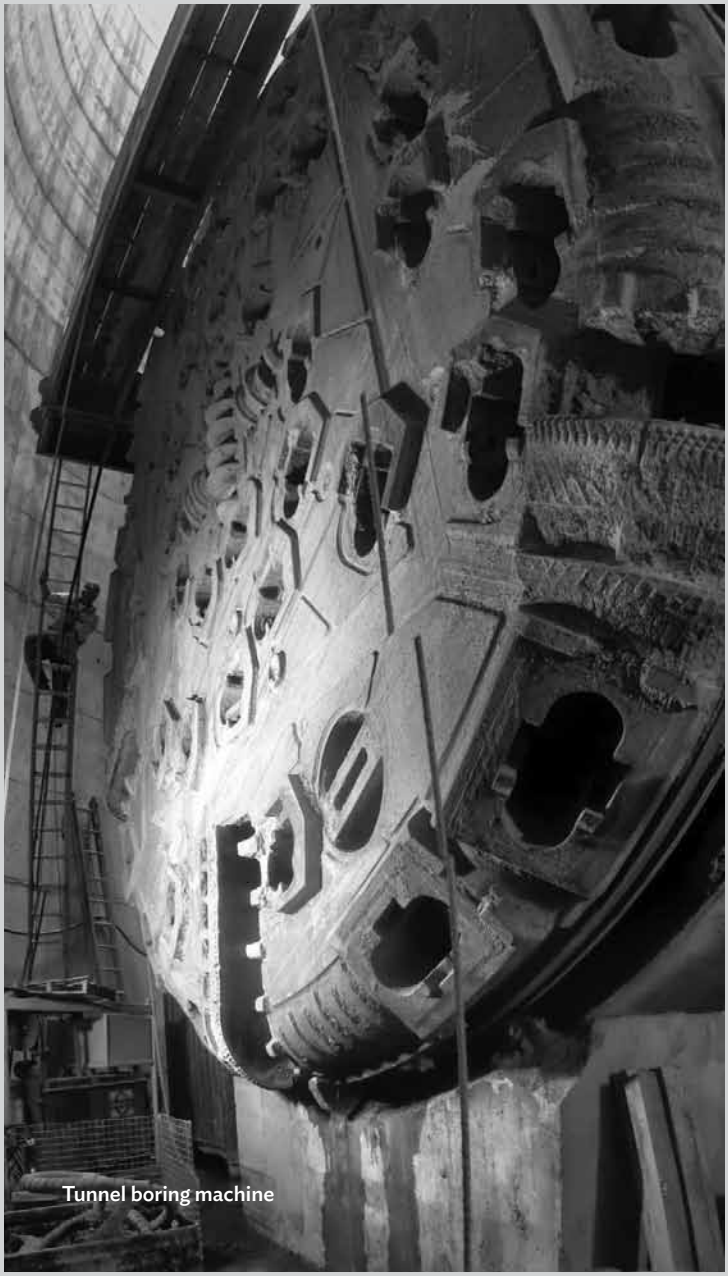
Stormwater program

Also under Ciaccia's leadership, the District developed and launched the Regional Stormwater Management Program, enduring legal challenges and growing a movement of support from communities and partners. The program was established to address flooding, erosion, and water quality problems throughout its service area. In addition, the District was to assume responsibility for millions of dollars of necessary maintenance along streams across the region.

A Stormwater Advisory Committee, formed in 2008, provided a forum for citizen stakeholders as the District developed its program. Its 20 members—representing religious organizations, member communities, developers, community organizations, and owners of large impervious surfaces, such as parking lots—provided critical feedback on such topics as the stormwater fee and fee credits.

Also in 2008, several District functions—its emerging stormwater management program, Water Quality & Industrial Surveillance, Analytical Services, and ongoing stream restoration and watershed projects—were restructured into one department: Watershed Programs.

PROJECT CLEAN LAKE: TUNNELS AND BEYOND



Tunnel boring machine

IN 1972, THE CLEAN WATER ACT was created to address the nation's water-quality issues, among them the foul spectacle of raw sewage discharging into the environment. In Cleveland, the Sewer District's construction projects during the next several decades would reduce these discharges significantly—from an estimated 9 billion gallons a year down to 4.1 billion (in 2015).

However, in 1994, the U.S. EPA adopted a Combined Sewer Overflow Control Policy, which required wastewater agencies to develop long-term plans to further reduce combined sewer overflow (CSO). Cleveland and hundreds of cities around the country have negotiated long-term plans with the EPA to address these overflows.

Project Clean Lake will reduce CSO volume in Cleveland from 4.5 billion gallons to under 500 million gallons annually. By 2035, the number of overflows will be reduced to four or less per year, resulting in an estimated 98% capture and treatment of all wet-weather flows in Cleveland's combined-sewer system.

"Even with the new storage tunnels, you still can have combined sewer overflow."

At the heart of the Project Clean Lake is the construction of seven large-scale storage tunnels, ranging from two to five miles in length, up to 300 feet underground, and up to 24 feet in diameter—large enough to park a semi-trailer truck. This technology is widely used in CSO-control plans across the country. The tunnels can hold tens of millions of gallons of CSO, rather than allowing it to discharge into Lake Erie and the Cuyahoga River. After the rain stops, massive hydraulic pumps convey the flow back to the surface and to one of the District's three wastewater treatment facilities.

In April 2011, the Sewer District

broke ground on its Euclid Creek Tunnel project, which includes an 18,000-foot long, 24-foot wide storage tunnel 200 feet underground. Just over two years later, in August 2013, "Mackenzie," a 1,500-ton tunnel boring machine, completed its three-mile-long excavation. The finished tunnel will have the capacity to capture about 65 million gallons of combined wastewater and stormwater, and will directly impact water quality in Lake Erie and local streams.

Project Clean Lake also includes a minimum of $42 million in green infrastructure projects, which the federal government had never before included in its CSO-control consent decrees. These stormwater-control measures, which include such technologies as bioswales and detention basins, can store, infiltrate, and evapotranspirate rainfall before it even makes its way into the combined-sewer system.

Enhancements to the District's three wastewater treatment plants, which together treat over 90 billion gallons each year, are another crucial component of Project Clean Lake. At the Easterly and Southerly plants, the amount of wastewater that can receive treatment will increase. This is necessary to accommodate the greater volumes of combined flow that will no longer be allowed to discharge into the environment. In particular, Easterly is undergoing major construction to expand its secondary treatment capacity, including installation of six additional final settling tanks.

Despite the ongoing construction, Easterly was recognized in 2014 with the highest performance honor from the National Association of Clean Water Agencies: the Platinum "Peak Performance" Award, for five consecutive years of meeting National Pollutant Discharge Elimination System permits. Westerly and Southerly also received Gold Awards for continued excellence in meeting their NPDES permits.

In addition, all three District plants are implementing advanced methods for dealing with wet-weather flows from overwhelming rain events. "Even with the new storage tunnels, you still can have overflow," explained Douglas Dietzel, a Process Specialist at Westerly. "As part our agreement with the EPA, we're increasing our ability to treat wastewater during high-flow events."

The Westerly plant, which sits on the shore of Lake Erie, is Cleveland's oldest wastewater treatment site (constructed in 1922). It processes an average flow of 26 million gallons per day (mgd) of wastewater, and its Combined Sewer Overflow Treatment Facility (CSOTF) provides storage for six million gallons and preliminary treatment for up to 300 mgd during wet-weather flows. In CSOTF, the heavier organic material is allowed to settle out of the wastewater, but the flow can still contain pathogens when it is returned to Lake Erie, since it does not pass through secondary treatment or disinfection.

A new project, Chemically Enhanced High Rate Treatment (CEHRT), expands the overall size and scope of CSOTF treatment process, with the inclusion of chemical storage and feed facilities, to provide treatment and disinfection capabilities absent from the current system.

CEHRT is an advanced way of treating wastewater overflow by speeding up the natural, gravity-based settling process used in the normal treatment process (through the addition of chemicals), and providing disinfection. "Instead of having just settled wastewater, you have treated flow safely going back out into the Lake," said Dietzel.

The EPA gave the District an opportunity to demonstrate the effectiveness of lower-cost treatment options like CEHRT through pilot demonstration projects. "The EPA initially wanted us to use a much more expensive sand-injection process," said Dietzel. "They gave us three years to test out CEHRT at all three of our plants."

The plants have utilized a bench test to determine the optimum amounts of ferric chloride and polymer to get the process to work. "Based on our testing, we see that CEHRT works very well," said Dietzel. The CEHRT systems could be fully operational at all three District plants as early as December 2021.

The success of the CEHRT pilot program, and opportunities to optimize projects through advanced planning and value engineering, will help the District minimize Project Clean Lake's financial impact on its ratepayers. "The CEHRT system is relatively new, and very few wastewater agencies in the U.S. use it," said Dietzel. "We are the first large sewer authority to do something like CEHRT. It will save our ratepayers money, and that's our goal." □

Excerpted from an article that appeared in Water Innovations *magazine in September 2015.*

In 2010, District Trustees unanimously voted to adopt Title V, the Stormwater Code of Regulations. The District immediately filed a motion with the Cuyahoga County Court of Common Pleas to reaffirm its authority to manage stormwater within the existing service area. In 2011, the Court ruled that the District had that authority.

But in 2013, the Cuyahoga Court of Appeals reversed that decision, ruling that the District did not have the authority under Ohio Revised Code Chapter 6119 (or the District's charter) to implement its Regional Stormwater Management Program or collect stormwater fees.

The case made its way to the Ohio Supreme Court, which in September 2015 finally authorized the District's program. At that time, the District identified more than $220 million of needed stormwater-related construction projects to provide relief to multiple communities.

A green parking lot, funded by a Sewer District grant, in Cleveland's Waterloo Arts District

Green Infrastructure

Green Infrastructure refers to measures that store, filter, infiltrate, harvest, and reuse or evapotranspirate stormwater. When the District signed its Project Clean Lake consent decree in 2010, it was granted authority to replace gray-infrastructure plans with green, provided they allow the District to meet its regulatory obligations. The agreement was considered groundbreaking, as "green-for-gray" had never before been part of a federal consent decree.

By engaging key stakeholders, the District gained support of, and built advocacy for, a regional green infrastructure vision, policy, and strategy. An advisory committee representing the City of Cleveland, Cuyahoga County, regional planning organizations, NGOs, and non-profits provided input on District green infrastructure projects that help remove stormwater from the combined sewer system.

The Green Infrastructure Grants Program, launched in 2009, enables local organizations to make green improvements that protect water quality, beautify streets and neighborhoods, improve property values, and revitalize neighborhoods. The projects have increased from lot-sized projects to large-scale developments that divert significant volumes of stormwater from the combined sewer system. They include bioswales, bioretention, and cisterns that treat stormwater as a valuable resource to be harvested and used on-site, or filtered and allowed to soak back into the ground. Between 2009 and 2016, more than $7 million was awarded in green infrastructure grants.

The District also supports watershed organizations that address water-quality concerns through community engagement, education, research, monitoring, and projects related to stormwater management. Through an annual call for proposals, eligible watershed organizations provide a list of services, and the District determines eligibility and enters into Watershed Service Agreements.

In 2015, the Board of Trustees adopted the District's Green Infrastructure Policy to unify all of these efforts into a cohesive Green Infrastructure Program.

Partnership with Metroparks

In 2007, the District partnered with Cleveland Metroparks to support the development of a Watershed Stewardship Center (WSC) at the West Creek Reservation, in Parma. The Center's goal is to enhance and protect urban watersheds through innovative community programming, regional participation in watershed issues, and scientific discovery. With a series of stormwater control measures that treat on-site runoff, the WSC's exhibits demonstrate effective ways that communities and individuals participate in the improvement of regional watersheds. The WSC received a 2013 Parks and Recreation Association "Award of Excellence" and in 2014 was named an Ohio Stormwater Conference "Outstanding Government Project."

Since taking responsibility for the Villa Angela, Euclid, and Edgewater lakefront beaches in 2013, Metroparks has benefited from the District's data collection and support of beach maintenance to benefit water quality. Metroparks staff receive daily water-quality reports on these beaches.

DISTRICT TIMELINE

2015

The "Year of Clean Water" promotes importance of clean water to the region.

District recognized as a "Top Workplace" by the Cleveland Plain Dealer and NorthCoast 99.

Ohio Supreme Court gives final OK to District stormwater program and fee.

Euclid Creek Tunnel is completed $3.6 million under budget.

Southerly REF earns LEED Gold Certification.

District welcomes the public to its first "Sewer University" lecture.

2016

Dedication of renovated Public Square, featuring green infrastructure to manage stormwater.

The Board selects Kyle Dreyfuss-Wells to become CEO of the Sewer District.

The Watershed Stewardship Center at West Creek features stormwater-control demonstrations.

Customer service improvements

Taking a cue from the private sector, the District began to place great emphasis on the importance of good relations with its customers, and developed an in-house automated tracking system to gather customer inquiries and concerns, forward them along to the appropriate department, and document their timely resolution and follow-up.

