



Macomb County Public Works Spring 2019

Candice S. Miller, Commissioner

Our Vision: Clean Water



INSIDE:
**Protecting
Lake St. Clair**

**Improving
Quality of Life**

**Fighting
the "Fatberg"**



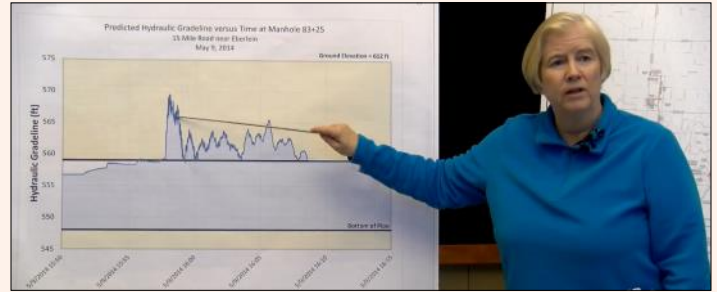
Message from the Commissioner

If anyone ever tells you that being a county public works commissioner, or, as I still like to call it from back in the day, that being a drain commissioner is boring – don't believe them! Our office is responsible for an incredible raft of projects that have direct and immediate bearing on the quality of life for Macomb County residents and plays a huge role in the economic vitality of our community.

Enclosed in this Spring 2019 report to the community, you will find details on some of our larger projects. I'd like to highlight two in particular: our plan to expand and upgrade the Chapaton Retention Basin in St. Clair Shores and daylighting the Sterling Relief Drain.

At Chapaton, we are currently engaged with a design team to develop a plan that will transform our relationship with Lake St. Clair. I am excited about this process. Our engineers have put together a plan that could transform our operations at Chapaton, which turned 50 years old last year. Upgrading the Chapaton Retention Basin is a complex project that requires vision, hard work and financing. It would be easy to just throw our hands up in the air, but at the Macomb County Public Works Office, we feel the time is right to make a generational change in how we interact with Lake St. Clair. The actions we take now will leave behind a cleaner lake for our children and grandchildren. (See more details on Page 10-11)

In Sterling Heights, our team worked to secure just over \$1.8 million in federal grants to pay for a series of green infrastructure changes to the drain, which serves roughly the entire middle third of the city, running west to east. We are taking steps to "daylight" much of the drain with green infrastructure, creating a butterfly "flyway" in the process. (See more details on Page 6)



Macomb County Public Works Commissioner Candice S. Miller points to the pressure spikes recorded in the 15 Mile Road Sewer Interceptor, which collapsed on Christmas Eve 2016. The collapse was caused by human error.

As you know, in 2017 the Macomb County Public Works Office spent almost every waking hour fixing the massive 15 Mile Road sewer interceptor collapse and resulting sinkhole, which took place on Christmas Eve 2016.

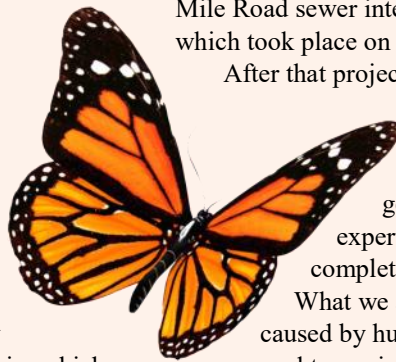
After that project wrapped up in December 2017, we hired an outside expert to review all of the data from that collapse and similar collapses which had taken place in the same general area in 2004 and in 1978. What our expert found was that the three collapses were completely different, caused by different reasons.

What we also found was that the 2016 collapse was caused by human errors. A series of internal gates were opened too quickly inside the pipes, allowing a tsunami of sewage to flow down the pipes. When that tidal wave hit a turn in the pipe, it created a water hammer that was, in effect, like a bomb going off inside the pipe. The pipe was damaged and eventually the collapse occurred.

Mistakes happen – and that is exactly why you carry insurance. Three contract firms were doing work in the underground system when these internal controls were not handled properly. The insurance firms of these companies were notified in January that we filed a claim for damages. We will report soon on the response to these claims.

There's always plenty happening at the Macomb County Public Works Office. In addition to all of the above, our crews are out in the community every day, ensuring our drains operate properly, maintaining our sewer systems and working with numerous local, state and federal partners to be sure we are doing our part to keep Macomb County the best place in the world to live, work and raise a family. Should you ever have any questions, please contact us at publicworks@macombgov.org or call my office at (586) 469-6101.

