

FY 2022



Drain Annual Report

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Message from Commissioner Jim Nash

As required by Section 31 of the Michigan Drain Code, Public Act 40 of 1956, as amended by Public Act 104 of 1978, and as authorized by the Board of Commissioners' Miscellaneous Resolution No. 8603 adopted September 21, 1978, I hereby present the Annual Report for the Water Resources Commissioner's office for review and filing. This complete financial report covers the fiscal year period from October 1, 2021 through September 30, 2022.



One issue highlighted in the report involves water affordability.

I am keenly aware that water affordability is not just a problem of the poor. It impacts all of us. The interconnectivity of our drinking water and sanitary systems binds us together. In short, the lack of access to affordable water for one is a great cause of concern for all. Juxtaposed against that concern is our responsibility to ensure that rates are sufficient to provide this critical service.

Safe drinking water and reliable sewer services are essential to protect public health. Enabling continued water service for qualifying customers who need assistance is the key to improved public health equity. That's why it remains my top priority.

I invite you to review the successes and challenges contained in the annual report while I extend my sincere thanks and appreciation to the Board for its continued excellence and unfailing assistance given to my office and staff throughout the year.

Jim Nash
Water Resources Commissioner

A handwritten signature in blue ink that reads "Jim Nash".

Introduction

System Details

22

Local Water Systems

- 176,000 people serviced
- 1,460 miles of water main
- 26 wellhouses and water treatment facilities
- 11 water storage tanks
- 6 water booster stations

10

Regional Sewer Systems

- 1 million people serviced
- 410 miles of sewer
- 4 retention treatment facilities
- 2 water resource recovery facilities
- 3 septage unloading facilities
- 17 sewage pump stations

26

Local Sewer Systems

- 146,000 people serviced
- 1,210 miles of sewer
- 7 water resource recovery facilities
- 3 sewage retention reservoirs
- 142 sewage pump stations

429

Stormwater Drains

- 545 miles of enclosed storm drain
- 215 miles of open channel storm drain
- 40 Lake level control/dam structures
- 10 pump stations

The Oakland County Water Resources Commissioner's Office (WRC) has the responsibility of planning, developing and maintaining designated surface water drainage systems in Oakland County. These activities are authorized by state law, commonly known as the Michigan Drain Code. In addition, as agent of the County, Jim Nash, the Water Resources Commissioner, operates and maintains several county water and sewer disposal systems and operates and maintains water and sewer systems for several communities within Oakland County through intermunicipal agreements.

This report provides a comprehensive overview of budgetary and maintenance efforts along with operational activities and capital improvement projects undertaken during FY 2022. These activities are reflective of the organization's dedication to the long-term sustainability of the utilities managed by the WRC while improving the level of service for the Oakland County residents served.

The WRC's maintenance and operations efforts, as well as overseeing planning, designing, and constructing water, sewer and drain improvement projects, combine to achieve the following outcomes:

- Protect public health and safety
- Preserve natural resources and a healthy environment
- Maintain reliable high-quality service
- Contribute to economic prosperity
- Ensure value for investment



The Commissioner's dedication to these outcomes in FY 2022 is demonstrated by the innovative work in searching for a solution to water affordability, undertaking operations for new systems, pursuing funding opportunities, adopting innovative industry-leading practices, and collaborating regionally to ensure value for water infrastructure investment. Several projects highlighted in this report show how innovation optimizes the balance among these five desired outcomes.

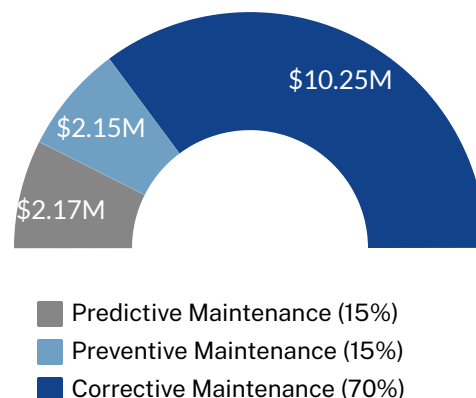
Innovation and Optimization in Action

In FY 2022, the WRC was responsible for 507 system funds with a total asset replacement value of more than \$54.6 billion for the utilities it operated and maintained. These utilities include storm drains, sanitary and combined sewer systems, drinking water systems, lake levels and dams. It also includes new funds this year for operations and maintenance responsibilities for the cities of Sylvan Lake and Pleasant Ridge. As these systems age, they need maintenance, rehabilitation and eventual replacement.

