CleanWaterWorks

 ${\it A}$ technical journal of the Northeast Ohio Regional Sewer District

VOLUME 4

MAINTENANCE SERVICES

The teams, technology, and tunnels that keep the flow going

Northeast Ohio

From the Deputy Director of Operation & Maintenance



TOM MADEJ

Dear Reader,

This year's *CleanWaterWorks* focuses on how our Maintenance Services departments ensure that wastewater is conveyed to the Sewer District's treatment plants with minimal impact on the environment.

Maintenance Services, alongside Engineering & Construction, plans and coordinates the Sewer District's capital improvement projects, such as Project Clean Lake, which consists of large-scale storage tunnel construction and treatment plant enhancements. Our department also maintains these tunnels, which can be as large as 24 feet in diameter, up to 300 feet underground, and range from two to five miles in length.

Our Sewer System Maintenance & Operation team is responsible for over 300 miles of interceptor sewers and hundreds of regulators, pump stations, and tunnel-control structures. We provide inspection and maintenance to comply with EPA guidelines and permits, and we respond to abnormal operating conditions with appropriate corrective action to maximize wastewater flow to the plants.

Our Systems Integration group is responsible for data collection, analysis, reporting, quality assurance, and quality control. They perform rain, level, and flow monitoring and oversee the Ohio Utilities Protection Service program. Systems Integration also maintains real-time data for rain gauges throughout the service area, and provides daily precipitation reports to over 200 end users.

Maintenance Services also maintains and provides services to District facilities and the organization's fleet vehicles and equipment.

I hope you enjoy reading about all that Maintenance Services does to help the Sewer District keep our Great Lake great!

Tan Madej

Tom Madej

An 18-year employee with the Northeast Ohio Regional Sewer District, Tom Madej became Deputy Director of Operation & Maintenance in September 2017.



An SSMO crew inspects and clears debris from a sewer in Cleveland's North Collinwood neighborhood.

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ON THE COVER: Alfred Harrison, Todd Andexler, and Pete Lehman of SSMO conduct a sewer flush using a combination JetVac truck.

▼

Our Mission is to provide progressive sewage and stormwater management through innovation, fiscal responsibility, and community partnerships.

Our Vision is to be the environmental leader in enhancing quality of life in the region and protecting its water resources.

This annual magazine gives subjectmatter experts the opportunity to explain in greater detail our work and that of our partner agencies.

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Tunnels and more

Sewer System Maintenance & Operation crews protect the pipes

ou can flush anything, but that doesn't mean it's doing the sewer any favors," said Joshua Dress, an Operation Technician with the Northeast Ohio Regional Sewer District's Sewer System Maintenance & Operation (SSMO) department. He and the other technicians work to clear out blockages that keep the District's collection system from operating at full capacity and efficiency. "Many of times it's rags that get caught," Dress said. "Baby wipes, grit, debris. We've found cinder blocks." "I pulled a fender out once," added Field Technician Brian Stapleton, Jr.

The collection system carries wastewater and stormwater to the District's wastewater treatment plants. After a heavy rain event, SSMO crews clean off the bar racks giant screen-like structures located throughout the system that prevent large debris from reaching the treatment plant. "It's a pretty intensive job," said Stapleton. "After a rain event, you'll see debris stacked all the way to the top of the bar rack."

The JetVac pictured on the cover of this magazine is one of the large trucks that SSMO uses to keep the sewers clean. It has jet and vacuum systems and storage tanks for flushing out and removing debris. A tube put down a manhole takes debris out of the sewer, and the solids are taken to the District's Southerly plant for proper disposal.

In addition, crew members physically go into the tunnels for inspections. There are "3-team" tasks that entail lowering a technician from a tripod into a manhole while two operators assist on the surface, and "2-team" inspections that don't require manhole entries. The 3-team routes take longer, due to the time required to set up the tripods and monitor the sewer atmosphere for hazards.

Sewer District Field Technician Operators clean an intercommunity relief sewer in Mayfield Heights.

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WITH A \$6 MILLION ANNUAL BUDGET, Sewer System Maintenance & Operation (SSMO) operates and maintains over 318 miles of *interceptor sewers*, which are the large trunk sewers that carry wastewater from community sewers to the Sewer District's wastewater treatment plants.