Also on behalf of ratepayers, the District's Government Affairs staff engage state and federal legislators to more positively impact legislation and regulations that impact the District. Notable accomplishments have included securing American Recovery and Reinvestment Act funds, initiating federal legislation to assist customers with payment of water and sewer bills, and state legislation that allows the District "quick take" authority and the ability to hold conservation easements. Engagement is accomplished at the local, state, and federal levels to positively impact District customers.

Analytical Services

In 2007, the District's Analytical Services department became the first laboratory of its kind in Ohio to earn certification from the National Environmental Laboratory Accreditation Conference, indicating that the lab is managed by strict quality-assurance guidelines (similar to the ISO9000 international standard). Since then, the District has offered its testing services to outside agencies as a means of generating revenue.

Analytical Services is certified by the Centers for Disease Control for legionella testing and by Ohio EPA for drinking water analyses, and in 2009 was awarded a contract to perform analytical work for the Cuyahoga County Board of Health. The staff also collect and analyze samples for Nowcast advisories at local beaches, providing water-quality predictions for swimmers. The Sewer District is one of the few agencies in the nation that monitors local water quality on a daily basis.

Automation has played a big role in the lab's ability to become more efficient and take on more research work. With an average of 20 years experience, staff are trained to do multiple tasks, and all permanent full-time technical staff hold Wastewater Analyst certification from the Ohio Water Environment Association.

LAUNCHING THE STORMWATER PROGRAM

IN LATE 2016, staff members from the Ohio Environmental Council (OEC) visited the Sewer District to learn about its success in launching the Regional Stormwater Management Program (RSMP).

The OEC, a non-profit advocacy organization working "to secure healthy air, land, and water for all who call Ohio home" (as stated on the group's website), was interested in the political and legal challenges the District faced in getting its RSMP implemented. How could other Ohio communities apply these lessons learned, and how could the OEC help promote similar clean-water initiatives and regional cooperation?

Sewer District Deputy Director of Watershed Programs Kyle Dreyfuss-Wells gave OEC staff an overview of the District's responsibilities—its 330 miles of interceptor sewers and 420-mile regional stormwater system, its proactive beach-monitoring program (Cleveland's beaches are the most monitored in the nation), and its renowned laboratory and Water Quality & Industrial Surveillance programs—to highlight the District's unmatched qualifications to lead a regional stormwater management effort. "We *know* watersheds," said Dreyfuss-Wells.

She and the other District staff spoke candidly about the decades-long preparation towards launching the RSMP. "You need a lot of perseverance and patience," said Watershed Programs Director Frank Greenland. "Creating a stormwater program is not to be entered into lightly," added Dreyfuss-Wells.

"With stormwater, it's not where the problem is, it's what the problem is."

The District started its homework early on. In 1978, the District had identified 147 drainage problem locations; by 2002 that number had risen to 513. In 2010, the District identified over $200 million in critical projects to address local flooding, erosion, and pollution issues.

From 1997-2007, the District spent $12 million in studies and conducted over 300 meetings with communities to better understand both the problems and fixes, and the required engineering work to meet those demands. The District's Regional Intercommunity Drainage Evaluation (RIDE), completed in 2002, estimated the cost of a regional stormwater program at about $336 million (in 2002 dollars).

The decision to proceed with implementing the program fell to Julius Ciaccia immediately after he became Executive Director of the District in 2007. "There is, in general, a distrust of regional government," said Ciaccia. "We could have just presented the RIDE findings and left it to the individual communities to

Sewer District crews examine properties impacted by failing streambanks, poorly-planned culverts, and other issues.

fix the problems. But we knew little would get done because of a lack of funding and the need to organize on a watershed basis."

Communities generally balk at doing maintenance work on private properties, a task the District accepts as entirely appropriate, since flooding and erosion issues do not respect property lines or municipal boundaries. "With stormwater, it's not where the problem is, it's what the problem is," said Chief Legal Officer Eric Luckage. The District's Stormwater Inspection & Maintenance crews regularly examine residential and commercial properties impacted by failing streambanks, poorly-planned culverts, and other issues, and make recommendations to correct those problems.

Well-acquainted with political realities from his decades with the City of Cleveland Water Department, and anticipating legal challenges from some communities to new fees, Ciaccia sought a "declaratory judgment" from the Cuyahoga Court of Common Pleas, to affirm the District's authority to create a stormwater program. (This stance was based on language from the 1972 court order that created the Sewer District, specifying responsibility for managing both wastewater and stormwater.)

Although the District would endure years (and millions of dollars' worth) of legal engagements, this pre-emptive strategy paid off. An Ohio Supreme Court ruling in late 2015 gave the District the final go-ahead to implement its RSMP—and impose a new fee to fund it. As with the program itself, District staff spent years researching and developing an acceptable fee and billing structure.

"The billing system has to be done right," said Dreyfuss-Wells. "You have to be able to articulate how the money will be spent, and clarify how those funds will be insulated from other District revenue and projects." The District's RSMP fee is expected to bring in $41 million a year for addressing erosion, flooding, and pollution issues caused by stormwater runoff.

Customers can reduce their fee if they install rain gardens, rain barrels, or other stormwater control measures on their property. So far, the District's Watersheds department has approved over 1,200 fee credit applications.

Community outreach also has been important in winning "hearts and minds" and getting public buy-in for new initiatives like the RSMP. Administration and External Affairs Director Constance T. Haqq pointed to the Good Neighbor Ambassador program as an effective tool for gaining goodwill with communities impacted by sewer construction projects and rising sewer bills.

District staff shared a common-sense approach to replicating the RSMP elsewhere in Ohio. "There has to be a willingness to look at what is needed, and what it will cost," said Greenland. "Then you establish a program to get it done." □

Analytical Services offers nine specialty services, including the use of innovative technology (such as a mass spectrometer for microcystin analysis) and processes 25,000 samples every year for both internal and external customers. From 2009 through 2016, this generated $662,000 in revenue and $296,000 in grants.

Geographic Information System

Since 2012, in-house Geographic Information System (GIS) expertise has enabled District teams to better access, analyze, and manage data. Notably, the GIS Stormwater Fee Finder supported customer service and outreach to the public regarding the new Regional Stormwater Management Program.

On the District's online GIS site, there are over 50 groups with hundreds of web maps and apps related to field inspection data, property maintenance, water quality, and plan-review activities. Staff have increased access to information via mobile devices in the field, saving time and resources. In addition, GIS was integral in a 2013–15 account verification project, which led to over 1000 accounts being identified to be added to billing and resulted in over $600,000 in additional annual District revenue.

New efficiencies

As a result of efforts by our Purchasing and IT departments, multiple improvements were made to purchasing and inventory processes, including end-to-end automation, starting with online supplier registration, electronic quoting and bidding, and electronic invoicing. The integration of the District's systems has provided control and visibility over the entire life-cycle of a transaction, providing full insight into cash-flow and financial commitments. The technology implemented has reduced mountains of paperwork, manual processes, and inefficiencies.

In a similar fashion, Human Resources is able to hire, train, deploy, assess, motivate, and reward District employees more effectively by automating administrative duties and managing information more efficiently.

In 2016, the District hired a Sustainability Program Manager to oversee initiatives related to energy efficiency, CO_2 emissions reduction, waste minimization/recycling, resource conservation/recovery, heat-island reduction, and green infrastructure.

Employee effectiveness

In 2010, the District adopted a performance-management system to clarify expectations and ensure that employees are measured on their performance. Organization & Employee Development (OED) provides consulting and coaching in talent development, organizational learning, and change management. An improved tuition-assistance program, manager-training opportunities, and a maintenance-training program helps employees maximize their skills for greater productivity and upward mobility.

In addition, a Diversity & Inclusion initiative, and increased outreach to more diverse community-based organizations and schools, has resulted in hiring a workforce that more closely reflects the diversity of the ratepayers. The District has been recognized for its diversity efforts with awards from the *Plain Dealer*, Diversity Center, and the Greater Cleveland Partnership's Commission on Economic Inclusion.

The next chapter

Water quality in Northeast Ohio has vastly improved since the District's formation. Largely due to the organization's investments in plant rehabilitation and sewer construction, Lake Erie and the Cuyahoga River have prospered in ways that were unimaginable four decades ago.

Clean water has spurred economic growth through lakefront development and waterfront real estate construction, and the proliferation of fish species and wildlife that had virtually disappeared in the 1960s has resulted in fishing competitions and other water-related events. Perhaps most importantly, civic leaders recognize clean water's potential to fuel economies of the future, such as wind energy.

Many challenges remain, however. Due to the absence of federal funds since 1990, the District must rely on its customers to pay for the federally mandated CSO-control program and increasing operation and maintenance costs. Additional challenges include an aging infrastructure and a weak economy. Considering the public's financial predicament, the District must continue to lobby for federal financial assistance and operate as efficiently as possible.

Still, the District's priorities have not changed. The organization maintains its commitment to solidifying its position as an environmental leader, and regardless of economic challenges, its mission remains to protect public health and the environment, thereby assuring clean water for a greater Cleveland. □

ABOUT RATE INCREASES

SEWER RATE FEES were based on water consumption long before the District assumed ownership in 1972. The City of Cleveland began charging connected communities for sewage treatment in 1938 to help pay for improvements. Cleveland charged suburban customers higher rates by reasoning that the suburbs benefited most from the expanding sewer system.

The court order that formed the District identified specific projects for which suburban customers had to pay and specific projects for which City of Cleveland customers had to pay. In addition, suburban customers had to pay $33 million to Cleveland for the wastewater treatment plants. Funding for most of these projects was over 20-25 years. Since these projects are now significantly paid down or off, the District implemented a 20-year rate equalization process in 2003. As a result, in 2022, there will be one sewer charge rate for all regular customers.

In simple terms, sewer charges fund operations, maintenance, equipment replacement costs, and capital improvements (pay-as-you-go and/or debt-service payments). The District's capital improvement program includes major projects such as interceptor construction and plant renovations.

Rates are calculated by first identifying annual needs for operation and maintenance expenses (including natural resources), debt service payments, and pay-as-you-go capital, and dividing the total by the estimated total water consumption. The calculation has remained constant.

However, the rates themselves have changed significantly over the years. Since the end of federal funding in 1990, sewer rates have risen continuously.

In 1974, the average Cleveland resident paid $1.41 per thousand cubic feet (mcf) and the average suburban resident paid $3.79 per mcf. In 2016, those charges were $78.05 per mcf for Cleveland residents and $79.85 per mcf for suburban residents. This significant increase is the result of a lack of federal grant funding since 1990 and rising costs, primarily due to inflation and, most recently, federally-mandated Project Clean Lake construction projects. Currently, about 38¢ of every sewer-bill dollar will go towards Project Clean Lake.

Since the end of federal funding in 1990, sewer rates have risen continuously.

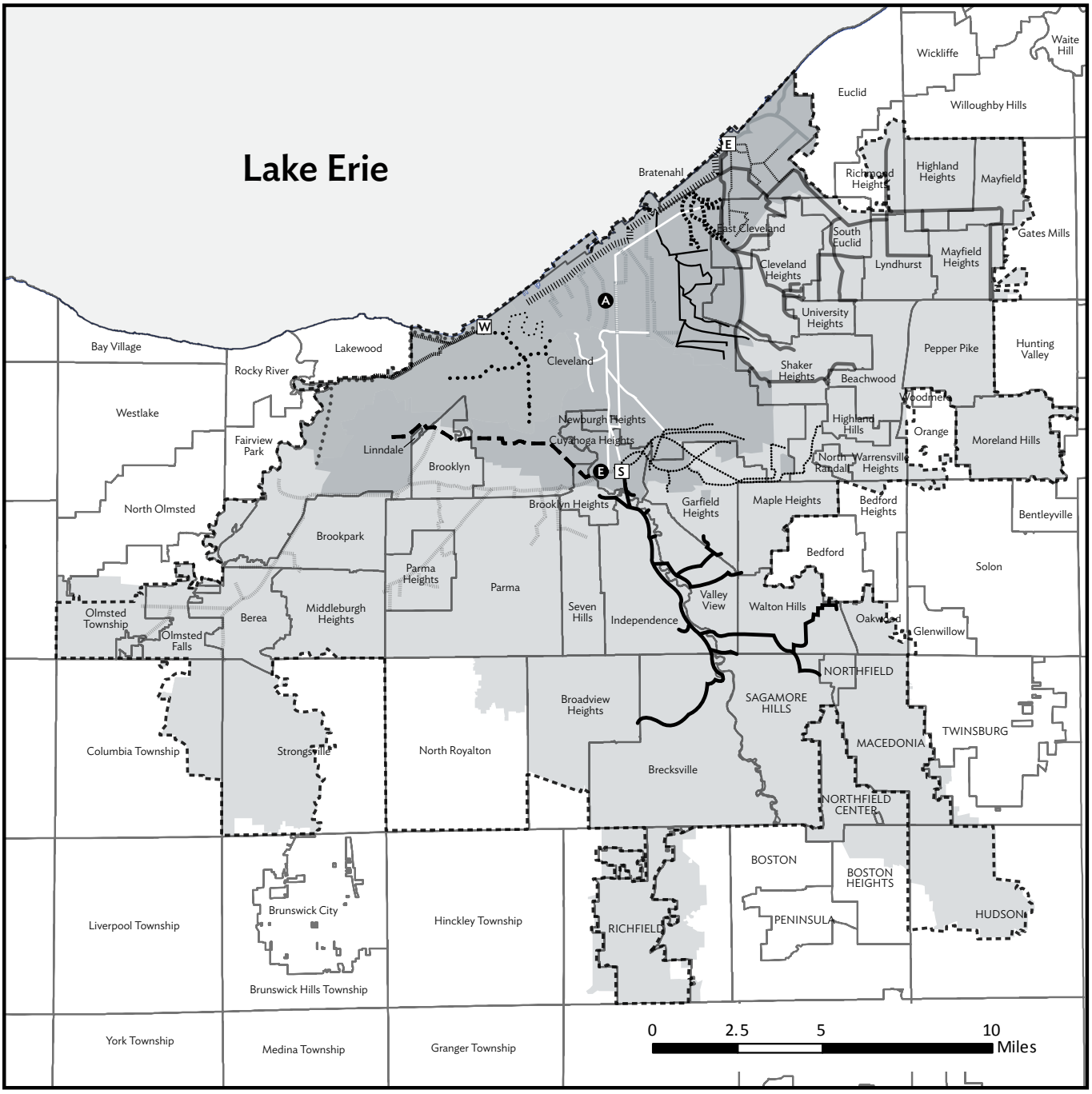
Also playing a role in increasing rates is a declining customer base coupled with an expanding service area. Since 1972, the population the District serves has remained relatively consistent while the service area has nearly doubled. The District has also seen a significant decrease in its largest user group, industrial customers.