The WRC manages all this through the County's Collaborative Asset Management System (CAMS). CAMS provides the ability to optimize predictive, preventative and corrective operations and maintenance work for all systems under its jurisdiction. See **Figure 1: Maintenance Breakdown** for details. This maintenance program is critical for extending the useful life of system components and to prevent premature failures. It also promotes long-term sustainability and reliability while minimizing costs.

The approximately 44,000 work orders accounted for more than \$14 million of maintenance work. See **Appendix A: Key Performance Indicators**, which quantifiably measure the WRC's performance toward its objectives. More specific asset details and maintenance efforts is further broken down by each utility in the following sections.

Figure 1: Maintenance Breakdown



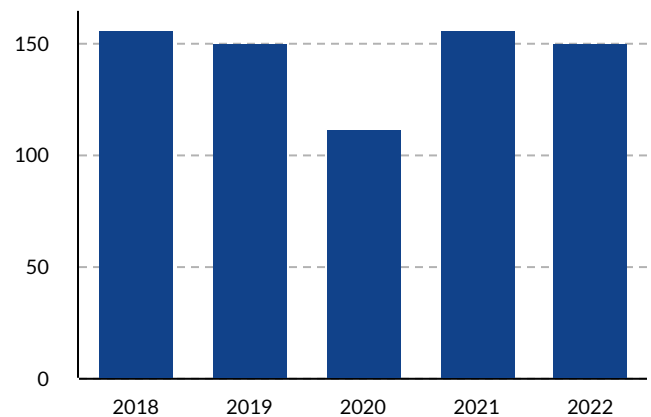
Drinking Water

The WRC maintains 22 local water systems. This includes more than 1,460 miles of water main, 26 well houses and treatment facilities, 11 storage tanks and six water booster pumping stations. Water quality and protection of public health is of the utmost importance and there are numerous regulations including the Safe Drinking Water Act that operators must abide by for compliance and maintaining water quality. The Consumer Confidence Report produced by the WRC is designed to inform consumers about their water quality. The report includes information about the water supply source, detected contaminants and violations (with corrective actions) that occurred during the reporting year. The WRC is required to prepare these reports by July 1 of each year. One important piece of water quality efforts being actively pursued is the replacement of lead service lines. In FY 2022, some 179 lead service lines were replaced with many more to be replaced in the coming years.

Pursuant to the five core outcomes, another top priority is system reliability. The main indicator of service reliability for drinking water systems is the frequency of water main breaks.

Increasing and decreasing main breaks can be attributed to the weather but can also be an indication of possible capital investment needs. As system main breaks increase, capital improvement repair projects are needed. In FY 2022, 5.5 miles of water mains were replaced, and 150 water main breaks were repaired. This is a typical number of breaks, especially considering the mild winter of 2021-2022 as seen in **Figure 2: Water Main Breaks**.