"We ensure that wastewater collection and storage provides optimum health and safety for customers and communities," said SSMO Manager Michael Zapior (*pictured in the 24'-diameter Euclid Creek Tunnel, above*). Zapior manages a department of 47 that includes supervisors, specialists, and union employees. Their work is extensive, but their goals are straightforward:

- Maximize storage in the collection system
- Maximize flow to the treatment plants
- Eliminate sewer overflows to the environment

The SSMO teams also inspect and maintain many sewer-related structures throughout the District's service area, including:

- 718 fixed-weir regulators
- 24 automated regulators
- 28 precipitation gauges
- 102 level- and flow-monitoring sites
- 10 floatable control facilities
- 8 odor control facilities
- 11 pump stations
- 10 portable and stationary generators
- 6 tunnel-control structures
- 122 combined sewer overflow (CSO) outfalls
- 310 drop structures
- 30 bar racks



Some Cleveland sewers date back to the 1890s and are still used today. This 1982 photo of a sewer inspection shows similar safety precautions taken today, including breathing gear, hand tools, and harnesses.

Some locations are considered more critical to maintain than others, based on proximity to Lake Erie. "This regulator at East Park [in Cleveland's North Collinwood neighborhood] has a side-spillway fixed weir," said Dress (*see page 10*). "If that overflows, it's going to go right into the lake."

Preventative maintenance is central to SSMO's work. In addition to inspecting and repairing the sewer infrastructure, crews inspect the District's pump stations, controls, and monitoring equipment. While the field crews maintain, inspect, and repair the system's *fixed* assets, the System Utility Maintenance Persons (SUMPs) maintain the *automated* assets: the electrical, mechanical, hydraulic, and pneumatic systems and instrumentation that regulate the flow of wastewater in the system, "basically everything that measures and keeps track of how the station is running," said Dress (see story, page 12).

There are three levels in the SSMO's field crew department's classifications: Field Tech Operators, Operator Technicians, and Field Technicians. "Op Tech is the next classification up from Field Tech, and requires a Commercial Driver License and Wastewater Collection Class 1 License," said Dress. "Op Tech involves more paperwork, while Field Tech is more of the grunt work."

The SSMO teams benefit from having iPads with Geographic Information System (GIS) displays of all the Sewer District's assets. "These purple lines are sewer lines, and the yellow ones are the local lines," explained Dress, pointing to a map on an iPad. Details about an individual sewer—such as the pipe size and the year it was built—are easily accessible. "It makes it a lot easier to locate things and determine which lines are the Sewer District's and where our responsibilities are."

Work orders are created in the Oracle Work and Asset Management (WAM) system. Some are automatically generated, for example, in the event of a dry-weather sewer overflow, which is often caused by some sort of blockage. "In that case, WAM will indicate a need for a camera inspection, too," said Dress (*see story, page 14*).

Some jobs are bigger than others. "Straightforward preventative maintenance jobs might take an hour," said Field Tech Operator Pete Lehman. "But if there's a pipe that's extremely dirty, we could be there for a week."

In addition to making sure the sewer pipes are clear of debris, SSMO inspects different underground structures, such as regulators (*see pages 10-11*) and Tideflex backflow preventers (*pictured, right*) that prevent river inflow during heavy rains.

In general, SSMO handles the District's big interceptors pipes and CSO infrastructure, while the City of Cleveland's Division of Water Pollution Control handles the local sewers. "It takes a while to see everything we deal with," Dress said. "Even after being here a year, I still see sites that I haven't come across on a route book."

"Lake Erie is a great resource, but it was abused," added Dress. "Ten years ago, you wouldn't have wanted to go to Edgewater Park. Now it's a lot better." **CWW**

Michael Uva is Senior Communications Specialist at the Northeast Ohio Regional Sewer District.



One of the many assets that SSMO routinely inspects and maintains is a Tideflex Duckbill check valve. Its purpose is to prohibit flows from local waterways entering into the wastewater collection system.



Field Tech Christopher Lesh and Field Tech Operator Tony Reese inspect a regulator.

What gear does Sewer System Maintenance & Operation need to inspect a sewer?





Visitors to the Sewer District's annual Open House explore the Sewer Simulator.

What's it like down there? SSMO team creates a virtual sewer

he Sewer Simulator is a virtual sewer designed by Field Tech Operators Pete Lehman and Todd Andexler and used as part of the District's educational outreach.

The simulator demonstrates how flow comes from businesses and homes and through bar racks that the SSMO department has to clean and maintain to keep large items from going into the sewer.

"We heard about a simulator project from a sister agency, ALCOSAN, in Pittsburgh, and we thought it would be great to do something like it," said Andexler. "We had a rusty old shipping container in back of our garage," said Lehman. "We did a lot to rehab it. The troughs on the sides are two half pieces of corrugated culvert pipe." The simulator also features two fountain pumps, and holding tanks for water. "We pulled most of the materials out of the recycle bin," Andexler said. The scaled-down bar-rack structure was custom made by one of Southerly's Plant Utility Maintenance Persons.