To help customers, the District offers several rate-saving programs. The Homestead Program (implemented in 1991) offers a significant discount to homeowners that are 65 and older, or under 65 and totally disabled. Customers must also meet a maximum household income requirement and own the property in which they live.

Under the Summer Sprinkling Program (implemented in 1993), customers' summer bills are based upon the lower of average winter water consumption, or actual summer water consumption. As a result, customers do not pay for seasonal use, such as watering their lawns.

In 2011, two new programs were implemented. A Wastewater Affordability program offers customers whose income level is at or below 200% of the poverty level a potential rate reduction of 40%. The Crisis Assistance program benefits customers affected by a major event in their life, such as major medical expenses not covered by any other source, job loss, separation, or divorce. The program offers financial assistance up to $300 annually towards sewer-bill payments and suspends interruption of water service. □

NORTHEAST OHIO REGIONAL SEWER DISTRICT WASTEWATER AND STORMWATER SERVICE AREAS



- Combined Sewer Area
- Separate Sewer Area
- Stormwater Service Area

- A McMonagle Administration Building - 3900 Euclid Avenue
- E Environmantal & Maintenance Services Center - 4747 East 49th Street
- E Easterly Wastewater Treatment Plant - 14021 Lakeshore Boulevard
- S Southerly Wastewater Treatment Center - 6000 Canal Road
- W Westerly Wastewater Treatment Plant - 5800 West Memorial Shoreway

WESTERLY WWTP INTERCEPTOR SYSTEM

- Low Level Interceptor
- Northwest Interceptor
- Walworth Run Interceptor
- Westerly Interceptor

EASTERLY WWTP INTERCEPTOR SYSTEM

- E. 140th / E. 152nd-Ivanhoe Interceptors
- Easterly Interceptor
- Doan Valley Interceptor
- Dugway Interceptor
- Heights-Hilltop Interceptor & ICRS
- Lakeshore-Nottingham Interceptors

SOUTHERLY WWTC INTERCEPTOR SYSTEM

- Big Creek Interceptor
- Cuyahoga Valley Interceptor
- Mill Creek Interceptor
- Southerly Interceptor
- Southwest, West Leg Interceptors & ICRS

Southerly, 1978

The Plants: Easterly, Westerly, and Southerly

Upon its creation in 1972, the Sewer District assumed ownership of the Easterly, Westerly, and Southerly Wastewater Treatment Plants. But all three plants predated the District's formation by several decades, and their individual histories, at least until 1972, are quite independent from the District. This section follows the plants' histories, which can be traced back to the 1920s and 1930s.

Plans and studies preceding the plants

As the City of Cleveland grew throughout the 1800s, the purity of the water supply became an increasing cause for concern. The Sta te Department of Health began to call attention to the dangers of polluting the water supply in 1895. At this point, officials, scientists, engineers, and other interested parties began to seriously contemplate how to address the growing problem. The following plans and reports were the result. It is evident how these early concepts shaped Greater Cleveland's current wastewater treatment system, with the Pratt Plan becoming the most influential.

THE HERING-BENZENBERG-FITZGERALD PLAN

A study on water and sewage control conducted in Cleveland in 1896 led to a report by the Commission of Engineers on water supply and sewage disposal issues in the City of Cleveland. This report was known as the Hering-Benzenberg-Fitzgerald Plan, named after the members of this commission. It made four recommendations:

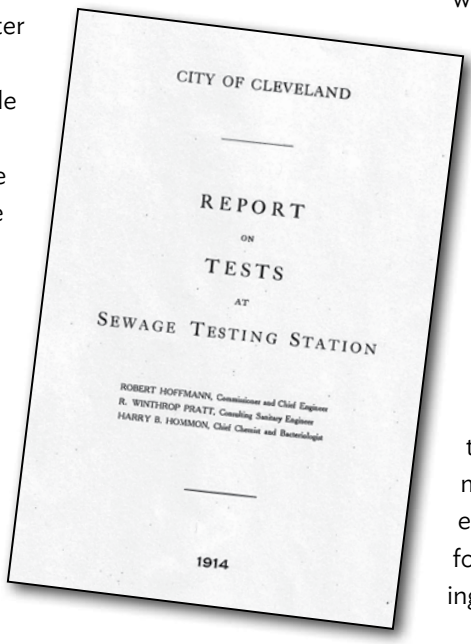
1. That a combined system of sewers be provided for the main portion of the City, with a separate system of sewers for the low-level section along the Cuyahoga River.
2. That permanent points for intake of the drinking water supply and the discharge of sewage be established, and that these should not be less than ten miles apart.
3. That a system of "intercepting sewers" be constructed, collecting the sewage of the entire city and carrying it to a discharge point in Lake Erie, ten miles east of the water intake and extending not less than one-half mile into the lake.
4. That the sewage be screened on the shore and carried out into the lake by submerged pipes as near the lake bottom as practicable.

As a result of this study, the Easterly Interceptor was constructed and placed in operation in 1905, running from the Cuyahoga River along the lakefront to the current site of the Easterly Wastewater Treatment Plant at East 140th Street and Lakeshore Boulevard. The Easterly Interceptor took sewage flows from the combined trunk sewers along its route and carried them into Lake Erie, but no treatment of any kind was included in the plan. By 1908, coarse bar screens were installed at the terminal basin of the interceptor, and a 63-inch steel outfall pipe was extended 2,000 feet into the lake. Engineers originally intended to install siphons under the Cuyahoga River to carry sewage from the west side of the City into the Easterly Interceptor as well, but these siphons were never constructed. (It was the first time this concept would be suggested, but not the last.)

It is important to note that the original plan recommended "combined sewers" for the main portion of the City. A combined sewer carries domestic sewage, industrial sewage, and stormwater all in a common sewer, as opposed to a "separate sewer" system that isolates stormwater from the domestic and industrial sewage flows.

THE PRATT PLAN OF SEWERAGE

In 1911, R. Winthrop Pratt, Consulting Sanitary Engineer for the City of Cleveland, was commissioned to undertake a study to form recommendations for treatment of both drinking water supply and sewage. This was before the construction of the City's water purification plants. Pratt concluded that "sewage works" (treatment plants) would not prevent possible pollution of the water supply from surface drainage entering the Cuyahoga River within city limits, or from the "diluted sewage which must pass into the lake once or twice a month through some 30 stormwater overflows in the sewer system." Pratt also concluded that if drinking water purification works were constructed, the main objective of sewage treatment would be to protect the beaches, shores, and lake waters with an eye on preventing bacterial pollution of the lake at the water intakes. Pratt recommended additional studies to further define a course of action.


CITY OF CLEVELAND

REPORT
ON
TESTS
AT
SEWAGE TESTING STATION

ROBERT HOFFMANN, Commissioner and Chief Engineer
R. WINTHROP PRATT, Consulting Sanitary Engineer
HARRY B. HOMMON, Chief Chemist and Bacteriologist

1914

As a result of Pratt's recommendations, the Cleveland Sewage Testing Station was constructed at the present site of Easterly WWTP, at the terminus of the Easterly Interceptor. Testing at this site for 11 months (beginning in January 1913) entailed investigation of various forms of "sewage treatment," including grit chambers, hand-cleaned bar

gratings and coarse screens, sedimentation in various types of tanks, roughing filters, trickling filters, and sludge treatment. Based on these tests and related engineering studies, Pratt formulated the following conclusions in his "Report on Tests at Sewage Testing Station" (1914):

1. The Cleveland areas should be divided into four major sewerage districts—the Westerly, Easterly, Southerly, and Low Level districts—and each of the first three should be provided with a main intercepting sewer to deliver sewage to a local sewage treatment site.
2. The sewage from the Westerly and Easterly districts should be treated at two lakefront works (at West 58th Street and East 140th Street), while the sewage from the rest of the City should be treated at a site on the Cuyahoga River opposite Willow Station (now Cuyahoga Heights).
3. Partial treatment of the sewage should be provided at the Westerly and Easterly sites, and complete treatment should be provided at the Southerly site.

Pratt indicated that 50 percent of the City's sewage would be treated at the "Easterly Works." He felt that clarification of the sewage, along with disinfection and discharge to the lake, would provide a sufficient degree of purification for this location. Pratt recommended grit chambers, scum removal, clarification in two-story tanks, disinfection by chlorine, and discharge at least one-half mile into the lake. He also suggested drying the sludge in enclosed structures and disposing of the dried cake as fill material or fertilizer. The proposed location of the Easterly works would make it the one facility immediately adjacent to a City neighborhood. In light of this, Pratt pointed out, "It is desired to particularly emphasize the importance of reducing to a minimum, both in the design and operation of this plant, all sources of nuisances or features which, from an aesthetic standpoint, will be objectionable for a plant located as this."

Pratt projected that 22 percent of the City's sewage would be treated at the "Southerly Works." Because it would discharge into the Cuyahoga River, he felt that a greater degree of treatment would be necessary at that site than at the Easterly or Westerly sites. With scientists determining that the flow of the river would be insufficient to oxidize a large quantity of treated sewage, Pratt recommended adding an oxidation step to the plant effluent, in addition to employing similar processes to those suggested for Easterly.

The remaining 28 percent of the City's sewage would be treated at the "Westerly Works." Then, as now, the limited space at the Westerly site was a concern, but Pratt felt that the smaller size of the Westerly service area would convey a fresher sewage to the plant than at the other two sites. As a result, he recommended that further testing be performed at Westerly to determine the preferred treatment process. The basic processes of grit and scum removal, disinfection, discharge, and sludge disposal were similar to those recommended for the Easterly site, but testing would be needed to determine whether to incorporate a clarification process similar to that proposed for Easterly, or to use fine screens (with the screenings disposed of by incineration or by using them as fertilizer).

Pratt felt that the fine screen process would be an economical and effective treatment process for this site. The City constructed a demonstration plant at the West 58th Street site to conduct fine-screen tests for one year under Pratt's direction. Pratt's assistant engineer during the Easterly and Westerly studies was George B. Gascoigne.

Unfortunately, the City was unable to proceed with construction of these facilities due to the onset of World War I. In addition, lack of funds had limited what they were able to accomplish with the original testing station. As a result, additional tests were performed in 1916 and 1917 at the Easterly site, this time to demonstrate the applicability of the newly developed "activated sludge" process. A one million gallon per day ("1 mgd") pilot plant was built for this purpose. The results obtained from this work were very favorable and much original and valuable information was gained from these early studies.

In 1917, there was considerable controversy about the degree of treatment required at the two lakefront sites—particularly the treatment processes. After considerable discussion with a number of eminent sanitary engineers and health department officials, the conclusion was that the sedimentation (clarification) process would provide 35 percent purification, while fine screening would only be capable of 5 to 10 percent purification. As a result, it was determined that sedimentation—supplemented by disinfection during the bathing season—would be recommended for Westerly and Easterly.

Considerable concern was also expressed about the relationship between sewage treatment and the water supply. However, by this time, scientists had determined that it was necessary to treat raw lake water for drinking water purposes. Consequently, a modern water filtration plant was constructed in 1914 at the Division Avenue site (now Garrett Morgan Water Plant), along with a water

intake extending five miles from shore.