Figure 2: Water Main Breaks

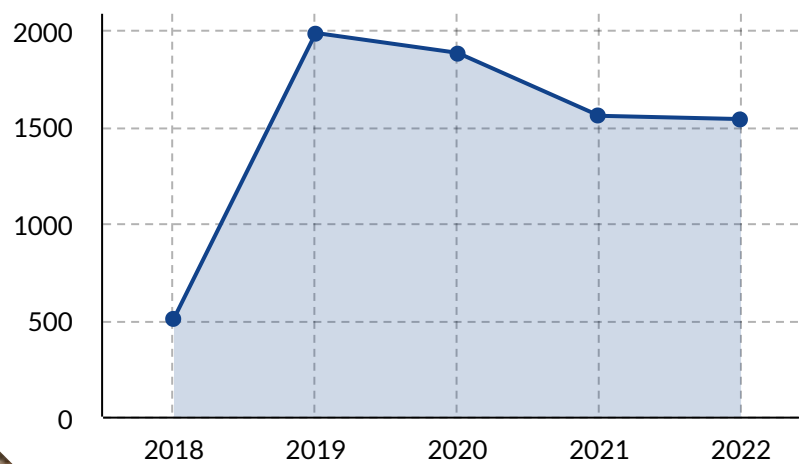


Storm Drains, Lake Levels and Dams

This fiscal year, the WRC inspected 36 dams during the triennial dam inspection program. In general, Oakland County's dams were found to be in fair to good condition.

There are 429 storm systems overseen by the WRC with more than 545 miles of enclosed storm drains and 215 miles of open channel storm drain. Additionally, there are 40 lake level control structures and 10 pump stations. As part of the County's Municipal Separate Storm Sewer System permit, the WRC inspects and cleans manholes and catch basins. These inspections ensure that the storm systems stay in good condition while periodic cleaning removes any accumulated dirt and debris preventing it from entering the County's lakes, rivers and streams. See **Figure 3: Manhole Inspections**.

Figure 3: Manhole Inspections



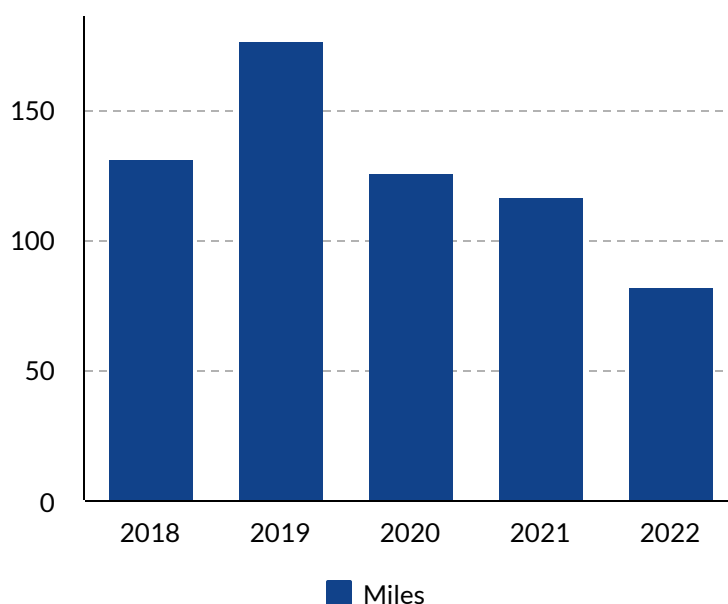
Sanitary and Combined Sewer Systems

The WRC operates and maintains 10 regional sewage disposal systems and 26 local sanitary systems which include more than 1,600 miles of sanitary and combined sewer, 11 water resource recovery facilities, four retention treatment basins, three septage unloading facilities and 159 sewage pump stations.

One of the key performance indicators for sanitary and combined systems is the number of inspections of gravity mains. The WRC has inspected over 82 miles of gravity main in FY 2022. This is based on asset management plans for each system where assets are inspected at 5-, 10- or 15-year intervals depending on their criticality, condition and the level of service dedicated each system. See **Figure 4: Inspected Sewer Mains**.

Once inspected, findings are entered into an asset management program which adds any needed interventions into a 5-year plan. Projects within the long-range plan are prioritized by condition and criticality. Many of the findings ultimately turn into future capital projects.

Figure 4: Inspected Sewer Mains



Project Management

In addition to operations and maintenance responsibilities, the WRC is responsible for capital replacement and major maintenance for most of the systems.

For FY 2022, the WRC managed approximately 76 capital and major maintenance projects over \$200,000 with a combined investment of \$251 million. See **Appendix B: FY 2022 Projects** and **Figure 5: Project Investments**.

The WRC continues to push the envelope to bring projects to light through innovative funding and delivery methods saving our communities time and money. This year the WRC was one of the first organizations in the state to use the Construction Manager At Risk (CMAR) contractor procurement, a delivery method which embraces a commitment to deliver a project with a guaranteed maximum price, for a state revolving fund loan program.