The biggest challenge in constructing the model was making sure the pump rate was adequate to maintain a continuous flow of water. "We had to pick the right diameter for the drain, the right size pump, and the correct gallons per minute," said Lehmen. "We got lucky. We nailed it first try." Lehman said that visitors who walk through the simulator say that they had no idea of all that goes on down in the sewers—and what's entailed in maintaining it. "They are impressed by the flow sensors and monitoring equipment, and they have a lot of questions about the kinds of debris that we find."

Todd and Pete listed items they've found in the sewers: tires, trees, jewelry, bowling balls, car bumpers, and "millions of rags," according to Lehman. "Who flushes rags? It baffles me every time."

Still, the simulator can't convey all of the aspects of what it's actually like underground. "I don't think many people understand how dangerous it is working in a sewer," said Lehman. "Low-oxygen atmospheres, hydrogen sulfide exposure, explosive gases, and all the unknowns." For a team of men and women to go underground safely, personal protective equipment can't be overlooked (*see page 8*).

"We're not taking care of just small sewer lines," said Andexler. "We have huge structures that we have to maintain." Some brick sewers in operation throughout the city are more than 100 years old, and continue to function well, thanks in part to SSMO's diligent preventative maintenance efforts. **CWW**

Fixed-Weir Regulator



A REGULATOR IS A DEVICE used in combined sewers to control or regulate the diversion of flow. In the District's service area, there are two types of regulators: fixed-weir and automated.

There are over 700 fixed-weir regulators located within the Cleveland and inner-ring-suburb area (served by combined sewers) that are inspected and maintained by the District. Fixedweir regulators are designed to send wastewater flow to the treatment plants, but prevent street and basement flooding during a rain event.

During normal dry-weather conditions, sanitary flow enters the regulator and then travels to one of the District's wastewater treatment plants.

During heavy rain conditions, the level of combined wastewater and stormwater exceeds the height of the weir wall, and travels to a *combined sewer overflow* (CSO) outfall, where it is released into the environment.



DATA PAGES

Automated Regulator



SEWER SYSTEM MAINTENANCE & Operation's SUMPs also maintain the District's 24 automated regulators. These "autoregs" have underground vaults with hydraulic, pneumatic, and electrical systems. They control the opening and closing of gates and inflatable dams to provide additional storage in the local collection system.

During rain events, a level monitor will activate the gate so that it partially closes. This protects both the sewer leading away from the autoreg and the treatment plant, and it also turns the incoming sanitary lines into storage chambers for the combined flow, to be held until after the rain ends and the treatment plant can process it.

Above a certain level, that stored flow will pass over an inflatable dam or gate to a CSO outfall and into the environment, to prevent sewer backups into homes and streets.





All systems go

Preventative maintenance is key

f giant interceptors are the circulatory system of the Sewer District, then regulators and monitors make up its nervous system. Making sure that that network is in top condition is the job of System Utility Maintenance Persons, or "SUMPs."

According to SSMO Supervisor Stacy Juby, the core of SUMP work is preventative maintenance ("PM" for short), which involves checking the hydraulic, pneumatics, and electrical systems at the District's pump stations, automated regulators, and level and flow monitors. "I love the job because I'm always doing something different," Juby said.

Juby runs through a daily task list. "SUMPs are constantly on the move," he said. Maintaining assets throughout the District's service area entails a lot of driving. "When I started, it took a while to learn all the locations. This was before iPads. We just had a book, and oh man I was getting lost! You learn the city, that's for sure." Crucial to the operation of the District's collection system are 24 automated regulators that open and close gates. During heavy rain events, these "autoregs" provide additional storage in the collections system. They operate on either a hydraulic (liquid pressure) or pneumatic (air pressure) system. "Some autoregs can tell the level of water in a sewer pipe based on the weight of that water pressing down on an air bubbler tube," Juby explained. "As that water level rises or falls, the autoreg will open or close a gate leading to a nearby waterway. We try to avoid that, of course. Preventing overflows is the name of the game."

At one of the District's 11 pump stations, massive pumps move water from underground storage chambers up to the District's interceptor sewers, which in turn convey flow to the treatment plants. "We just replaced three pumps at this station," Juby said. "Efficiency is way up."