Sincerely,



DID YOU KNOW? About 77.5 square miles of Macomb County — or roughly 16 percent — is open water!

... Of Fatbergs and Ragballs



This 19-ton monster — a 100-foot long, 11-foot wide, 6-foot tall collection of fats, oils, grease and solids — formed in a Macomb County Public Works Sewer interceptor. It was dubbed the Macomb County Fatberg and drew international media attention to the problems created when things other than sewage enters pipes.

Wipes Clog Pipes — Our campaign against ‘ragging’

Over the past 12 months, the Macomb County Public Works has dealt with both Fatbergs and Ragballs -- conglomerations of materials that don't belong in our sewers, but once there, combine to form a major – and disgusting – problem.

Both are caused when people flush materials such as baby or personal wipes down the toilet. Other times, people send oil cooking grease or similar materials down their drains. Kitty litter, cotton swabs, cigarette butts – along with dozens of other items – all combine to cause a problem. The wipes have a tendency to get wrapped up into a ball that just keeps growing and growing, either causing a blockage in a pipe or making their way downstream to a pump,

that then gets tied up by the wipes. When fats, oils or grease, or FOGs, are added to the mix, a solid mass can form. The solids are collectively referred to as “ragging.”

The Macomb County Fatberg formed in our Lakeshore Interceptor line, which runs along I-94 in central Macomb County. The ragball, weighing about a ton, was discovered in the Garfield Arm, an interceptor that runs north and south under the road of the same name. Both were removed and the solids were disposed of in a landfill.

Wipes and similar items should be disposed of via regular household garbage. FOGs used in cooking should be poured into a glass jar or similar vessel to be allowed to cool before also disposed of in household garbage.



Remnants of the ragball excavated from below Garfield and 18 Mile roads.



MCPWO has partnered with researchers at Wayne State University to study the Fatberg to explore if there are steps that can take place at the sewer operations level to reduce Fatbergs.

About the Macomb County Public Works Office

Candice S. Miller, Commissioner



27
Communities served



865,000
Approximate people served



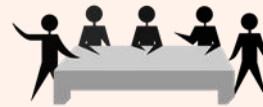
484



16%
of county is surface water



61
Full-time MCPWO employees



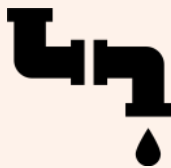
107
Drain board meetings

Storm water



14,022
Soil erosion inspections

1,262
Soil erosion permits issued



732
Miles of open & enclosed drains



141
Citizen calls about potential pollution. 24-hotline:



6
Pump stations



52
Drain permits issued



475
Number of county drains

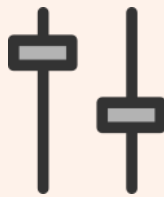


2,282
Plan reviews

Wastewater



68
Miles of pipe in 6 sanitary sewer districts



10
Sewer gate / control structures



11
Rain gauges



784
Sewer flow control meters



15.3
Million gallons annual total sewage transported



526 million
Gallons of combined sewage retained & diverted from entering the Great Lakes