In 1922, a sewage treatment facility consisting of bar grates, grit chambers, sedimentation tanks of the Imhoff type (two-level tanks with sludge digestion in the lower portion), and disinfection was placed in operation at the Westerly site. Preparatory devices consisting of bar grates, grit chambers, flow measurement, and disinfection were also built at the Easterly site, with the expectation of providing further treatment at a later date.

GASCOIGNE REPORT OF 1924

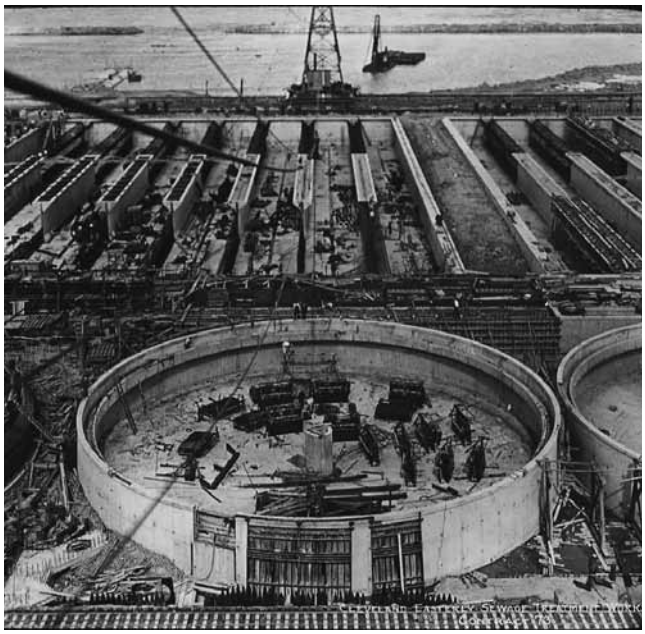
In 1924, George Gascoigne was commissioned to prepare a report on sewage treatment alternatives for the Southerly site. This report reconfirmed Pratt's recommendation that complete treatment was necessary because Southerly would discharge into the Cuyahoga River. Gascoigne recommended the construction of Imhoff tanks for primary settling and sludge digestion, and trickling filters for removal of dissolved organics. The relatively new activated-sludge process was considered, but for economic reasons—and because of its unproved dependability—Gascoigne did not recommend this process. The Imhoff tank-trickling filter plant was constructed and put in operation in 1928.

ELLMS REPORT

In 1929, J. W. Ellms, Engineer of Water Purification and Sewage Disposal (later the City's first Commissioner of Sewage Disposal), submitted a report on treatment alternatives for the Easterly site. He recommended the incorporation of complete treatment at Easterly—construction of an activated sludge plant with primary settling—and sludge digestion "at some location other than East 140th Street." Ellms projected the cost of such a facility at $14 million.

HOFFMAN-HOWSON-HERRON REPORT

In May of 1930, a Special Engineering Commission was formed to report on the Cleveland water supply system. Driven by plans for the construction of the Nottingham Water Plant on the east side and a new water intake to be located four miles from the Easterly plant's discharge, the study recommended that sewage treatment at the Easterly site "be undertaken at as early a date and to as high a degree of completeness as financial limits will permit." (Ironically, due to financing disagreements between the City and the suburbs, the Nottingham plant would not be constructed until 1951.)



An undated photographic plate of the Easterly Sewage Treatment Works, "Contract 73"

GASCOIGNE REPORT OF 1931

In November of 1930, a referendum was held in the City of Cleveland to vote on approval of the sale of bonds to fund construction of sewage treatment improvements. The response of the public was favorable. As a result, George Gascoigne revisited the report written by J. W. Ellms two years earlier, with the same conclusions. Gascoigne recommended that an activated sludge plant be constructed at the Easterly site, with treatment of the solids to take place at some other site, preferably at the Southerly Sewage Treatment Works.

It is interesting to note the change in preference for the level of treatment from a decade-and-a-half earlier. This may have been motivated by the growing need for new water intakes, increased use of the lake for boating and swimming, significant advances in the art of sewage treatment, and the general public demand for improvement in the level of treatment.

The activated sludge plant constructed at the Easterly site went into operation in 1938. The design included facilities to pump sludge 13 miles under the City of Cleveland to the Southerly plant for disposal and incorporated sludge digestion and incineration. At the same time, similar sludge digestion and incineration facilities were provided at the Westerly plant, and an "abbreviated" activated sludge plant was constructed at the Southerly site.

Easterly Wastewater Treatment Plant

SERVES: 333,000+ residents
AVERAGE FLOW: 85 million gallons per day (mgd)
FLOW CAPACITY: 300 mgd (full) / 400 mgd (primary)

The oldest of our facilities, Easterly is located in Cleveland, where it has stood since 1908. The plant treats wastewater from homes and businesses, as well as stormwater from combined sewers which have existed under Cleveland in some areas for more than 100 years.

In recent years, Easterly has undergone major construction to expand its secondary treatment capacity to 400 mgd, a requirement of the District's consent degree with the U.S. EPA and Ohio EPA. This program of 25 Control Measures that will control CSOs across the District's service area is referred to as Project Clean Lake.

The Easterly Wastewater Treatment Plant began as a screening-only treatment point for raw wastewater collected in Cleveland and discharged into Lake Erie. Planning for the plant began in 1896 with the development of the Hering-Benzenberg-Fitzgerald Plan, which recommended building a system of combined and separate sewers to collect wastewater and transfer it to interceptors for discharge into the lake. In 1905, the system of sewers and interceptors began operation. The Easterly Interceptor extends from the Cuyahoga River to the current location of the Easterly Wastewater Treatment Plant at East 140th Street and Lakeshore Boulevard. Engineers also recommended screening the wastewater, so a screening facility was built and put into service in 1908, along with a 63-inch outfall pipe extending 2000 feet into Lake Erie.

As a result of the 1911 Pratt Plan of Sewerage, the Cleveland Sewage Testing Station was built in 1913. The testing station was to be used for an 18-month study and consisted of a grit chamber, hand-cleaned bar gratings and coarse screens, a variety of sedimentation tanks, roughing filters, trickling filters, and sludge treatment. Influent flow was routed through the testing facilities prior to discharge into the lake. Pratt's conclusions from the study were to install permanent grit chambers, scum removal, clarification in two-story tanks, and disinfection by chlorine, and to discharge effluent at least one-half mile into the lake. He also suggested drying sludge in enclosed

Easterly construction, 1932

In 2013, Easterly underwent major construction to increase its treatment capacity.

structures and disposal of dried cake as fill or fertilizer. These facilities were never constructed due to the onset of World War I.

Availability of equipment at the Easterly site led to additional tests beginning in 1916 to demonstrate the applicability of a newly developed "activated sludge" treatment process. The City constructed a one-mgd activated sludge pilot plant for this purpose. Results were favorable, and useful data were collected.

The design and construction of full-sized preparatory works with chlorination facilities and a second submerged outfall began in 1919 and was completed in 1922. These facilities included hand-cleaned bar screens, grit channels, a chlorine feeding and storage installation, and an 84-inch concrete submerged outfall extending about 2700 feet into the lake. City officials anticipated that secondary treatment would be provided at a later date.

Because the new Nottingham water plant intake was planned for installation about four miles from the Easterly outfall, three separate studies recommended the construction of a highly effective treatment works at the Easterly site as quickly as possible. The most comprehensive study in 1931 called for an activated sludge process with pre-settlement of the sewage and transfer of the waste solids to the Southerly Wastewater Treatment Center for processing and disposal. Based on these recommendations, the 123-mgd Easterly activated sludge treatment plant was constructed and placed in service in 1938. Its peak capacity was 307 mgd through primary treatment and 184 mgd through secondary treatment.

In 1959, City officials recognized that the size of the plant needed to increase when average flows exceeded the design capacity of 123 mgd for several months. "A Plan for Improvements and Enlargement of the Easterly Wastewater Treatment Plant," submitted in 1966, outlined improvements to address the significant additional flow and pollutant loading since 1938 by increasing the average design capacity to 155 mgd. As a result of this plan, in 1968, the primary treatment capacity was expanded by adding four primary settling tanks, new primary sludge pumping and new grease separation facilities.

In 1974, the Facilities Plan for Phase I Improvements was submitted. This plan included a multi-phased approach for improvements driven by National Pollutant Discharge Elimination System (NPDES) permit effluent standards. Phase I was intended to address secondary treatment, including new disinfection and a new effluent pumping station. Phase II (1976) centered around a treatment process demonstration program for evaluating phosphorus removal, effluent filtration, and disinfection processes. The report recommended improvements to the return-activated sludge system and final settling tanks. A 330 mgd secondary capacity value appears to have originated within this 1976 report. It is based upon 310 mgd flow entering the plant and a 20 mgd allowance for filter backwash.

Substantial expansion of the headworks facility and construction of a fluidized bed grease incinerator had occurred by 1976.

By 1981, construction of a new disinfection facility and effluent screw pump facility brought secondary capacity to 330 mgd.

In 1994, the District undertook the construction of the Heights/Hilltop Interceptor for transporting wastewater from the eastern suburbs to the Easterly Wastewater Treatment Plant. The plant headworks were modified to provide priority treatment to the separately sewered Heights/Hilltop flow. Also constructed in 1994 were three one-million-gallon sludge storage tanks, a pumping facility, and a new sludge force main (replacing the one originally installed in 1938) to the Southerly WWTC.

In 1997, the Easterly Wet Weather Preliminary Engineering Study evaluated ways to cost-effectively upgrade the Easterly plant to minimize untreated discharges of wet-weather flows. These improvements were implemented in 2002 during the Easterly Wet Weather Improvements project. The improvements consisted of replacing the coarse screens with 3/4" screens, leveling the detritus tank weirs, and installing a new primary effluent wet weather pump station to discharge flows from primary treatment in excess of secondary capacity. During this project, the Collinwood pump station also was upgraded. Five new pumps were installed and other improvements to the wet wells were made. The Collinwood pump station collects and pumps flows from the Collinwood Interceptor, which collects flows from the area south of Lakeshore Boulevard and east of East 140th Street, up into the detritus tank influent channel.

A Comprehensive Facilities Plan Project from 2007 developed a 30-year capital improvement program and established plans for Easterly's future wet-weather flow management and capital improvements based on future conditions and regulatory requirements.

Multi-year projects necessary to expand plant capacity—a requirement of the consent decree—brought significant construction activity to Easterly in 2013. Secondary system improvements to increase the plant's capacity for processing wastewater included installation of six additional settling tanks. In recent years, Easterly has also undergone grit system improvements, primary settling tank rehabilitation, chemical storage and feed improvements, and a Chemically Enhanced High Rate Treatment Facility (CEHRT) pilot testing plant *(see page 26)*. The full scale CEHRT facilities are currently in design. Construction at Easterly is expected to continue through 2021. The total cost of these projects is anticipated to reach $275 million.

New final settling tanks will bring Easterly to 400 mgd capacity.

EASTERLY HIGHLIGHTS

1905 Easterly Interceptor construction (Cuyahoga River at West 9th to East 140th and Lakeshore) completed.

1908 Easterly begins screening wastewater. A 63-inch outfall pipe is extended 2000 feet into Lake Erie.

1913 Cleveland Sewage Testing Station built for an 18-month study.

1919 Design and construction of Easterly WWTP (including preliminary treatment and effluent chlorination) begins. A new outfall runs 2700 feet into Lake Erie.