Further, it was the first to utilize the state revolving loan program to purchase increased flow capacity for sending sewage for treatment. It's another example of how this talented team is always seeking opportunities to provide the most value for each investment dollar. This includes looking at alternate funding methods, collaborating with other utilities, coordinating with road agencies to "Dig Once" and working with state and federal agencies to ensure water infrastructure receives funding through various grant and loan programs.

In FY 2022, WRC's projects were funded utilizing the following methods. See **Appendix C: Financials** and **Figure 6: Project Financing**.

Figure 5: Project Investments

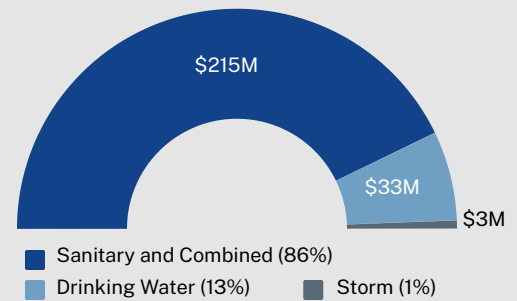
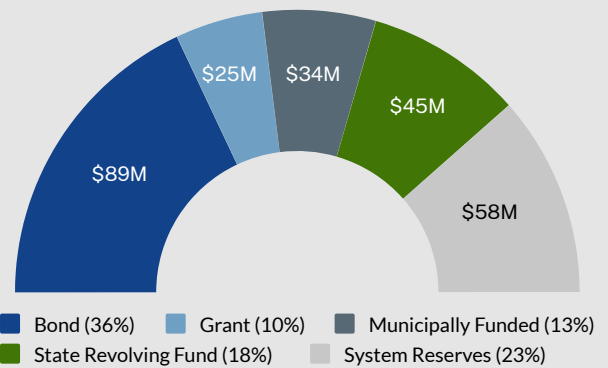


Figure 6: Project Financing



Water Infrastructure Solutions

The theme for the past decade has been do more with less. This is even more prevalent today with infrastructure replacement and rehabilitation projects, especially in the post pandemic era with its ever rising inflation. To maximize the value of infrastructure investment, both short- and long-term funding opportunities were sought for water infrastructure projects that would facilitate regional collaboration.

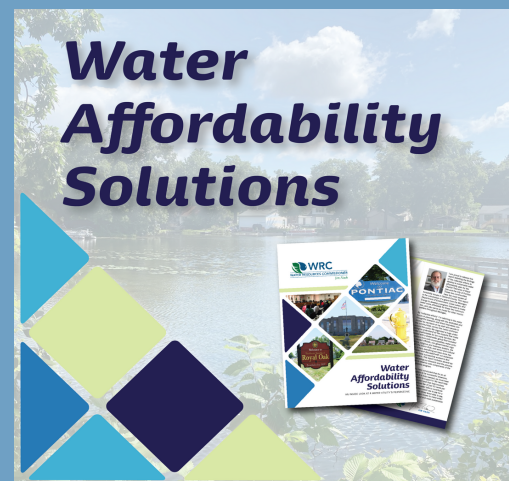
Water Affordability

Water affordability is an ongoing concern for many communities in Oakland County and across the nation. The WRC was awarded a \$444,600 grant to investigate potential water affordability solutions for water utilities. Providing safe drinking water and reliable sewer services is a cornerstone of public health protection. Water utilities face the challenge of maintaining proper investment in water and sewer systems to ensure safe and reliable services, while simultaneously keeping water rates to pay for those services affordable. In October 2022, the WRC published a Water Affordability Solutions report that provided recommendations on how water utilities can balance infrastructure needs with affordability solutions. Some of the key findings include:

- Unlike with gas and electric utilities, there is no federal or statewide strategy to provide comprehensive solutions to address water affordability. A recent survey showed that affordability concerns are present in every geographic and demographic across the state. Therefore, a statewide plan was determined to be necessary to advance water affordability for all communities in Michigan.