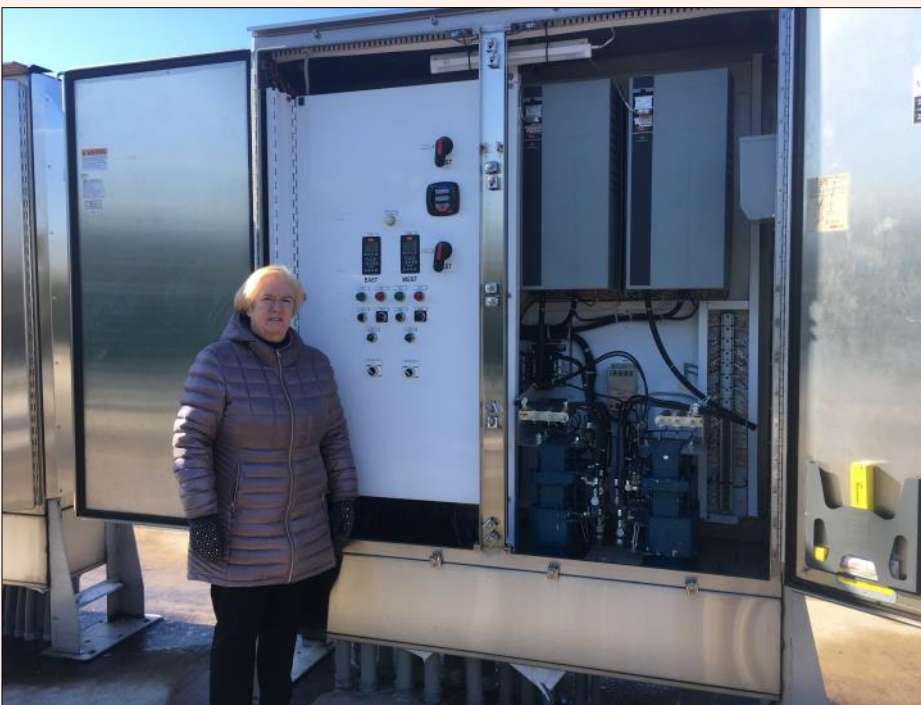


39 million
Gallons of capacity in 2 retention basins

All data represents annual activity in 2018

14,022 inspections & counting

In 2018, MCPWO conducted 14,022 inspections of job sites around the county, ensuring drain taps were made properly, soil erosion controls were in place and that county, state and federal laws were followed. These inspections help ensure that all the small steps that contribute to clean water are taken. In the photo at right, one of our inspectors ensures that a drain intake is properly protected from taking in soil sediment.



North Gratiot Upgrade

At the controls of our North Gratiot Pump Station, part of the Macomb Interceptor Drainage District (MIDD). We are investigating the installation of a “trickle” system, to add small amounts of a re-agent into the sewer line to help offset the amount of sewer gas generated. Not only will this help with odor control, it will extend the life of our pipes and internal systems, which are impacted by the corrosive nature of the gas.

New Maps Published

MCPWO has published a new series of maps that highlight the county's stormwater drains. The new maps are the first that show the location of every county drain since a hand-drawn map was created in the 1970s.

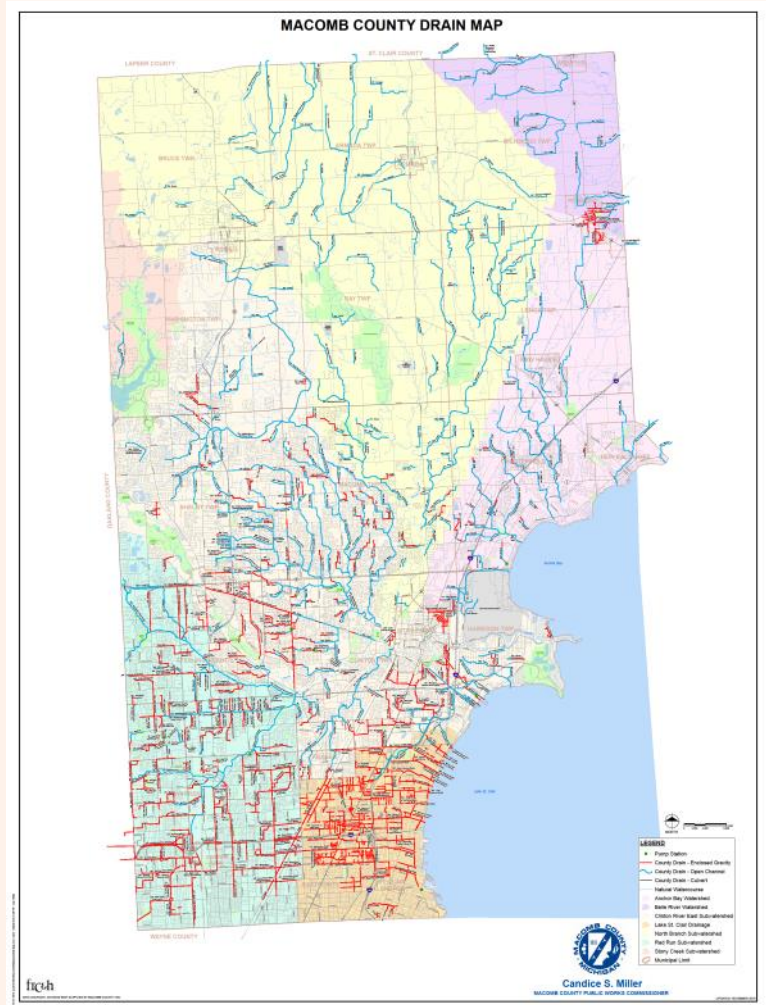
"When I first took this job, I was told there was more than 900 county drains. Then I heard it was more like 800. I said, 'We need a map that shows us what we own.' How can we plan and forecast anything if we don't even know how many drains we have and how many there are?" said Candice S. Miller, Macomb County Public Works commissioner.