1922 Easterly construction completed.

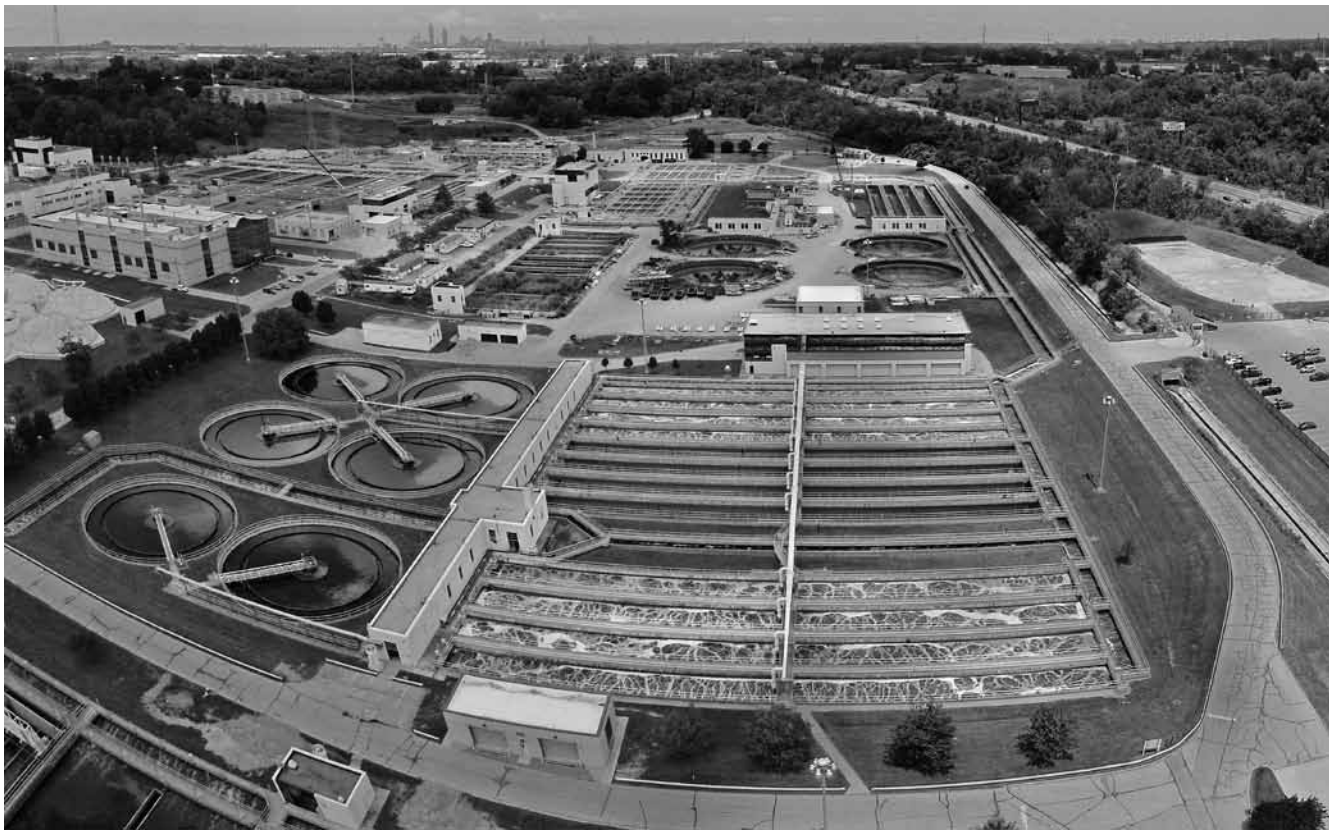
1938 Secondary treatment plant completed and placed into service. Easterly becomes Cleveland's first activated sludge plant.

1966 Average daily flow of 123 mgd attained.

1972 District assumes operation of Easterly and continues to expand capacity and refurbish the plant to meet stricter discharge limitations.

1994 Construction of three sludge storage tanks, a pumping facility, and a new sludge force main to Southerly (replacing one from 1938).

2013 Major construction begins for improvements to attain Project Clean Lake mandates.



Southerly Wastewater Treatment Center

SERVES: 530,000+ residents
AVERAGE FLOW: 120 mgd
FLOW CAPACITY: 735 mgd

Situated on 288 acres, Southerly is the largest of the Sewer District's three wastewater plants, and one of the largest facilities of its kind in the country.

The first-stage activated-sludge process is similar to those used at Easterly and many other treatment plants around the world. The second-stage process uses specialized bacteria to remove ammonia and nitrogen, two compounds which deplete oxygen in receiving waters. As a final step, the flow passes through filters and is disinfected by a chlorination/dechlorination process from May to October.

In 1914, after the sewage testing station had been operating for two years, R. Winthrop Pratt and George B. Gascoigne made the following observations for the Southerly site:

1. Approximately 22 percent of the city's sewage would be treated at these works.
2. It would be necessary that the effluent from the plant (which would be discharged into the Cuyahoga River) be relatively clean since the flow of the river would not always be sufficient to oxidize a large quantity of tank-treated sewage.
3. Consequently, a higher degree of purification was necessary than at the Easterly and Westerly works.

It was therefore recommended that the plant provide grit removal, grease and oil removal, sewage clarification by tank treatment, tank effluent oxidation in coarse grain filters, sludge drying, and final dried sludge disposal.

In 1924, Gascoigne submitted a report to the City reaffirming the need for complete treatment of sewage discharged into the Cuyahoga and recommended constructing an Imhoff tank trickling filter plant at the Southerly site. The plant, designed to serve 280,000 persons and treat an average dry weather flow of 35 mgd, was built between 1925 and 1927. It began operation in 1928. The relatively new activated sludge process was considered but, for economic reasons and because of unproved dependability, was not recommended.

In 1931, Gascoigne's recommendations would again influence the Southerly site. In a report to the City called "The Treatment of Sewage from the Easterly Sewerage

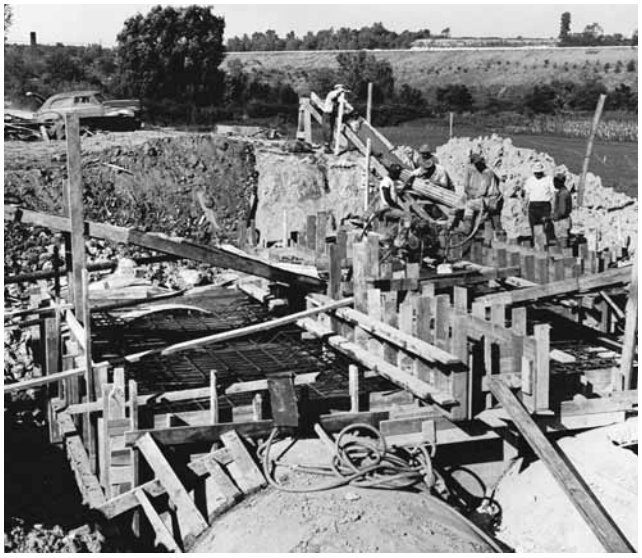
District" he recommended "that the treatment of the recovered solids take place at some other site, and preferably at the existing Southerly Sewage Treatment Works of the city." This decision led to the construction of the following facilities at the Southerly site from 1933 to 1938: a sludge force main from the Easterly site to the Southerly site, sludge concentration tanks, sludge digestion tanks, sludge vacuum filters, sludge incinerators, abbreviated aeration tanks, and clarifiers. Modifications to the trickling filters and humus tanks were also made. It was estimated that the plant would serve 410,000 persons and have the ability to treat an average dry weather flow of 45 mgd.

From 1950 to 1953, additional screening and detriter tanks, primary settling tanks, additional aeration tanks and clarifiers, additional digestion tanks, and a second outfall conduit were built. At this point, engineers estimated that the plant would serve 455,000 persons and have the ability to treat an average dry weather flow of 68 mgd.

From 1966 to 1968, the Imhoff tanks were converted to secondary digestion tanks. Also, several primary settling tanks were added along with aeration tanks and clarifiers, new sludge vacuum filters, new sludge incinerators, and elutriation tanks. It was estimated that the plant would serve 500,000 persons and have the ability to treat an average dry weather flow of 96 mgd.

In 1972, a design report authorized by the City for upgrading and expanding the Southerly site was completed and a basis of design was issued in February 1973. Later that year, the District assumed responsibility for the project, and the massive upgrade was completed between 1975 and 1987. The Southerly works were totally redesigned with: mechanical bar screens and aerated grit tanks, additional primary settling tanks, a second stage lift station, a second stage aeration system, multimedia effluent filters and chlorine contact tanks, a chlorine distribution facility, a chemical distribution facility for phosphorus removal, facilities for primary sludge degritting and gravity thickening tanks, sludge storage tanks, a wet air oxidation process, steam generation facilities, and skimming disposal facilities. Additional upgrades on existing primary settling tanks, aeration tanks and clarifiers, vacuum filters, and incineration were also done at this time. Engineers estimated that the plant would serve 605,000 persons and have the ability to treat an average dry weather flow of 175 mgd.

In the summer of 1987, the District entered into an agreement with the City of Cleveland to receive and treat water plant sludge from three of its water filtration plants. The sludge, pumped through force mains to interceptors, flows to the District's treatment plants. The Baldwin and Nottingham Water Filtration Plants convey their sludge to the Easterly site while the Garret Morgan Filtration Plant sludge travels to the Southerly site.



Southerly construction, 1951

Major equipment additions or replacements over the last 30 years have included new transformers, additional pumps, and a second force main to increase the capacity of the Cuyahoga Valley Lift Station. Gravity belt thickeners for thickening excess activated sludge replaced disc-nozzle centrifuges; vapor combustion units for odor control at three locations replaced chemical scrubber systems; a second package boiler was added at steam generation; high-speed centrifuges replaced vacuum filters at the sludge dewatering building; and new emergency generators increased back-up power capability.

In 1991, plant personnel successfully tested sodium hypochlorite for disinfecting plant effluent. In 1992, the District constructed a new disinfection facility that allowed them to discontinue the use of liquid chlorine—a change made with plant and community safety in mind. (Although sodium hypochlorite contains chlorine, it presents significantly less danger than liquid chlorine.) The facility included provisions for the storage and application of sodium bisulfite for effluent dechlorination to meet new stringent permit limits.

Numerous City of Cleveland and District initiatives have affected the Southerly site throughout its history. In 1928, the Southerly Interceptor (built between 1914 and 1933) was the sole conveyor of sewage to the Southerly facility. Since that time, five interceptors—the Mill Creek (1895 to

1932), Big Creek (1926 to 1939), Cuyahoga Valley (1977 to 1985), Southwest (1985 to 1996), and the new Mill Creek storage/conveyance tunnel (1997 to 2008)—have been added. In addition, pump stations were built in the low level areas of the Southerly drainage shed where sewage needed to be elevated to the nearest interceptor. (The Jennings Road station constructed in the late 1940s and the Dille Road station constructed in 1960 are the most significant because they capture mostly industrial sewage.)

In 2007, the District completed a Facilities Plan Project to develop a 30-year capital improvement program. The purpose was to 1) establish an operating plan for the plant's future wet weather flows based on Southerly's CSO Long Term Control Plan; 2) prioritize and schedule for renewal and replacement of aging infrastructure and equipment; and 3) establish a schedule of capital improvements based on future conditions and regulatory requirements.

In the past decade, there have been significant projects to attain compliance with the District's Project Clean Lake consent decree, by increasing secondary treatment capacity from 400 to 615 MGD, while providing further treatment of wet-weather primary bypasses through Chemically Enhanced High Rate Treatment (CEHRT). The majority of the construction was rehabilitation of existing process equipment to improve energy and operational efficiency and update the control technologies for increased automation.

Renewable Energy Facility

Faced with aging equipment, rising operational costs, changing environmental regulations, and increasing energy demands, the District began construction of its $170 million Renewable Energy Facility (REF) in 2009. This new, state-of-the-art "fluidized bed" incineration system replaced a multiple-hearth system that was beyond its useful life.

This facility began operation in 2014 and features many environmentally-friendly practices. Even prior to considering a renewable-energy component, the REF's fluidized bed incinerators have saved the Sewer District money in operating and maintenance costs. The new process uses less natural gas than the old incinerators, saving approximately $1.5 million annually. The REF even captures heat released from the incineration process and utilizes the steam generated to turn a turbine, producing power.

The REF was awarded LEED Gold Certification by the U.S. Green Building Council, for its sustainability features including water efficiency, innovation, and indoor environmental quality.

Renewable Energy Facility, 2013

SOUTHERLY HIGHLIGHTS

1924 Design of Southerly WWTC in Cuyahoga Heights (then Willow Station) begins. The Gascoigne Report confirms need for full treatment at the site.

1928 Southerly WWTC begins operation.

1930 Addition of Imhoff Tanks and trickling filters.

1938 Sludge digestion and incineration facilities added in conjunction with construction of Easterly project.

1955 Southerly upgraded to activated-sludge secondary treatment.

1960s Vacuum filters added for sludge dewatering prior to new incinerators. Plant design flow increased from 36 mgd to 115 mgd. The plant is fed by the Big Creek and Southerly Interceptors.

1972 District assumes operation of Southerly.

1974 Major rehabilitation of Southerly begins, with investments of $400 million through 1995.

1988 Southerly reconstruction program completed.

2009 Construction of Renewable Energy Facility (REF) begins.

2014 Operation of REF begins.

Westerly Wastewater Treatment Plant

Construction of the City of Cleveland's sewage treatment facilities began at the Westerly Sewage Treatment Plant at West 58th Street and Bulkley Boulevard in 1919. Westerly was placed in operation in 1922. The 36 mgd plant was designed to serve 288,000 persons and consisted of bar screens, grit chambers, Imhoff tanks (two-level tanks providing primary settling and sludge digestion), and chlorine disinfection during bathing season. At this time, digested sludge was disposed of by pumping through the outfall into Lake Erie.

In 1932, the plant was upgraded by adding a detriter (grit-removal tank) for better grit removal, an aerated grease separation tank, two 50-foot diameter anaerobic sludge digesters, a sludge filter for dewatering, and a high temperature garbage incinerator.

In 1937, the plant added a new incineration building containing four vacuum filters for dewatering sludge and two multiple-hearth sludge incinerators. Four additional digesters, a digester gas storage ball, and pre-chlorination facilities were also added. By this time, total investment in the Westerly plant had reached $2,750,000.

In 1956, the Westerly plant upgrades included replacing the old grit chambers, detriter, and grease separation tank with two new detriters, new pre-aeration facilities, and three new mechanically-cleaned bar screens.