SUMPs are also responsible for maintaining over two dozen rain gauges that measure precipitation throughout the region. A rain gauge employs a see-saw-type lever that tips from side to side as it collects rain drops from a screened funnel. The gauge counts the number of "tips" and sends the data via a cellular system to the District base. "In some communities, a lot of basements flood because the sewers are small," he said. "We can provide the data we get to let a city know how much rain they had, so they can explain to residents why flooding is occurring."

Another task is calibration. At the SUMPs' shop in Cuyahoga Heights, Juby points out a charging station with dozens of hand-held gas meters that are used to check the atmosphere in sewer pipes and other confined spaces. The meter is lowered by a rope (or fitted with a tube that is inserted through a hole in a manhole cover) to determine if methane is present. "One spark can cause an explosion," Juby said. "Calibrating this equipment is an easy but important job."

The SUMPs also maintain numerous level and flow monitors at overflow sites and other key locations. These monitors are essential for collecting and transmitting data, especially at CSO sites, since the District must report any overflows to the EPA.

Odor Control is another example of sewer ingenuity. "It's basically a big bed of layers of mulch and stone," said Juby. A blower unit pushes foul-smelling air from its source (in this case, the District's Southerly wastewater treatment plant) to, and through, the mulch. A sprinkler system keeps the mulch moist, and microorganisms there feed on the odor. "Simple!" said Juby. The SUMPs make sure the blowers and sprinklers operate 24/7.

The SUMPs also assist the SSMO field crews. "We'll open and close the autoregulator gates for SSMO, and they help us out by being our eyes and ears out in the field. If they see a problem, like if a level monitor is down at a CSO location, they'll call us and we'll run out and fix it."

A member of the IBEW Local 38 electrician's union, Juby started out in the trade working on big construction projects, like Jacobs Field. "But I never got experience troubleshooting until coming to the District," said Juby. "I've learned so much from this job."

Although SUMP work leans heavy on electrical, the crew all learn welding and other skills. "Everybody's got their niche, and we learn from each other. I always say, 'There's never a stupid question.' That's how you learn, and you might be saving someone's life."

The SUMPs have regular work hours, but are always on call to respond to an emergency. "If something breaks down at two a.m. or on Christmas Day, we get the call," Juby said. **CWW**

Crawlers & cameras

Video capabilities ensure maximum sewer efficiency

aximizing storage and minimizing sewer overflows is SSMO's main goal. "Any time there's a dry weather overflow, we'll inspect to find out why it happened," said Field Tech Operator David Glisic.

When the District's Customer Service staff receive calls about sewer and drainage issues, an SSMO crew investigates. Sewer blockages can be caused by the slow accumulation of grit and debris or, more suddenly, from wayward tires, tools, or scraps of lumber and concrete from work sites. "Regardless if it's a Sewer District issue, or a local or homeowner's issue, we want to make sure that our assets are functioning properly," said Glisic.

There were very few dry-weather overflows in the first half of 2017. "It's a testament to all of the preventative maintenance work we're doing at the District," Glisic said.

The District's mobile truck and video equipment includes "crawlers" and other digital cameras (*see next page*). "The cameras are another tool for preventative maintenance," he said.

A visit from a software vendor sparked Glisic's interest in the new technology and how it could enhance SSMO's work. "We realized that our equipment was outdated, and around 2011 we started updating our fleet and gear," he said. "Now we're 100 percent digital, and we can generate video and reports and post them online for instant access by the District and the City and County."

continued on page 16



Field Tech Operator David Glisic in the mobile video truck



Rover X and Supervisor 250 crawlers

SSMO camera gear

"WE HAVE TO GET DIRTY," said Field Tech Operator David Glisic. "That's the nature of the business. But these tools allow us to inspect thousands of feet of sewer safely." Glisic demonstrated some of SSMO's camera units:

CRAWLERS

The Rover X crawler has adjustable wheel sizes and can fit into a 6" pipe. With its auxiliary lights on top, it can light up to a 60" diameter pipe. The head rotates 360 degrees for inspecting joints, cracks, roots, and debris and calcium that builds up on the walls of the sewer. A footage counter relays up onto our screen. If we find an issue, we can pinpoint where to start cleaning, or digging. It's a very maneuverable piece of equipment, and it eliminates a lot of guesswork.

The Supervisor 250 is older, heavier, and slower, but very reliable for large pipes and high flows. It can illuminate up to a 96" pipe.

With our crawlers, we can inspect

a 2000' length of sewer without moving our truck. We can set up away from busy intersections. It's safer than trying to open up manholes with cars whizzing by.