It turns out that there are 475 county drains in Macomb County.

"We have been systematically going through every file, reviewing every old document, just trying to understand exactly what assets are under our control," Miller said. "It is a very tedious process as some of these records go back to the 1800s."

The new family of maps includes an overall county map and individual, more detailed maps for each community in the county. The maps are all available via the Public Works Office's website, publicworks.macombgov.org. The maps are particularly helpful when working with community leaders as the Public Works Office plans and schedules maintenance projects in the various county drains.

"I'm in the drain business,," Miller said. "But that is a hard business to be in without a map to know where the drains are!"



Sterling Relief Gets Major Upgrade; Adds Butterfly Flyway

The Macomb County Public Works Office is using \$1.82 million in grants to transform two miles of the 5.2-mile Sterling Relief Drain in Sterling Heights, utilizing green infrastructure to better serve the community. The project is focused on water quality and improving the operation of the drain, but will include the creation of a butterfly "flyway" as a side benefit.

The grants will pay for upgrades along the drain, which runs west to east through Sterling Heights, roughly halfway between 15 Mile Road and Metropolitan Parkway. The work will take place along the drain between Van Dyke and Schoenherr roads.

The work will include "daylighting" portions of the drains central channel - making that area appear like an intermittent stream that will often be dry - and planting more than 5,000 trees and bushes in the drain property.

"This will not only enhance the operation of the drain by better



allowing Mother Nature to act as a natural sponge for storm water, reducing flood risk and improving water quality, but will also create a beautiful new green zone in central Sterling Heights," said Macomb County Public Works Commissioner Candice S. Miller. "Everything we do in this office is with an eye toward water quality."

The U.S. Environmental Protection Agency is providing a \$1.25 million grant to support the work. An additional grant of \$600,000 is being provided by the National Fish & Wildlife Foundation. Design work has already begun with substantial completion of the work expected by the end of 2019.

"This project will greatly improve the quality of life for the residents in the central portion of our city, by creating a beautiful new view, filled with trees and the birds and other wildlife they will attract," Miller said.

Public Works Office



**Bannister Drain
Shelby Township**

Drain Maintenance Program

The Public Works Office manages 475 drains in the county. About half of these are open drains – some appearing as small creeks or streams, others are ditches that only fill after a rainfall. The other half are enclosed drains — underground pipes generally found in older communities. All of these storm drains eventually transfer water to Lake St. Clair. The Public Works Office operates a drain maintenance program to remove beaver dams, trash and other debris from the open drains, in order to allow water flow to move without hindrance. This effort reduces soil erosion and reduces localized flooding. In the enclosed drains, inspection and testing efforts are ensuring the integrity of the pipes and making certain that sanitary sewage is not entering the drain – and ultimately ending up in Lake St. Clair. The program works on two tracks — in some cases, the county alone tackles a project. In other cases, the MCPWO partners with a local township, village or city, with each entity paying half the cost of the clean-up, thereby allowing local leaders to establish priorities in their home communities.



**Dunn Drain
Macomb Township**



Clinton Township Supervisor Bob Cannon, Public Works Commissioner Candice Miller & Executive Mark Hackel

Partnership bolsters Nicholson Nature Center

A new partnership between Macomb County and Clinton Township has been struck to encourage additional public use of the 33-acre James B. and Ann V. Nicholson Nature Center and Floodplain Conservation Easement adjacent to the Macomb County Public Works Office building.

First established in 2009, the county-owned nature center will remain mostly undeveloped to showcase the flora and fauna of the property. The north branch of the Clinton River and several walking trails run through the property.