In 1966, a study was conducted to determine treatment alternatives for the Westerly plant. At that time, Westerly was the only City plant to be limited to primary treatment: Easterly and Southerly were providing secondary treatment through the activated sludge process. Westerly was constrained by the high industrial component in its influent, and was restricted by the small amount of space available at the plant site (eight acres). One of the alternatives considered was to construct an activated sludge plant on the Westerly site. To provide sufficient space for such a facility, construction of an "Island in the Lake" with roughly twice the acreage of the existing plant was proposed just outside the existing breakwater. The existing screening and grit removal facilities would remain at the old Westerly site, as would the digesters and incinerators. The Imhoff tanks (constructed in 1919) would be converted to a stormwater detention basin. After screenings and grit removal, plant flows would be pumped to the island for activated sludge treatment. Primary settling tanks, aeration tanks, secondary settling tanks, and a new chlorine contact tank would be constructed on the island.

SERVES: 107,000+ residents
AVERAGE FLOW: 33 mgd
FLOW CAPACITY: 100 mgd

Our Westerly plant dates back to 1922, when treatment consisted of primary treatment, sludge digestion and chlorine disinfection.

Today, Westerly's treatment processes are state of the art. The facility is located on 14 acres east of Edgewater State Park, serving more than 107,000 residents in Cleveland and surrounding suburbs.

Westerly, 1919

Another option considered in the 1966 study harkened back to the original 1896 sewerage plan. Under this option, the Westerly plant would be abandoned and a lift station would be constructed at the existing plant site, with a capacity of 80 mgd. A 54-inch diameter cast-iron force main would be constructed to carry the sewage through a tunnel under the Cuyahoga River to the west end of the Easterly Interceptor, at the intersection of Lakeside Avenue and West 9th Street. The Easterly Interceptor had originally been designed to handle flows from the Westerly plant, so now all of Westerly's flow would be conveyed to the Easterly plant for treatment. However, this solution would have necessitated not only expanding Easterly, but also building additional capacity at Southerly, which would then handle sludge from all three of the City's plants. Neither the "Island in the Lake" nor the force-main idea was adopted.

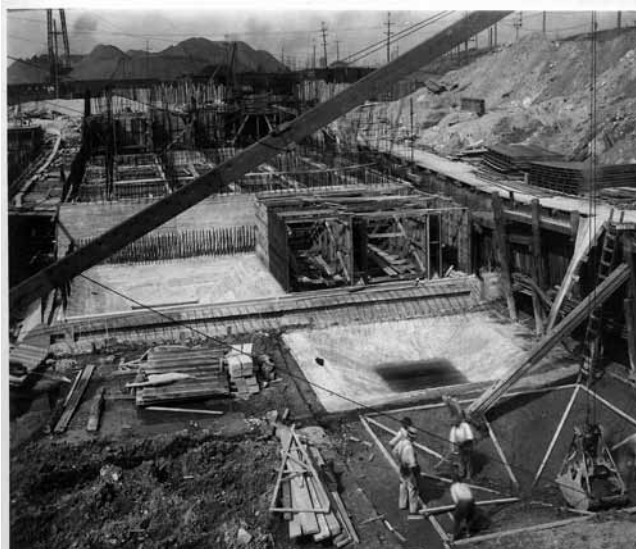
In 1970, the City of Cleveland began to explore additional alternative treatment methods for the Westerly plant. As a result of the various limiting factors facing the plant (high industrial load and limited space), the effectiveness of physical chemical treatment processes was investigated, with consultants being brought in to operate a pilot plant testing these processes at the Westerly site in 1970 and 1971.

Upon its formation in 1972, the Cleveland Regional Sewer District took over operation and design of the proposed Westerly Physical-Chemical Advanced Treatment Facility. Additional land was acquired, increasing Westerly's footprint to 14 acres. The District's Research & Development Group conducted a new series of pilot plant tests to further define the applicability of the new processes. The physical chemical process was an alternative to conventional secondary treatment which could be fit into a smaller space. The concept was approved and ground was broken in May 1974 for the construction of the new facility. The District began upgrading Westerly with the construction of new sludge handling and chemical handling facilities. This was followed by a continuing program of phased construction to rebuild the plant.

Following conventional screening and grit removal, the new Westerly resembled a water filtration plant more than a wastewater facility. Lime and polymer were added to flash mix tanks prior to the flocculator-clarifiers to enhance removal of suspended solids and phosphorus. The process elevated the plant pH to 10.5, necessitating treatment with carbon dioxide after the settling process to return the pH to a normal level of 7.0. The clarified effluent was then pumped through multi-media pressure filters to further reduce suspended solids and through activated carbon beds to reduce dissolved organics (BOD) in the final effluent. Oxygen from a cryogenic air separation plant and ozone from on-site generators were both used to augment the pressure filtration/carbon adsorption units. Chlorine was added for disinfection as a final step in the wet stream process prior to discharge into Lake Erie through the original outfall. On the solids side, horizontal bowl centrifuges were used for sludge dewatering, followed by feeding the sludge cake to one of two newly constructed multiple-hearth sludge incinerators.

At this point, Westerly's design flow capacity was 50 mgd with a 100 mgd wet-weather peak flow capacity. In addition to the plant, the Westerly site housed the Combined Sewer Overflow Treatment Facility (CSOTF), taking flows in excess of the plant's peak capacity. The CSOTF tanks were built on the original foundations of the old (1919) Imhoff tanks. (These foundations were the only part of the original plant remaining.) Flows up to 300 mgd going to CSOTF received primary settling, with flows up to 900 mgd receiving coarse screening. The maximum flow capacity of CSOTF was 1800 mgd. In addition, CSOTF was capable of retaining up to six million gallons during wet weather operation and pumping it back to the main plant for full treatment when flows returned to normal.

Construction of CSOTF was completed in 1983, and construction of the physical-chemical process in 1984. The District spent $123 million on the construction of the largest physical-chemical plant in the world at the Westerly site. In the years that followed, Westerly's operation was modified from the original scheme. Lime was replaced with ferric



Imhoff tank construction, 1920

chloride for suspended solids and phosphorus removal, eliminating the need for carbon dioxide and reducing operating costs by $1 million a year. Ultimately, mechanical failures in the carbon adsorption system resulted in another major redesign of the Westerly plant.

Upon the failure of the carbon columns, the District began to explore redesigning Westerly as a biological treatment plant. With the assistance of consultants Brown and Caldwell, a trickling-filter/solids-contact treatment process was selected for Westerly. In 1993, the plant began its conversion to biological treatment. The $60 million U.S. Representative Louis Stokes special appropriations grant helped finance this redesign.

In December 1995, the new biological treatment process at Westerly was placed in operation, consisting of three trickling filters, three solids contact tanks, and three final settling tanks.

In 2001, the Westerly Headworks was expanded to include two additional plug valves, two additional bar screens and influent channels, Parshall flumes for flow measurement, two additional grit tanks, and an additional grit washer.

In March 2005, the new Westerly outfall conduit was placed in service, replacing the original outfall after 80 years of service. The new outfall conduit extended 4,750 feet into Lake Erie—1,500 feet farther than the old conduit.

In 2007, the Westerly Interceptor Box Culvert (WIBCR) project began, replacing a 90-year-old culvert under the Cleveland Shoreway (and under railroad tracks) that brings flow into the plant from the Westerly Interceptor, enabling flows up to 100 MGD. (Previously, flows higher than 70 MGD would blow a manhole on the Shoreway on top of the old culvert.)

A recent project, Chemically Enhanced High Rate Treatment (CEHRT), expands the overall size and scope of the treatment process with the inclusion of chemical storage and feed facilities, providing new treatment and disinfection capabilities. Through the addition of chemicals, CEHRT speeds up the natural, gravity-based settling process used in the normal treatment process and provides disinfection. If approved by the EPA, CEHRT systems could be fully operational at all three District plants as early as December 2021. □

WESTERLY HIGHLIGHTS

1919 Construction of sewage treatment facilities begins at Edgewater Park on Lake Erie.

1922 Westerly expands to begin operating as a 36-mgd primary treatment facility.

1932 Westerly adds a detriter, aerated grease separation, anaerobic sludge digesters, a sludge filter, and a garbage incinerator.

1937 Sludge incineration added to Westerly, as are additional digesters and vacuum filters and a "Hortonsphere" digester gas storage ball.

1956 Westerly adds pre-aeration tanks and some equipment upgrades.

1974 Ground is broken for the new Westerly facility, designed to be the "largest physical-chemical treatment center in the world."

1984 Major construction of the physical-chemical process completed.

1993 Conversion of Westerly plant from physical-chemical treatment process to biological begins.

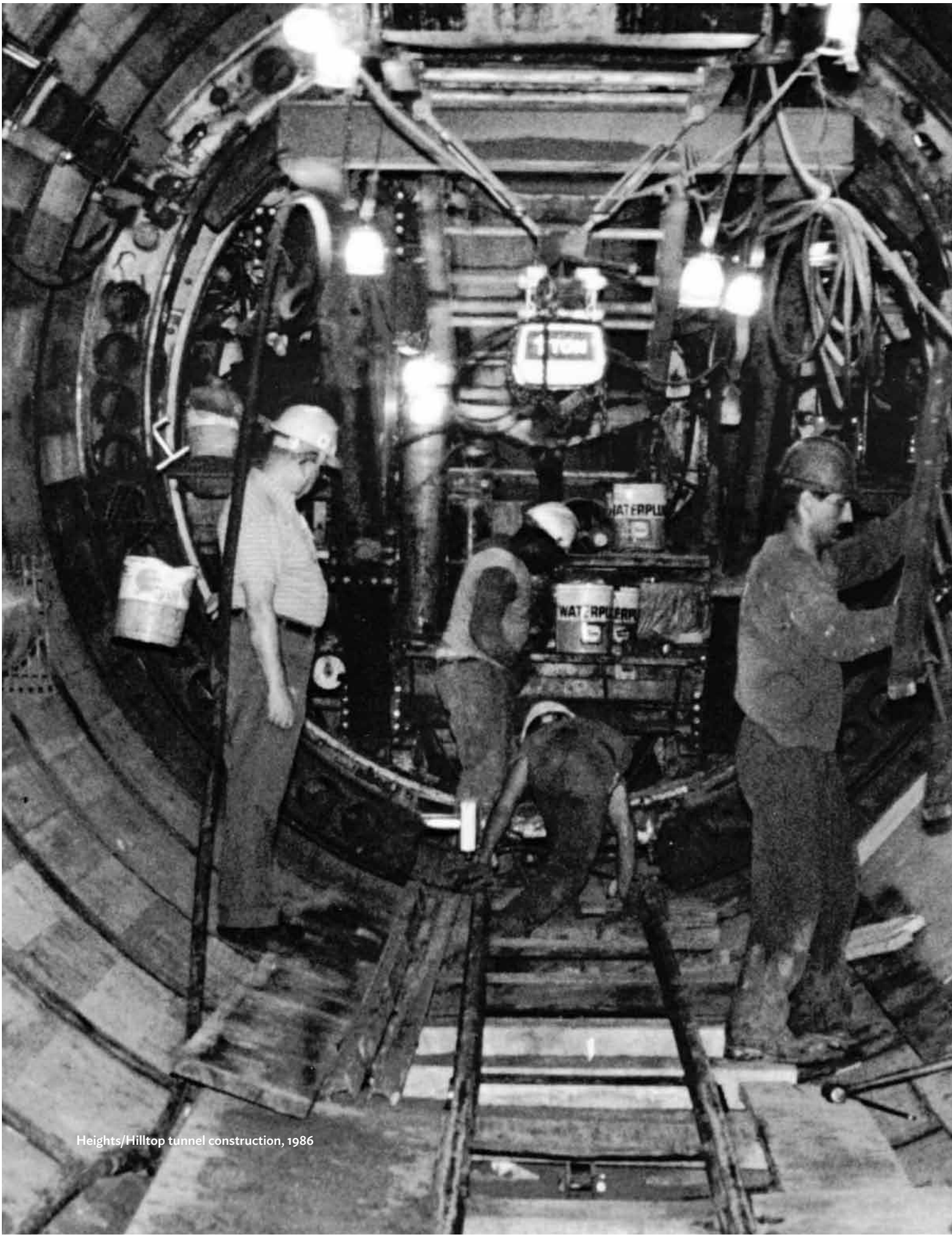
1995 District puts Westerly's new biological process online.