POLE CAMERA

This HD pole camera is great for quick results, to get a general idea of what's going on. We can inspect straight down a manhole and then zoom 300' in either direction. The feed is displayed on an iPad or anything with a wi-fi connection—there's a phone app, too and the info can be shared in real time.

LATERAL PUSH CAMERA

This is an older technology—you just roll it out like a garden hose. The camera head can fit into a line as small as two inches. With its intense light, it's great for sinkholes and voids under the pavement where you don't want to stick your hands.

If a business or homeowner is connected directly to one of our interceptors, we'd use this to inspect their line where we can't give a crawler access. It's good for locating offset joints or cracks or debris. Then we'll create a report and transfer the data to our GIS system. It all can be done using the push camera.

GoPro CAMERA

We also use a GoPro, either carried or mounted on a helmet, for postconstruction walk-through inspections for our engineers, and for preventative maintenance inspections of the large-diameter pipes that we have to physically go into. We also use it to shoot training videos for newer employees.

JETVIEW MONITOR

Our JetVac truck operators are tasked with cleaning out the sewers, and with this Jetview wireless monitor, they can see what the camera sees. Our cleaning has gone from what was once very good to 100% efficient. We can remove every piece of debris in the sewer.



Pole camera



Lateral push camera



Jet View monitor

Glisic's team collaborates with the District's Engineering & Construction teams, inspecting new assets before they go online, and prior to connecting a new sewer to an existing line. "We'll look at its condition and do an assessment," Glisic said.

Glisic shows me the office area in one of SSMO's two mobile video trucks. "This is my cubicle," he jokes. "Anything you can do from an office we can do here. We operate our camera through these controls, edit the video, create our reports, and upload them to GIS."

"When I started in 2009, we had a back office with shelves full of VHS tapes," said Glisic. "It's a huge change. Now we're we're able to wirelessly connect and post everything online. I like to see the results of our work, and share what we do. It's enjoyable to know our work is being used, and see how it helps other departments." CWW

Fleet Services

arryl Key says the biggest misconception about his department is that "all we do is oil changes." In fact, his Fleet Services team maintains all of the Sewer District's vehicles, boats, bikes, construction equipment, utility carts, generators, tow motors, pumps, and welding machines, in addition to managing maintenance contracts and fuel needs.

"Good preventative maintenance means that people only notice us when

something breaks down, which is rare," said Key. When a vehicle does fail, Key is able to get the District's tow truck out immediately and furnish a loaner vehicle until his crew can make a repair.

Key works closely with the different Sewer District departments to determine the most appropriate vehicles for them. "The more a customer is able to give input on what they need, and the better that vehicle performs, the better they take care of it," he said.



Fleet Services staff, interns, and Manager Darryl Key (right)

Longevity is important, given the responsibility to ratepayers and the heavy workload shared by Fleet Services' six mechanics. "We're always looking for things to help prolong the lifespan of our vehicles, like rustproofing and a chassis washer to clean the undercarriages."

Fleet Services mechanics—Jody Wysong, Julius Ware, Edward Stawicki, Donald McGhee, Brittani Lewis, and Mike Haught—are cross-trained, but each has his own specialty. "My concern is when they all get ready to retire," said Key. "Some of them have 30 years, and mechanics are at a shortage!" **CWW**

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Dig it! (but call OUPS first)

Marking the roads to protect the pipes

n any given day, you'll find Chuck Cofield in the middle of a roadway with a can of dayglo green spraypaint, marking up the pavement with arrows and numbers. A 30-year Sewer District veteran, Cofield alerts contractors and utility companies to the presence of sewer lines and other underground District assets, so that ex-

cavation and construction work doesn't damage them.

Cofield responds to incoming job tickets via an online ticket-management system of the Ohio Utilities Protection Service (OUPS), which serves as a com-

munication liaison between utility companies and anyone planning to dig. Notifications come in from contractors and utilities planning projects, and even residents just putting real estate signs or basketball hoops on their property. When Cofield is notified of work that might affect a District asset, he heads out to the site. "It's better for me to come out and mark it, and not need it, than for somebody to damage a pipe."

Using the District's GIS system, Cofield coordinates asset locations with the OUPS ticket info, and determines the depth of the crown, or top, of the sewer pipe.

> That info is relevant because if a contractor is excavating around or on top of the pipe, and even grazes the crown, damage can occur.

> All local utilities, including gas, electric, water, sewer, cable, telephone, participate in the OUPS program. "Every

utility sees the same OUPS screen that I see," said Cofield, pointing to a list of new tickets online. "If excavation is going to affect their assets, their crew will go out and mark it."

Tickets come in 24/7. "Red indicates an emergency





situation," said Cofield. "A water main break, a street cave-in, that's the first thing we are going to investigate."