- Water utilities should not forgo water and sewer system maintenance and improvement projects to keep customer rates low, particularly when inaction would compromise the utility's ability to provide safe and reliable water services. Short-term cost saving measurements to keep rates artificially low usually result in more expensive long-term financial consequences.

To learn more about our work, visit oakgov.com/affordability.



Water Infrastructure Funding

Two large infrastructure spending laws were adopted in the past few years. At the federal level, the Bipartisan Infrastructure Law was passed and at the state level, the Building Michigan Together Plan allocated some of the billions in federal American Rescue Plan Act (ARPA) dollars to water infrastructure in Michigan. Both funding mechanisms are processed through the State Revolving Loan Program for Michigan.

For its part, the WRC spent significant resources applying for and receiving three Clean Water State Revolving Fund projects and five Clean Water Non-Point Source projects totaling more than \$31.5 million in grants and principal forgiveness and more than \$150 million in low interest loans which saved the communities in Oakland County tens of millions in financing costs.

The WRC did not stop there. Constantly looking for ways to offset expenses for water customers, it applied for and received two drinking water asset management grants to assist Pontiac and Royal Oak Township optimize a plan to replace lead service lines and aging water infrastructure. In addition, the WRC teamed with several communities to obtain more than \$1 million in ARPA money allocated to Oakland County. That money was used to cover sanitary sewer inspections and project planning expenses.



The WRC is constantly working to maintain the high level of service that its customers have come to expect. Part of that process is continual capital improvements where needed. In FY 2022, the WRC worked on more than 76 large capital projects over \$200,000 with a combined investment of \$251 million. See **Appendix B: FY 2022 Projects**. Several of these projects included innovative approaches to collaboration to ensure the optimal solution. These projects broke new ground with respect to industry standards and ensured that the facilities owned and operated by the WRC created an exceptional value return for investment dollars while protecting public health and providing reliable service.

Northeast Sanitary Sewage Pumping Station and the North Interceptor-East Arm Rehabilitation Projects

In the spring of 2019, the Oakland-Macomb Interceptor Drain Drainage District (OMID) and the Great Lakes Water Authority (GLWA) entered into an agreement to allow OMID to manage the day-to-day maintenance and capital improvement projects for the downstream Northeast Sanitary Pumping Station (NESPS) and the North Interceptor-East Arm (NI-EA) sewer that solely serve OMID. Previously, GLWA was handling only the maintenance services for these facilities at an annual cost of more than \$8 million.

Both the Northeast Sewage Pumping Station with its contract capacity of 423 cubic feet per second (cfs) and the downstream NI-EA, with a diameter that ranges between nearly 12 feet and nearly 18 feet, were constructed in the 1970s and need significant repairs. Consequently, OMID engaged in three capital projects to rehabilitate these facilities.

Another NI-EA project begun in 2022, consists of lining approximately 800-foot section of the interceptor on Gratiot Avenue near Mack Avenue in Detroit using multiple lining products as part of a pilot study similar to the project mentioned above. These lined sections will be monitored to evaluate long-term performance of the various liner products. This practice will increase the knowledge base of the region which will be helpful when considering options for future repairs.

Additionally, as part of the project, two flow control structures will be added to provide as-needed flow diversion between the existing Interceptor and the existing sewer at Seven Mile Road to facilitate lining operations. The project also entails debris removal, leak sealing and spot repair of the interceptor at various locations. Work is scheduled to begin in June 2023 and be complete by June 2025.

Collectively, these projects represent an estimated **investment of \$100 million.**

There is **no additional cost to the ratepayers** thanks to an \$8 million per year in annual maintenance savings offset from a GLWA agreement utilized to cover the yearly bond payment.

The NESPS electrical upgrades project entails a complete upgrade of existing pumps, electrical switchgear, transformers, process piping, valving and other appurtenances to restore acceptable functionality and reliability to station operations. The work is being performed using a Construction Manager At Risk (CMAR) contract to help with pre-procurement of long-lead equipment to accelerate the project. Construction began in August 2020 with a new building to house new electrical components and facilitate the transfer of assets while keeping the facility operational. Work is anticipated to be complete by August 2024.