2001 Plant headworks expanded.

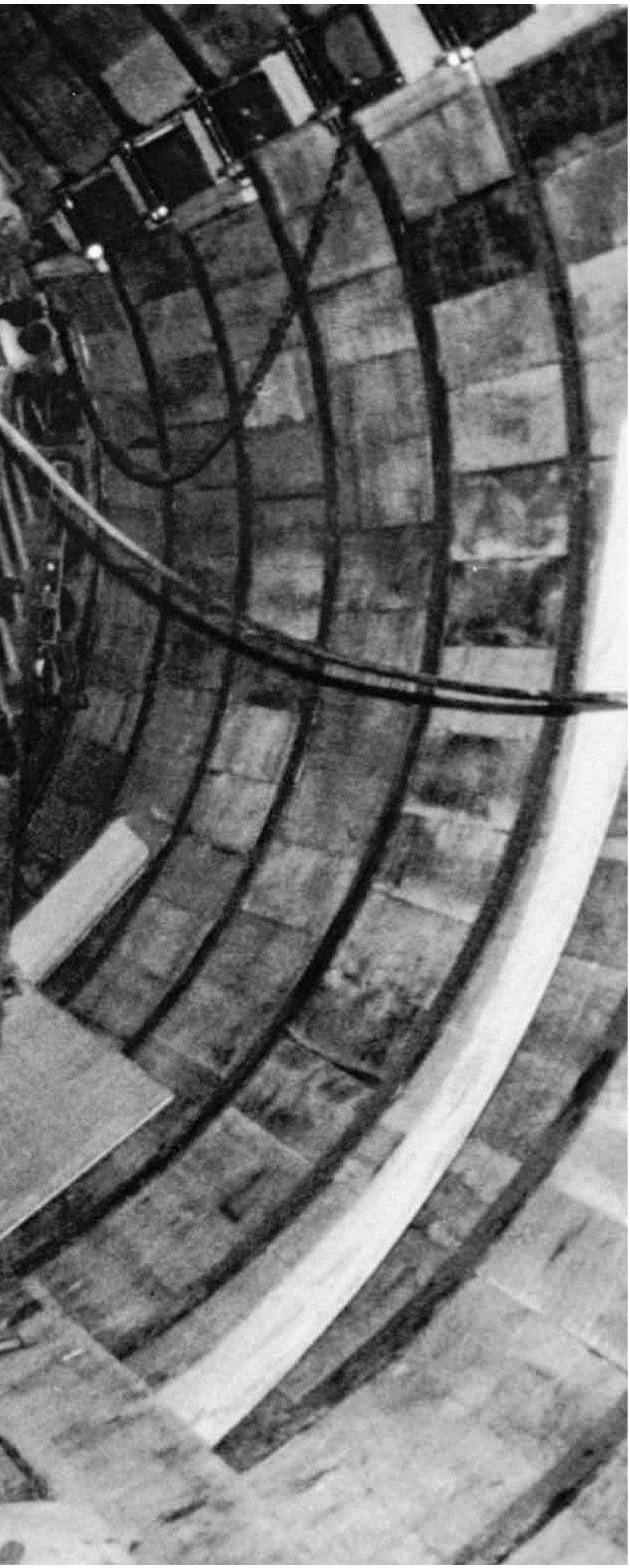
2005 New outfall conduit, extending 4,750 feet into Lake Erie, placed into service.

2007 WIBCR project increases flow capacity.

2015 Westerly tests CEHRT processes to provide new treatment and disinfection capabilities.



Heights/Hilltop tunnel construction, 1986



Northeast Ohio's Sewer System

Like the plants, Northeast Ohio's sewer system predates the District by several decades. The early sewers served to simply transport sewage away from Cleveland's growing population. But eventually they became the conduit through which wastewater traveled to the plants for treatment. Along the way, the sewers fueled the development of outer-ring suburbs by providing them with access to Cleveland's wastewater treatment plants. This is their story.

Eleven-foot-diameter concrete pipes for the Heights/Hilltop Interceptor, 1985

Interceptor and intercommunity relief sewers

In the late 1800s, city officials thought it would be most efficient to construct a single interceptor sewer that discharged into Lake Erie at a point about ten miles east of the Cuyahoga River at East 140th Street.

This interceptor sewer system would consist of combined sewers, designed to carry the dry weather flow, or sanitary sewage, from one million people. It would carry 200 gallons per capita per day of sanitary sewage and allow for a 100 percent increase in flow during storms. This required the construction of storm overflows into the Cuyahoga River and the lake at a number of points.

The main interceptor sewer was completed from West 9th Street to the outfall by 1911, as was the Doan Brook Valley branch interceptor which connected to the main interceptor. The Walworth Run Valley and the West Side Lake Front (from the city limits to West 58th Street) branch interceptors were also completed by this time, but temporarily discharged into the river and lake, respectively. Branch interceptors in the westerly and southeasterly portions of the city still had to be constructed and connected to the main interceptor and required an inverted siphon under the river between West 58th Street and West 9th Street.

In the early 1900s, a new view gained favor. It advocated dividing metropolitan Cleveland into four major sewage districts—the Easterly, Westerly, Southerly, and Low Level (the immediate areas on either side of the downstream section of the Cuyahoga River)—with Easterly, Westerly, and Southerly each having a main interceptor sewer to deliver sewage to a treatment site. Recommended treatment sites were East 140th Street for Easterly, West 58th Street for Westerly, and the Cuyahoga River near East 71st Street for Southerly.

By 1945, main interceptor sewers had been completed in the Easterly, Westerly, and Southerly districts, and plans were being developed for sewers to collect the sewage and industrial wastes in the Low Level District and discharge them into the Easterly, Westerly, and Southerly districts. Meanwhile, the many suburbs that had evolved around Cleveland had constructed separate sewer systems and connected their sanitary sewers to the Cleveland combined-sewer system.

In the 1970s, the need to provide further protection of Lake Erie bathing beaches, particularly at Edgewater

Park, became a priority. As a result, Cleveland designed and began to construct the Northwest Interceptor to intercept, store, and convey substantial combined sewer overflow discharges between West 117th Street and West 58th Street to the Westerly plant. At the same time, the need to decommission numerous small, difficult-to-manage wastewater treatment plants discharging into the upper section of the Cuyahoga River, particularly in the Cuyahoga Valley National Recreation Area, prompted Cleveland and the Cleveland Regional Sewer District to design and construct the Cuyahoga Valley Interceptor.

When the Sewer District was formed by court order in 1972, the City of Cleveland transferred 107 miles of interceptor to it. There did not seem to be any specific criteria to define the Cleveland interceptor sewers, and the original court order had some inaccuracies in defining the District's sewer system.

For example, some interceptor flows were incorrectly represented on the maps used to define the District's newly acquired sewer system. The court order also charged the District with constructing the Northwest, Cuyahoga Valley, Southwest, and Heights/Hilltop interceptors, requiring Cleveland to pay for Northwest and the suburbs to pay for the others.

The Northwest Interceptor was designed by Cleveland and already under construction when the District was established. The upstream section is a combined interceptor; the downstream section is a CSO storage sewer that discharges to the Combined Sewer Overflow Treatment Facility (CSOTF) at the Westerly plant.

The Cuyahoga Valley Interceptor was also designed by Cleveland and began construction when the District was established. It is a separate sanitary interceptor serving 11 communities in Cuyahoga County and nine communities in Summit County. Flows are pumped into the Southerly Wastewater Treatment Plant.

In the 1980s and '90s, the District constructed the Southwest and Heights/Hilltop interceptors. These interceptors were designed to prevent suburban sanitary sewage from entering the Cleveland combined sewer system and "express" it to the Southerly and Easterly plants for priority treatment.

The Southwest Interceptor is a separate sanitary interceptor serving 14 communities in Cuyahoga County and one community in Lorain County. Flows are conveyed to the Southerly Wastewater Treatment Plant.

The Heights/Hilltop Interceptor is a separate sanitary interceptor serving 15 communities in Cuyahoga County. Flows are conveyed to the Easterly Wastewater Treatment Plant. The interceptor was completed in 2005.

Heights/Hilltop, 1987

During development of the plans for the Southwest and Heights/Hilltop interceptors, it became obvious that connector sewers were needed to ensure that all communities, particularly those not adjacent to the interceptors, were able to take advantage of the interceptor capacity to be provided. In 1983, the Ohio EPA required the District to construct numerous intercommunity relief sewers and issue Community Discharge Permits to ensure proper use of these interceptors. From 1986 to 2006, the District constructed 40 miles of intercommunity relief sewers.

Combined sewers and CSO control

The combined sewers prevalent in older cities and inner ring suburbs carry both sewage and stormwater. In the mid-1800s, combined sewers were constructed in Cleveland to simply carry sanitary sewage, industrial waste, and stormwater directly to nearby streams, the Cuyahoga River, and Lake Erie. These first sewers were scarcely more than drains and were built only for local purposes. Nearly 40 years elapsed before a comprehensive system of sewers was adopted by the City.

In the late 1800s, with ten sewers discharging into the lake and 25 discharging into the river—while an increasing number of factories and oil refineries were adding to the

Mill Creek Storage Tunnel, 2003

river's vile condition—an outcry arose for better sewers. Thus, in April 1882, the City Council appointed a special committee to plan for a comprehensive sewer system. After conferring with engineer Rudolph Hering of New York, the committee recommended an intercepting sewer to discharge into the lake at Marquette Street.

Plans for a comprehensive sewer system lay dormant until 1885, when Mayor Robert McKisson appointed an expert sanitary commission to study the threefold problem of water supply, intercepting sewers, and river purification. In January 1896, the commission recommended constructing a single interceptor sewer system that discharged into Lake Erie. This interceptor sewer system was designed to receive up to twice the amount of dry weather flow, which necessitated the construction of combined sewer overflows (CSO) at many points along the river and lake.

In the mid-1900s, Cleveland built many more combined sewers and CSOs, while the maturing suburbs built separate sewer systems. However, the suburbs connected their separate sanitary sewer systems to the existing Cleveland combined sewer system, increasing the frequency and volume of overflows.

In the 1970s, Cleveland formed the Clean Water Task Force in response to a sewer tap-in ban and orders from state and federal agencies. A priority was to begin planning for some type of CSO control.

The Task Force installed a network of 12 rain gauges and sewer level monitors to help understand how the existing sewer operated. Three prototype in-sewer automated control structures were installed in the mid-1970s, each consisting of air-inflated rubber dams (Fabridams) to control the stormwater outlet and hydraulically operated slide gates to control the dry weather outlet. The structures were monitored and controlled by a central computer facility using analog telemetry over leased telephone lines. The CSO-control program was transferred to the Cleveland Regional Sewer District in 1972, at which point the Task Force was discontinued.

The District expanded the concept of in-sewer automated control structures by developing facilities plans for the Easterly, Southerly, and Westerly sewer drainage areas. These plans included a number of off-line combined sewer detention facilities and additional in-sewer control structures. The network of rain gauges was expanded to supply 25 additional automatic control structures. Based on the successful operation of the prototype control structures and the subsequent designs, the District installed 25 more structures in 1979.

In the 1980s, the greatest effort was put into the facilities plans, designs, and construction of the Southwest and Heights/Hilltop Interceptors. Even though they were sanitary express interceptors, they significantly reduced the discharge of dry- and wet-weather flow from separate suburban sewer systems into the Cleveland combined sewer system and thereby, other District interceptors.

In 1994, the U.S. EPA adopted the Combined Sewer Overflow Control Policy, requiring even more comprehensive facilities plans and the development of a CSO Long-Term Control Plan. The District authorized the development of an overall master plan for CSO control, followed by segmented long-term plans for the Mill Creek, Westerly, Easterly, and Southerly drainage areas.

The District's long-term plan for CSO control recommended deep tunnel storage for combined wastewater, a technology now widely used in metropolitan areas across the country. Rather than discharging to the environment, the combined sewage and rainwater is conveyed into a storage tunnel. After the rain stops, flow is pumped up (or flows by gravity) to a wastewater facility for full treatment.

Construction of the Mill Creek Tunnel began in 1997, and was completed in 2012, prior to the District's launch of its 25-year master plan, Project Clean Lake. Twenty

Euclid Creek Tunnel, the first of seven Project Clean Lake tunnels

feet in diameter and 41,400 feet long, the tunnel can store 75 million gallons of combined sewage for treatment at the Southerly plant, and has made possible a 97% annual reduction of CSO in the Mill Creek watershed.

In June 2012, excavation of the Euclid Creek Tunnel (ECT) began. The tunnel boring machine (TBM) that was used to excavate the tunnel boasts an impressive machine transport system for conveying and installing the precast concrete segments that comprise the lining of the tunnel. As the TBM advances, it erects and grouts these plates together, pushing out a finished product, one ring at a time. While the basic principles for excavating storage tunnels has not changed drastically in over a century, this "one-pass" technology marks an advance over earlier tunnels that required two passes.

In August 2013, the TBM successfully completed its three-mile journey under Cleveland and Lake Erie. The tunnel will have the capacity to hold 52 million gallons of combined stormwater and wastewater. The success of this project bodes well for the District's remaining tunnel excavations—and for continued improvements to water quality in the Cuyahoga River and Lake Erie.

Separate sanitary and storm sewers

In the mid-1900s, some areas of Cleveland and the growing suburbs began departing from building combined sewers to build separate sewers—one for domestic and industrial sanitary waste and one for stormwater runoff. As with earlier combined sewers, the storm sewers discharged into the nearest ditch or waterway. Over the years, these separate sewers evolved from being constructed "over/under" (with the storm sewer directly over the sanitary sewer in a common trench) to "side-by-side" (in a common trench) to separate trenches (most commonly on either side of the street). In most cases, the sanitary sewers were ultimately connected to a downstream combined sewer to be conveyed to a wastewater treatment plant for treatment. This subjected the domestic and industrial waste to overflow at many discharge locations.