If you want to dig a small hole on your property, chances are you are not going to affect anything, but it is still a good practice to call OUPS. "There may be a phone line or cable, and if you damage it, that's your responsibility," said Cofield. "I just do my part to make sure the District's assets are protected. At least whoever is working out there, digging, pile-driving, drilling, or cutting, they know that there are utilities within the work area."

Standing out in the middle of the street is dangerous. "People are not paying attention to flashing lights and yellow vests," Cofield said. "They're texting, or talking on the phone, putting on make-up, drinking coffee. I just don't want to be a hood ornament, that's all!" When he works in the roadway he brings an orange traffic cone and flag with him. "People see that and know something is going on." Cofield points out our location on an iPad. "This blue dot pinpoints where we are, at this intersection. Here you can see our Easterly Interceptor. We know exactly where our assets are." An upcoming construction project will feature a diversion structure and a drop shaft, so Cofield marks up the streets adjacent to the work site to identify District-owned pipes.

On the iPad, Cofield zooms in on the blue dot and pulls up the information he needs. The District's interceptors are shown in purple, and CSO locations and storm sewers are in pink. "We're working more efficiently," he said. "Any info I add is dated and tracked, and anyone can go into OUPS or GIS and see who documented what, and when."

The other utilities will do the same. "If you look along the sidewalk and streets, you'll see electrical, water, telecommunications, and cable markings," Cofield said. "It's a maze of stuff, and everybody marks and re-



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marks. It never ends because there is always something breaking or being built."

Cofield translates the green paint marks he makes in the road. "The paint color indicates who owns the utility," he says. "This arrow shows the direction of the flow, and the '10' with the hash mark indicates that the crown of the sewer is 10 feet deep. This 'br.' means brick, the material the sewer is made out of, and '42' is the diameter of the pipe itself. So all that information is here."

Cofield is also responsible for supervising connection tie-ins to District assets. "Anybody who has a new sewer line and wants to tie into one of our interceptors, I make sure it's done appropriately, according to the Sewer District's engineering specifications," he said. "A lot of contractors have my number on speed dial. I can show them exactly where the elevations are, where they are supposed to tie in, and make sure that it is done per our engineering specifications. And if I need to stop a job, I'll stop it. I've done that a couple of times." He recalled one instance where a District pipe was damaged, even though he had marked it. "The contractor disregarded the mark and drilled," he said. "We won that dispute because we had evidence that it was marked."

"As you can see, I have been marking the city up with a lot of green paint," said Cofield, laughing and pointing to paint spatters all over his truck and clothes. He addresses between 500 and 700 OUPS tickets per week. "It's never-ending."

Born and raised in Cleveland, Cofield knows the city as well as anyone. "My wife has a little joke. She says, 'Oh, you've been here,' when she sees green marks on the street. She knows my writing. Whenever you see green lines, there's a good chance I put them there." **CWW**

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Building Maintenance brings more than a fresh coat of paint

hether it's building a wall or tearing one down, pulling out old flooring or installing new tile, or constructing an entirely new space, like the rain garden at the George J. McMonagle Administration Building, the Sewer District's Building Maintenance team is up to the task. "They've done a lot of stuff over the years that is really impressive," said Manager Greg Holmes, pointing out storage areas converted to offices for the District's steadily expanding workforce, and countless ceiling and drywall projects and paint jobs.

Two decades ago, Building Maintenance's 11-man team included painters, HVAC specialists, a bricklayer, cabinetmaker, and cement finisher. The department's current five-man crew—carpenters Carmen Gumino, Mark Tomaro, and Raymond Berzins, electrician Tom Laser, and master plumber Joe Boziak are cross-trained in many skills, and

maintain over 100 District buildings, pump stations, and facilities across the organization. "The versatility of these people is incredible," said Tomaro.

"Between the five of us, we do a lot," said Berzins. "You'd be hard pressed to find a building in the District



that we haven't done something to." Their behind-thescenes work includes extensive electrical and plumbing upgrades that have to be done after hours or on the weekends. Some of the projects reflect cultural changes, for example: converting separate men's and women's lunch areas at Southerly into a co-ed space.



Building Maintenance tackles a backlog of projects both small (door and handle repairs) and large (pouring concrete pads for a new vehicle lift in the Fleet Services garage). Having an in-house maintenance department allows the District to save time by not having to outsource hundreds of tasks. Other recent installations include bicycle fix-it stations and exercise rooms at GJM and EMSC, and two new structures at Westerly: a salt shed and guard shack. "Those started up here," said 29-year District employee Tomaro, pointing at his head. "We envision something and then build it, from the ground up." **CWW**



Flow Monitoring Technician Daniel Conner prepares a regulator for installation of a flow meter, to assist our Engineering group design solutions to reduce CSO.