One of the NI-EA projects, which is under construction, consists of lining approximately 1,700 feet of corroded pipe that measures nearly 18 feet in diameter immediately downstream of the pumping station.

A 45-foot-deep access shaft has been constructed to perform the lining effort. The project also includes manhole repairs and leak sealing as well as removing debris from inside the interceptor pipe. As part of the bidding process, contractors were required to install three different liner sections within the interceptor at varying lengths of their choosing based on price. This process allowed for increased competition among lining suppliers. It also gave OMID the opportunity to study the various liners' viability in an area with one of the highest concentration of hydrogen sulfide in the region.

This project is estimated to be the largest sanitary sewer slip lining project in the world. The project is expected to be complete by June 2023.



Evergreen-Farmington Corrective Action Plan: Thinking Differently About Overflow Management

On occasion, heavy rains cause sanitary sewer and combined sewer overflows throughout southeast Michigan. The Evergreen-Farmington Sanitary Drain Drainage District (EFSD) was created to address these issues and to minimize the amount of untreated sewage entering the Rouge River, which flows into the Detroit River and eventually to Lake Erie. These overflows have the potential of sending E. coli to the Rouge River and exerting increased oxygen demand on the river. This can cause a reduction in dissolved oxygen in the river, which can be harmful to fish and other aquatic organisms.

Collaborating to reduce discharges

The need to manage these overflows in the region is significant. But rather than relying on each sewerage district in the area to develop its own local solution, three entities (Oakland County, the Great Lakes Water Authority and the City for Detroit) have come together to form a unique collaboration with a regional focus to reduce combined sewer and sanitary sewer discharges into local waterways. From a regional perspective, several construction projects have been identified for consideration over the next five years.

The Evergreen-Farmington Sanitary Drain is increasing its conveyance capacity along 8 Mile Road through increased capacity at an existing pump station and a new force main. The 8 Mile Pump Station will be modified to increase its ability to handle more sewage flow. This includes improvements to the pumps, modifications to the discharge piping, electrical equipment, mechanical equipment, and modifications of the structural elements. The existing pumps will be replaced with four 460 horsepower pumps. The electrical equipment needs to be replaced and upsized to supply the increase in power for the new pumps. The pump station structure needs to be modified to allow room for the larger pumps to be installed. This requires the removal of one of the floors within the pump station in addition to other structural modifications. Modifications will also be done to the downstream Evergreen Emergency Sanitary Sewer Overflow (SSO) Chamber as part of this work. The weir wall will be both longer and higher by several feet to accommodate the increased flow. The electrical, mechanical, and level monitoring system will also be replaced at the chamber.

A new force main will be constructed to convey the additional flow from the pump station. This includes the construction of 6,040 feet of 54-inch diameter sanitary sewer force main. The force main will run down 8 Mile Road from the pump station to the existing Evergreen Emergency SSO Chamber. Two lanes of 8 Mile Road will be reconstructed as part of this project. Additionally, the force main phase of the project will need to be coordinated with the work at the pump station, the SSO chamber and the Michigan Department of Transportation (MDOT) project approximately a mile away at the intersection of Telegraph and 8 Mile Road in the City of Southfield.

Together, these modifications will allow for more sewage flow to be conveyed through the system. The project has an incredibly detailed construction sequence which requires phased construction and a vast amount of temporary construction. This allows the existing pump station, which serves nearly 300,000 Oakland County residents, to remain in service throughout construction process. This project also utilized the Construction Manager At Risk (CMAR) procedure which allowed the team to pre-purchase long lead items such as the generator, pumps, electrical equipment and actuators. In addition, the CMAR procedure provided input on how the project was designed and sequenced to minimize risk. With this enlarged capacity, the Evergreen-Farmington Sanitary Drain will not only improve system reliability but will also avoid the higher cost of constructing a new wet-weather storage facility, as well as costs from its long-term operations and maintenance.