Under the new partnership agreement, Macomb County will continue to own the property and the Clinton Township Parks & Recreation Dept. will provide routine maintenance.

“The Nicholson Center is a hidden gem, right here in Clinton Township. We

hope through this new partnership more Macomb County residents will become aware of this unique park,” said Macomb County Executive Mark Hackel.

The property was acquired by the county about 10 years ago, with support from the Nicholson family and a grant from the Michigan Department of Natural Resources Trust Fund. The Six Rivers Regional Land Conservancy manages the conservation easement on the property and signed off on the initial renovation of the property in 2009. The site, which is located in a floodplain, is home to a range of different types of trees, as well as deer, fox, heron, coyotes, raccoons and a wide variety of birds.

“When I first took office as the Public Works Commissioner, I discovered this beautiful nature center right outside our back door. The problem was too few

people knew it was there. We want to make this more accessible, while still keep the natural beauty of the property intact,” said Candice S. Miller, Macomb County Public Works Commissioner.

Under the agreement, the natural character of the property will be maintained. The township will maintain the pathway in the Nature Center, empty trash cans at the entrance and perform similar light maintenance. The property also includes several clearings and a pavilion that can be used for educational gatherings by Scouting groups or other organizations.

“This is a perfect example how the township is able to partner with local organizations, in this case the county, to be able to bring benefits to our residents,” said Bob Cannon, Clinton Township Supervisor.



**Red Run Drain
Clinton Township**



**Plumbrook Drain
Sterling Heights**

Pollution? Call

877-679-4337

MCPWO personnel receive about a dozen calls per month on its 24-hour hotline, responding to citizen reports of pollution or other problems in our county drains.

On receipt of a call, an MCPWO staffer responds to the scene and makes an assessment of what steps need to be taken. Typically, MCPWO will work with the local fire department first to ensure there is no immediate danger to area residents. Then, absorbent booms or pads are placed in the drain, if appropriate, to remove any pollutant discovered. In other instances, a vector truck may be used to remove oils or other items from the drain.

Where appropriate, we coordinate response with the Macomb County Health Dept. or Michigan Dept. of Environment, Great Lakes & Energy.

“Our number one goal always is to protect the safety of residents and our personnel and to protect the quality of the water itself,” said Commissioner Candice S. Miller.

Protecting Lake St. Clair at the Chapaton Retention Basin

It happens once or twice every winter and then again in the spring. The temperatures warm up, people rejoice and the snow starts to melt.

That melting snow means busy days and nights ahead for a crew of eight people who work as station operators at the Chapaton and Martin retention basins in St. Clair Shores. It is their job to keep sewage out of Lake St. Clair – a job made harder when stormwater or melting snow is also running through the region’s underground pipes.

Once spring arrives, it sometimes can be hard to recall just how much snow fell in the cold of winter — and how rapidly it can melt during a mid-winter warm-up.

A case in point was a roughly 24-hour period over Jan. 23 and 24. A 40 degree day brought melting snow and an accompanying 7-tenths of an inch of rain. For the Macomb County Public Works Office team, it was a busy day, but a day when they could count 30.7 million gallons of combined sewer flow that was treated, retained and prevented from spilling into Lake St. Clair.

“This is exactly how this system is designed to work. On these wet days, our retention basins are used to keep this flow out of the lake. Now, we are working on ways to be able to expand on our retention capabilities,” said Candice S. Miller, Macomb County Public Works commissioner.

The two systems collect storm water in St. Clair Shores, Eastpointe and Roseville. Because the sewer systems in those three communities are at least partially “combined,” both storm water and sanitary sewage – from toilets, wash machines, showers, sinks and the like – travel through the same pipes. In wet weather events, the pipes that carry this sewage to a treatment facility in Detroit can become overwhelmed. That means the excess sewage needs to either back up



in to basements or be diverted into the two giant underground retention basins in St. Clair Shores. Once the basins begin to fill, workers at the basins begin to treat it with sodium hypochlorite, a type of high-powered bleach solution, to kill bacteria in the sewage.

If the basins reach capacity, the treated combined sewage is spilled in to Lake St. Clair.

During the Jan. 23-24 event, station operators approached capacity at the two basins, but did not have to discharge sewage into the lake.

“We monitor it very closely during a wet weather event,” explained Pete Trombley, a 20-plus year employee at Chapaton and the manager of the facility. “We live here too, and we want to protect the lake as much as possible.”