The earlier over/under and side-by-side construction methods also allowed significant storm flow to transfer from the storm sewer to the sanitary sewer, overloading some sanitary sewers and contributing substantially more storm flow to the downstream combined sewers. Even separate-trench sanitary sewers developed cracks and leaks over time, allowing rainwater and groundwater to enter downstream separate (and ultimately, combined) sewers, and leading to basement flooding.

Many communities relieved these excessive flow problems by constructing interconnections between the sanitary and storm sewers, creating sanitary sewer overflows. This practice resulted in many stream segments becoming polluted. Although considered illegal by U.S. and Ohio EPA, numerous sanitary sewer overflows still exist today.

In 2016, the Sewer District developed a Member Community Infrastructure Program (MCIP) to help fund sewer repair and rehabilitation projects that address water quality and quantity issues impacting health and the environment. The MCIP helps member communities 1) achieve compliance with the Sewer District's Community Discharge Permit Program, 2) improve the function and condition of the local sewer system, 3) identify and remove sources of inflow and infiltration ("I/I") to preserve the hydraulic capacity of the local and District sewer systems and help to alleviate basement flooding and sanitary sewer overflows, and 4) eliminate failing septic systems.

Through grants or community operating leases, MCIP funds are made available annually through a competitive process and with Board approval. The funds are provided on a reimbursement basis directly to the member community for project costs, conditioned on the District's prior approval of the project. □

Using an electrofishing boat, WQIS staff conduct a fish survey on a wetland restoration project.

Water Quality & Industrial Surveillance

Monitoring water quality is key to the Sewer District's clean-water mission. Its Water Quality & Industrial Surveillance department works to ensure that discharges to the sewer system are free from hazardous pollutants that may threaten our treatment plants, infrastructure, and the environment. District investigators also evaluate water quality in the local streams and on Lake Erie, and serve as emergency responders.

A WQIS investigator collects a sample of an unknown caustic material at a CSO storage tunnel.

The early days of the Industrial Waste Section

On June 12, 1973, the new Cleveland Regional Sewer District (CRSD) contracted with the City of Cleveland's Water Quality Laboratory to establish a system that would charge industry within the borders of the CRSD a "fair and proportionate" sewer charge. This was a prerequisite of the Federal Water Pollution Control Act Amendments of 1972 for receiving federal construction grants.

Jim Weber, a chemist with the Water Quality Program, was given the lead to develop a program to comply with these requirements. With Jim Laheta (from the laboratory), he assembled a file system of companies within the District's jurisdiction. To determine CRSD's service area, the size and location of tributary sewers, and to begin sampling to assess the nature and strength of industrial waste discharge by industry, Weber also recruited Larry Adloff, also from the lab.

To obtain information about industries within the CRSD service area and to facilitate access to industrial sites, Weber developed a letter and questionnaire to distribute to all companies on the Water Department's large water-account list.

The District held numerous meetings with the Greater Cleveland Growth Association, Association of Metal Finishers, plant operators, coin-op laundries, linen suppliers, and other trade groups in the area to get the word out on the upcoming User Charge Program. January 1974 was established as the date the new billing programs would be ready.

Weber developed an Industrial Waste User Charge formula based upon three factors: flow, biochemical oxygen demand, and total suspended solids. Utilizing the research of Adloff and Laheta, he prepared a list of class average rates that would apply to specific industrial groups.

By December 1973, all of the various pieces of the puzzle were coming together, but what was lacking was a clear definition of authority to enforce standards and some sort of assurance to industry that things wouldn't change with every new administration. After several meetings, Weber and Lou Rego, the CRSD's General Counsel, agreed to develop a Sewer Use Code that would memorialize the program and ensure uniformity and consistency. This Code was adopted by the Board of Trustees and authorized the implementation of the User Charge Program in January 1974.

The IWS (now WQIS) performs stream monitoring, gathering information to assess water quality, 1988

Fish are collected, sorted by species, and counted, to see if the fish community is meeting Ohio EPA goals.

It was also in January 1974 that Weber, Laheta, and Adloff were transferred from the City of Cleveland to the Cleveland Regional Sewer District. Now, as employees of the District, Weber established a budget, named this group the Industrial Waste Section (IWS), and began the requisition process for vehicles, monitoring equipment, and staffing of this new District division. The IWS invested a lot of energy into fine-tuning the billing system to ensure fair and comprehensive charges.

This continued monitoring of industry revealed that there were some very dangerous and toxic discharges being dumped. High concentrations of strong mineral acids, cutting oils, lubricants, heavy metals, and cyanides were commonly found in the collection system. The IWS staff also observed that there was minimal control over septic-tank waste brought into wastewater treatment plants. Weber drafted language to more tightly regulate the acceptance and billing structure for this waste.

In June 1975, after reviewing the User Charge Data submitted by the Industrial Waste Section, the U.S. EPA approved the District's User Charge System, which now made the District eligible for hundreds of millions of dollars in grant money. This grant money was used to fund improvements at Westerly, Southerly, and Easterly, and to construct the Cuyahoga Valley and Northwest Interceptors.

In 1990, the names of departments at the new EMSC building were changed to better reflect their purposes; the District's laboratory became Analytical Services and IWS became Water Quality & Industrial Surveillance (WQIS).

Monitoring water quality

Since 1986, the Sewer District has had a program to monitor the water quality of surface waters in its service area. The District performs water quality sampling to provide information regarding the condition of local streams, rivers, and Lake Erie. This sampling can provide meaningful data, including information on bacteria, pollutants, and nutrients such as phosphorus.

This data is used to 1) establish and monitor water-quality criteria for different water bodies, 2) assess the impact of spills, illicit discharges, and environmental disruptions (and make recommendations for their remediation), 3) identify changes and trends in water quality and existing or emerging problems (especially those attributable to District facilities and programs), 4) coordinate monitoring activities with fellow agencies and entities interested in protecting water quality, and 5) provide a scientifically sound, current information basis for environmental planning and future pollution-abatement projects.

Members of Environmental Assessment, a division of WQIS, conduct sampling at numerous sites, including small streams like Mill Creek and Doan Brook, large rivers like the Cuyahoga and Chagrin, and Lake Erie. Staff collect thousands of water samples on an annual basis. Environmental Assessment applies the State of Ohio's water-quality standards to determine if surface waters meet the designated use set by Ohio EPA. Results are compared to historic data to show temporal as well as spatial trends.

The health of fish and macroinvertebrate communities is evaluated in conjunction with water quality data to identify impacts to the biological communities. The overall health of these communities in the Cuyahoga River has improved substantially over the past several decades. In 1969, when debris in the Cuyahoga last burned, many people would have thought results like these were impossible.

Data collected also can be used to determine whether or not compliance with pollutant regulations is being met. Sampling data is not only vital in determining where pollution problems exist, but it also shows where progress has been made. All of this is very important for the District's three wastewater treatment facilities.

New fish in the Cuyahoga

Assessing the fish community in a stream is one way that the Sewer District determines water quality and tracks changes over time. The types and abundances of fish in a stream indicate if the water there is clean or not. Since the early 1990s, the District has monitored aquatic communities in the Cuyahoga to determine the overall health of the river.

Fish sampling at each site is usually conducted one to three times each summer using a method called electrofishing. In electrofishing, an electrical current is put into the water. The current stuns the fish, and the electroshocking team pulls them from the water with nets. During fish surveys, all of the habitat areas within a section of stream are electrofished. The size of the stream section assessed (150, 200, or 500 meters in length) depends on the site's drainage area.

Starting in 2006, the District began observing different types of fish in the river. Between 2006 and 2014, 17 fish that had never been collected before by the District in the Cuyahoga were found. New species of fish collected since 2006 include the silver redhorse, rainbow darter, johnny darter, mimic shiner, and stonecat madtom, all of which are sensitive to pollution. The fish collected demonstrate that the water quality in the Cuyahoga River is improving and its capacity to support a more diverse aquatic community is increasing. However, there is still more work to do within the watershed to improve water quality conditions.

The District also has surveyed benthic macroinvertebrate communities since the late 1980s. These organisms play important roles in the environment: they are a food source for organisms that live in and around the water, and they also use and re-distribute organic matter and nutrients in the water. Ohio EPA use benthic macroinvertebrates to determine if a stream segment is meeting Clean Water Act goals, or if it needs improvement. For example, based on comparisons of samples from 2007 and 2014 from Mill Creek in Warrensville Heights, Mill Creek has improved from "Needs Improvement" to "Healthy."

Fish like the silver redhorse have returned to previously unihabitable waters thanks to improvements in water quality.

Tracking illicit discharges

The District's Illicit Discharge Detection and Elimination (IDDE) program is aimed at creating cleaner waterways. Detecting, tracing, and eliminating illicit discharge takes time and resources, but given its clean-water mission, the District sees it as one of its duties to assist communities in the enormous task of addressing these problems.

District investigators review information that the Cuyahoga County Board of Health (CCBH) provides on area sewer outfalls, and collect water samples to be analyzed for *E. coli* bacteria, a strong indicator of sanitary sewage infiltration. Based on the data from these analyses, the investigators will narrow down the problem areas and take samples from manholes for analysis by the District's Analytical Services department. Once the problem has been located, a District watershed team leader will work with a community representative to address the problem.

District investigators test wastewater from a food manufacturing facility in Cleveland.

A WQIS investigator brings absorbent material to contain a fuel spill.

Industrial pretreatment

Since 1984, the Sewer District has had an EPA-approved Industrial Pretreatment Program. The Clean Water Act gives the District the authority to regulate industrial wastewater discharges to its collection system, the sewers.

District crews inspect hundreds of local companies each year, based on the type of manufacturing processes in their facilities. This oversight ensures that discharges do not harm the collection system, interfere with biological processes at District treatment plants, or enter the environment. Many companies are required to have a pretreatment system to treat their wastewater before it enters the sewer system. These systems remove pollutants from wastewater in order to meet discharge limits.

The District uses laboratory data to determine compliance or non-compliance with these pollutant discharge limits, and may use the data to apply a surcharge to the industrial user's sewer rate. When a company is found to be violating limits, a notice is issued and the District works with the business in its effort to return to compliance. In extreme cases, enforcement action may be necessary: fines may be levied or sewer service revoked. The District may also refer cases to the U.S. EPA Criminal Investigation Division for potential prosecution.

The District also monitors area hospitals and dental facilities. All 460 dental facilities in the District's service area are required to have an amalgam separator, a device designed to remove the mercury used in fillings from the facility's waste stream.

Emergency response

For over 30 years, WQIS has responded to emergency calls from all over the District's service area. The District responds to emergencies 24 hours a day, 365 days a year.

If there is a potential threat to the sewer system or the environment, WQIS will dispatch a crew of investigators prepared to handle a wide variety of situations. Callers may report unexplained odors, chemical or fuel spills, or events that they perceive as needing immediate attention. WQIS is often dispatched to assist area fire departments or Ohio EPA if an emergency is in any way sewer related.

The District's WQIS staff participate on two regional hazardous-material teams. Spills or illicit discharges to water bodies within our service area often require water-quality sampling, and WQIS staff are appropriately prepared to deal with these situations. They can be called out to any HazMat incident and seamlessly enter an established incident command structure. Resources are pooled and efforts are not duplicated, which leads to an effective and efficient community response to emergencies. □

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OUR VISION

Be the environmental leader in enhancing quality of life in the region and protecting its water resources.

OUR MISSION

Provide progressive sewage and stormwater management through innovation, fiscal responsibility and community partnerships.

CORE VALUES

The District is committed to:

Environmental Stewardship
Initiating and maintaining effective practices of environmental sustainability through commitment to a better tomorrow, a healthy environment, and strong communities.

Ethics, Honesty, and Transparency
Maintaining the highest standards with our customers, our business partners, and each other.

Customer Focus
Individual and organizational commitment to providing value-added service to our external and internal customers. Includes attitude, knowledge, technical support, and quality service in a timely manner.

Balanced and Informed Decision Making
Quality decisions based on objective metrics, analysis of our systems, customer needs, and organizational goals.

Progressive Culture
Initiating and facilitating positive changes. Embracing and promoting innovation that benefits the District, our industry, and the region.

Accountability
A consistent willingness to accept responsibility, account for one's actions, and deliver on individual and collective commitments.

Respect
Demonstrating high regard, value, and consideration for self, others, community, and environment.


PLANTING PLAN BIORETENTION
MLK JR. DR.
ALIGN PLANTING BED LINES WITH JOINTS IN HARDSCAPE AS SHOWN (TYP.)
CR 25
PO 1
AA 1
AR 1
CC 1
NS 2
AF 28
PF 14
AM 34
CV 1
CS 38
CS 18
IE 20
OA 1
CS 11
IE 33
IV 27
AM 49
GB 4
LM 17
NS 1
CC 1
AA 2
AR 1