The City of Detroit will construct the West Warren Green Infrastructure Project in a residential neighborhood immediately west of the Rouge River and North of West Warren Avenue. The project includes sewer separation, neighborhood drainage improvements and a green stormwater infrastructure (GSI) feature in the Rouge Park. The GSI feature will provide for the removal of particles that are not dissolved in the stormwater stream. These particles are commonly referred to as "Total Suspended Solids." It also will reduce peak flow rates from the new storm sewer system to the Rouge River. The existing combined sewer will continue to collect and convey flow from sanitary leads, footing drains and various other connections but will convey it at a much lower volume to the Great Lake Water Authority. That will free up much-needed capacity for the Evergreen-Farmington Sanitary Drain.

For its part, the Great Lakes Water Authority will accelerate its schedule for a two-part improvement project at its West Warren combined sewer outfall located along the Rouge River in Detroit. This will address and substantially reduce wet-weather discharges from this site. The project includes constructing a new diversion weir chamber at the existing outlet of the Rouge River and will triple the size of an existing 18-inch diameter pipe to a 54-inch pipe east of the Rouge River.

Combined, the projects will prevent approximately **48 million gallons of untreated wet-weather discharge** from flowing into the Rouge River each year.

The drainage district will invest more than \$130 million in this joint effort. Ultimately, coordinating these projects across multiple jurisdictions allows for a collaborative direction to maximize the investment value while achieving an overall cost savings for those in the region. It provides a significant environmental benefit while obtaining increased system reliability.

I-75 Modernization and GWK Dequindre Pump Station Rehabilitation Projects

As part of the Michigan, I-75 Modernization Project from north of 13 Mile Road to north of 8 Mile Road in Madison Heights, Royal Oak, Hazel Park and Ferndale, WRC entered into agreements with MDOT to improve regional water quality. As part of the project, MDOT is constructing a 25-million-gallon, four-mile-long, deep tunnel adjacent to the service drives. It also is building a new pump station on property owned by the George W. Kuhn Drain Drainage District (GWK) in Madison Heights. To ensure that operations between the I-75 project and the GWK interface to the greatest benefit of the region, the GWK will operate the pump station once it's constructed.

Through a coordinated effort between the WRC and MDOT, this project will allow MDOT to capture stormwater runoff from I-75 from most storms up to a 100-year rain event without increasing discharge to the GWK's retention and treatment basin. This project, which involves widening the interstate, allows for the so called "first flush" capture of stormwater runoff from I-75. First flush refers to the initial runoff of surface water and prevents most of the polluted water from entering the storm drains. Water found in the first flush, which is treated at the GWK facility, is more concentrated than subsequent stormwater runoff.

After the first flush runoff is captured and treated, any additional stormwater runoff from I-75 will be directed to a new stormwater outlet, preventing the majority of the expressway's stormwater runoff from entering the combined sewer system. The additional 25 million gallons of storage and the stormwater outlet frees GWK's basin capacity previously utilized by MDOT for some storm events. That increased capacity is expected to reduce the volume and frequency of treated discharges to the Red Run Drain.

Some of the equipment in the Dequindre Pump Station were nearing the end of their useful life and before conditions deteriorated, they needed to be rehabilitated to reduce the potential of future failures. The majority of the mechanical and electrical equipment was rehabilitated, and in the process, piping was replaced in the pump station. This project ensures that the GWK can discharge the maximum allowable flow rate to the Great Lakes Water Authority.

Together these two projects align with the approved Regional Operating Plan for the Great Lake Water Authority. This plan has been reviewed and approved by GLWA to maximize both existing and proposed facilities to improve water quality throughout the region.



Appendix A: Key Performance Indicators

Water System

130
Water Main Breaks Repaired

179
Lead Service Lines Replaced

5.5
Miles of New Water Main Installed

Sewer Systems

112
Miles of Sewer Main Cleaned

82
Miles of Sewer Main Inspected

4
Miles of New Sewer Main Installed

Stormwater Drains

4
Miles of Storm Drain Inspected

1,541
Storm Manhole Covers Inspected

36
Dams Inspected

Environmental

8,058
Cross Connections Site Visits

20,182
Soil Erosion Inspections

926,000
Gallons of Pollutants Removed