Intern Jasmine Hagan inspects a level monitor.

Systems go Data tells a story

ollecting, analyzing, and maintaining data is a crucial aspect of the Sewer District's work. The Systems Integration department performs data analysis and quality control for the District's wastewater and stormwater systems, to ensure that the organization is compliant with, or exceeds, all current regulations, and has the data to back it up.

Manager Karen Sokolow and her team collect data at 160 remote sites throughout the wastewater collection system, via a cellular-based remote terminal unit (RTU) data-acquisition system. The data, along with alert notifications, is made available to over 350 end users.

"We analyze the data to determine why systems fail," said Sokolow. "We can predict potential problems, make recommendations, and troubleshoot our instrumentation and equipment. And we're using technology to fulfill our mission of preventing and lessening sewer overflows into the environment," said Sokolow. One way to do this is to use monitors at locations that regularly overflow during dry weather.

TROUBLESPOT MONITORING

After making physical inspections of more than 200 regulators, Systems Integration staff, working with SSMO, found that some sites overflowed more frequently than others. The regulators are designed to allow combined sewage to overflow during wet weather to avoid backups and flooding, but if they overflow during dry weather it means there is a blockage or equipment malfunction.

About 84 of the sites were put on "troublespot" routes for more frequent inspection. "Our SSMO crew would go out to make sure these weren't blocked, but there was no guarantee that any one location wasn't overflowing as soon as the crew left," explained Flow Monitoring Technician Sue Chmura. "So we installed flow monitors in these locations to watch levels in the sewer."

Depending on the site, the team will monitor with either an ultrasonic sensor, which shoots a signal down towards the water, or a pressure transducer, which sits inside the water. An antenna transmits data via cellular communication.

Matt Horner surveys stream elevations at Highland Park Golf Course for a stream restoration project.

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An alarm system notifies SSMO if there's an issue. "If there's no rain and we get an alarm, we know there's a problem," she said. Several factors can contribute to this problem: a big pipe flowing into a smaller one, or low flow during dry weather, or sharp bends all allow grit to collect and accumulate. "Things randomly get lodged," said Chmura.

"We send out text alert notifications to warn of rising levels and try to dispatch crews before overflows into the environment occur," said Chmura. "Now we're catching problems long before they cause overflows." In some cases, remote monitoring replaces the weekly inspection routes the SSMO field crew used to perform.

"Hopefully, with troublespot monitoring, we can eliminate dry-weather overflows altogether," said Chmura. The Sewer District's Project Clean Lake tunnel construction program also will help address many overflow problems.

HIGHLAND PARK GOLF COURSE

Systems Integration also uses land surveying equipment to obtain coordinate data and locate wastewater collection and stormwater assets.

The Flow Monitoring team assists the District's Watersheds department by surveying elevations at points along the creek at Highland Park Golf Course, to monitor erosion. "With the data we collect, we can keep track of how much the creek is moving around," Horner said. The District shares the coordinate data with the City of Cleveland, which owns and maintains the Highland Park property.

Horner uses GPS surveying equipment to measure longitude, latitude, and elevation, pinpointing the location to within a millimeter. He uses fixed structures, like footbridges, as reference points. "Since the bridge doesn't move, we can compare elevations of the creek with that, and see how much changes over time."



Data collected at a District regulator shows a normallydry sewer pipe in which Systems Integration installed a level sensor. "Using text notifications and screen review, we are able to catch rising levels and often address blockages before overflows occur," said Manager Karen Sokolow. The blue horizontal line is the level at which the flow would top the weir and discharge into the environment. In this instance, a flow team member spotted the rising level and a crew was sent to inspect, jet, and vac the pipe. After that, the level dropped.

OTHER PROJECTS

Systems Integration maintains real-time data for rain gauges throughout the Sewer District's service area and provides daily reports to over 200 communities, staff, and consultants. Other projects include:

- Installing a monitoring system for the District laboratory's de-ionization process and tanks.
- Assisting with beach season reporting at Cleveland's Villa Angela and Edgewater beaches.
- Developing an early warning system to alert plant operators of changes in flow to the plants.
- Developing operational data and regulatory reports for internal and external stakeholders, to monitor CSO locations for EPA compliance.