During the wet weather event, Trombley’s crew is moving between two buildings and an outdoor testing station at Chapaton and traveling to the Martin facility, about a 10-minute drive, to not only ensure that all of the system’s

internal pumps and gates are operating smoothly, but to test the chlorine levels in the sewage.

“Too much chlorine would kill fish if we did have a spill. We are testing it very closely, every few minutes during an event, and our guys take a lot of pride staying well below the state limits for the chlorine. So, enough to kill the e.coli in the sewage, but not too much to harm the lake if we do have to spill,” he said.

The Chapaton basin system can currently retain about 30 million gallons of combined sewage. At Martin, the capacity is just below 9 million gallons.

Under Miller’s leadership, MCPWO engineers are in the process of awarding contracts for a construction project that could expand the capacity at Chapaton by as much as 30 million gallons. The Martin system is land-locked and will present a greater challenge.

“Our station operators work hard because they understand this is about keeping Lake St. Clair and our Great Lakes clean for the next generation. Now,

In 2018, the Chapaton RTB retained 526 million gallons — sewage that did NOT enter Lake St. Clair!



Macomb County Public Works Commissioner Candice S. Miller and Chapaton Retention Basin assistant manager Kris Benda are seen in the testing lab at the Chapaton Retention Basin in St. Clair Shores.

Protecting Lake St. Clair at the Chapaton Retention Basin

we are trying to give them a bigger basin to work with to significantly, significantly reduce CSO overflows. We want more episodes like we had in January, where we worked hard yes, but we didn't spill in to the lake and nobody even knew we did it. That, to us, is a very successful day," Miller said.

Shortly after the rain stopped and the temperature dipped back below freezing, the wet weather event at Chapaton was over. At the basins, flows were reversed and the sewage was sent back into the pipe system and eventually down to the wastewater treatment plant. Trombley's crew drew a little water into the basins from Lake St. Clair to flush out the basins and get them clean for the next time. That flush water is also sent to the treatment plant.

In the meantime, the basin station operators perform maintenance on the pumps and pipes, mix up the next batch of sodium hypochloride and keep a weather eye on the sky and the thermometer, ready for the next wet weather event.

Two-prong approach for Chapaton upgrades

Macomb County Public Works engineers are working on a two-prong approach that will double the total storage capacity at the 50-year old Chapaton Retention Basin.

The existing basin in St. Clair Shores now holds about 28 million gallons of combined stormwater and sanitary sewage from Eastpointe and St. Clair Shores. Another 2 million gallons are held in a canal that connects the facility to Lake St. Clair. During periods of heavy rain or snow melt, the capacity of underground pipes can become overwhelmed and the combined sewer is diverted into the basin, where it is treated with a strong bleach mixture. When the basin reaches capacity, it overflows into the lake.

Under the new plan, two changes will be made at the basin facility, at 9 Mile and Jefferson roads:

- A canal where the over flows take place will be widened and the overflows gates in the canals will be moved closer out to the lake.
- A series of internal gates will be installed in the existing underground sewer pipes – some of which are 12 feet in diameter – that will allow station operators to better control the flow of the sewage and allow some of it to be stored in the pipe until the wet weather event passes.

Combined, these actions will add another 30 million gallons capacity at Chapaton and reduce Combined Sewer Overflows into Lake St. Clair by 75 percent.



Every day we monitor 38,054 data points in our system, looking for problems BEFORE they start.



Happy 60th!

The Clinton River Spillway is seen under construction in 1959. The Spillway, which allows high volume flows of the Clinton River to “spill” out in to Lake St. Clair, was created to prevent chronic flooding which impacted Mount Clemens, Clinton and Harrison Townships frequently in the first half of the 20th century. Completed in 2018, the Spillway was the focus of a \$4.4 million restoration effort, funded by the Environmental Protection Agency and National Atmospheric and Oceanic Administration, and managed by the Spillway Drain Board, which is made up of the drain commissioners in Macomb, Oakland, Lapeer and St. Clair counties along with a state representative. The Macomb County Public Works Office has developed a “walking curriculum” about the Spillway, perfect for groups who want to walk along all or part of the two-mile stretch and learn more about Macomb County’s Engineering Marvel.