Systems Integration also processes over 30,000 Ohio Utilities Protection Services tickets annually *(see story, page 18)*. **CWW**



Sue Chmura calibrates a flow monitor.

Administrative Services

isa Francisco and Joe Sidari oversee the District's Administrative Services department, coordinating "pretty much everything inside and out at EMSC and GJM that makes those facilities run," said Francisco. That includes landscaping and janitorial services, boiler and HVAC system inspections, safety drills, interoffice mail, trash, recycling, and elevator maintenance.

Francisco said the biggest challenge is meeting the requests of hundreds of employees. "What I like about it is that no two days are the same," she said. A big part of Sidari's job is making sure that outside service providers fulfill their contracts, and helping coordinate the District's annual Open House at EMSC. "It's our busiest time of year," he said. **CWW**



Administrative Services' Lisa Francisco, William Williams, Joe Sidari, and Miguel Andino

Green scene

Keeping stormwater at its source

he lush greenery at the corner of Fairhill Road and Martin Luther King Jr. Boulevard in Cleveland marks one of five Sewer District Green Infrastructure demonstration projects. Until early 2017, the District's Sewer System Maintenance & Operation department oversaw its functionality and structural integrity. (The District's Stormwater Inspection & Maintenance team now manages these sites.)

"Many of our Green Infrastructure sites have dedicated stormwater catch basins and laterals that carry stormwater to the bioretention basins," explained Infrastructure Support Specialist Mike Blair. Since stormwater carries grit and other debris, pre-treatment devices were installed upstream to catch floatables and allow grit to settle out, so the system does not clog.

The stormwater then enters the bioretention basin, passing through bio-engineered soils that improve water quality. The stormwater percolates down into the groundwater for long-term storage or, in the case of the Fairhill site, into an underdrain system that outfalls to Doan Brook. "Or it is taken up by the roots of the basin plants and sent back into the atmosphere via evapotranspiration," Blair said.

The basins are designed to drain collected stormwater within 40 hours, preventing them from becoming a safety hazard or a breeding ground for mosquitos. "We conduct regular inspections of the basins to ensure they are free of debris and weeds, to ensure that the system is functional and aesthetically pleasing."

In addition to helping reduce the amount of combined sewer overflow (CSO) entering Lake Erie, Green Infrastructure can provide sustainable, visually attractive features in neighborhoods. Over eight years, the Sewer District will invest an estimated \$55 million in Green Infrastructure projects to reduce CSO. **CWW**





Q&A

An interview with Ramona Lowery of the City of Cleveland Division of Water Pollution Control



How does Water Pollution Control differ from the Sewer District?

Daily operations for both agencies are similar, in terms of preventative maintenance. Cleveland's Division of Water Pollution Control (WPC) cleans and repairs the City's 1,436 miles of combined and separate sewer lines, nearly 43,500 catch basins, and 12 pump stations. We work with contractors and spend millions annually on capital-improvement projects, such as sewer replacements.

As the City's stormwater manager, we report to the Ohio EPA. We're responsible for matters relating to the elimination and regulation of polluted water in the city.

How would a resident know whether to call WPC or the Sewer District?

I recommend calling WPC first. We're responsible for the local sewers in the streets that get the flow to the District's big interceptor sewers.

The City has inspectors that take care of the various wards. They go out and make an assessment to determine if it's a local sewer problem. If it's not, we'll reach out to the Sewer District.

The two agencies work closely together. The line can be so fine on who is responsibile for various problems. We are often at the table together to determine that. The part that I most enjoy is figuring out how to improve a process.

What is a typical day for WPC?

Each day, we prepare a run sheet that shows how many crews will be out. One team might be tearing down a catch basin, prepping a site for bricklayers. Another will be walking through one of the large sewers with a camera, assessing a problem, or flushing out or repairing a mainline sewer.

We also have trucks running through the city to set up barricades to secure potentially dangerous sites. If we receive a call for a missing manhole cover, we have 60 minutes to get there. Those are very dangerous, and our number-one priority.

Do the two agencies work together?

We make sure we're not duplicating work, and there's a lot of information sharing. The Sewer District may be out inspecting and see an issue, and let us know. We also collaborate in the elimination of illicit discharges, and some state, county, and private projects require collaboration between WPC and the Sewer District. We have a good working relationship, and everybody knows who to contact.

clevelandwpc.com

Ramona Lowery, MBA/MPA, is Deputy Commissioner at Cleveland's Water Pollution Control. She previously served as Manager of Operation & Maintenance at the Northeast Ohio Regional Sewer District. **CleanWaterWorks**

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Sewer Maintenance



Crawlers & Cameras



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