



# ACEC ESE 2026 Michigan

## Official Entry Form

### ABOUT THE PROJECT'S SCHEDULE AND BUDGET

Budgeted and/or actual costs may not apply to some studies in Category A and some projects in Category D.

With the exception of Category "A" and some Category "D" projects, **costs reflected below are always construction costs and are NOT ENGINEERING FEES**. If your firm was responsible for the entire engineering-design of the project, then the *Entrant's Portion of the Total Construction Budget* amount and the *Entrant's Portion of Total Construction Actual Cost* amount will be the same as the *Total Construction Budget* amount and *Total Construction Actual Cost* amount.

If your firm was not responsible for the entire engineering-design of the project, then the *Entrant's Portion of the Total Construction Budget* amount and the *Entrant's Portion of Total Construction Actual Cost* amount should be the part of total project construction cost your firm was responsible for. (i.e.: A mechanical engineering firm was responsible for \$12M of a total Construction budget of \$40M. \$12M is the *Entrant's Portion of the Total Construction Budget*. \$12M is the *Total Construction Budget*.)

Furnish all information requested below for each entry (signatures by the submitting firm(s) and the client(s)/owner(s) are required). Firm, project, and client/owner's name should be typed or printed as they are to appear on the award. The project name is strictly limited to 45 characters.

The entry fee is \$400 per entry for ACEC/Michigan and MSPS members; \$1,300 for non-members. Checks for the remaining entry fee (less intent to enter deposit) should be made payable to ACEC/Michigan and delivered with your physical project panel or mailed to 530 W. Ionia Street, Suite D, Lansing, MI 48933. [Click here](#) to pay by credit card.

### ABOUT THIS PROJECT

**Submitting Firm(s):** Wade Trim

**Primary Client/Owner:** Macomb County Public Works Office

**Project Name:** Chapaton RTB Canal Rehabilitation

**Project Category:** F - Waste and Storm Water

**Project Location:** City: St. Clair Shores, State: Michigan, Country: United States

**What was the Entrant's Role in the project:** Prime Consultant

**(Budgeted and/or actual cost may not apply to some studies in Category A and some projects in Category D)**

#### Completion/Use Dates:

Scheduled:	6/12/25	Actual:	9/15/25
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#### Construction Costs:

Total Construction Budgeted:	27,374,710	Total Construction Actual:	29,500,000
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Entrant's Portion of Total Construction Budgeted:	27,374,710	Entrant's Portion of Total Construction Actual:	29,500,000
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**QBS:** Yes



**ABOUT THE FIRM(S) SUBMITTING THE PROJECT**

**Entering Firm:** Wade Trim

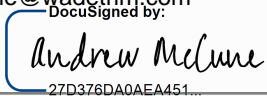
**CEO - Title:**

**Firm Representative - John Arvai Title:** Project Manager  
**Address (no P.O. Box):** 25251 Northline Road Taylor MI 48180  
**Phone:** (734) 947-9700  
**Mobile:** (734) 249-2157  
**Email:** jarvai@wadetrim.com

I hereby authorize submission of this project into the American Council of Engineering Companies' 2026 Engineering Excellence Awards competition.

**Senior Executive/Principal - Andrew McCune Title:** President/CEO  
(Signature will be required)

**Address (no P.O. Box):** 500 Griswold Street, Suite 2500 Detroit MI 48226  
**Phone:** (800) 482-2864  
**Mobile:** (313) 618-3925  
**Email:** amccune@wadetrim.com

**SIGN HERE**  **Date:** 9/16/2025

**Marketing Representative - Wendy Sherrill Title:** Marketing Communications Manager



**ABOUT THE CLIENT/OWNER(S) OF THE PROJECT**

**Primary Client/Owner:** Macomb County Public Works Office

I believe the work of the engineer meets the intended uses and expectations for the project and hereby grant permission to enter this project in the ACEC 2026 Engineering Excellence Awards competition, and authorize publication of images and details of the project. I confirm that the project was ready for use between November 1, 2023 and October 31, 2025.

**Primary Client/Owner Representative - Vincent Astorino Title:** Operations Director  
(Signature will be required)

**Address (no P.O. Box):** 21777 Dunham Road, City: Clinton Township, State: MI Zip: 48036

**Phone:** (586) 469-6320

**Mobile:** (586) 615-2436

**Email:** Vincent.Astorino@macombgov.org

**SIGN  
HERE** →

**Date:** 09/16/2025

## A. ROLE OF ENTRANT'S FIRM

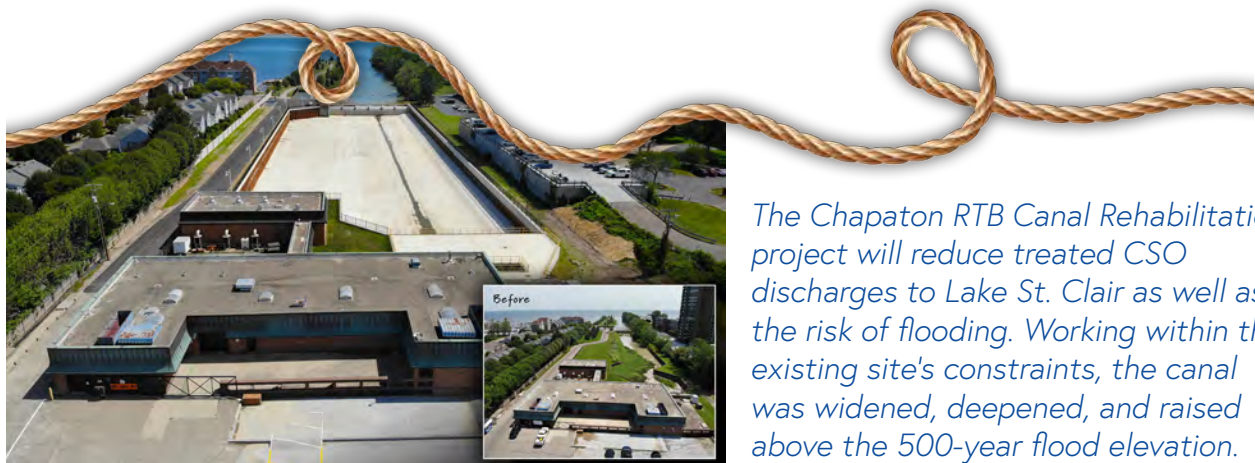
Constructed in the 1960's, the Chapaton Retention Treatment Basin (RTB) is a Macomb County Public Works Office (MCPWO) wastewater facility that protects public health and the environment by managing combined sewer overflows (CSOs) during wet weather events. Located in St. Clair Shores at the foot of 9 Mile Road near homes and public recreational amenities, the underground RTB receives combined sewage and stormwater flows from the 8.5 Mile Relief Drain Drainage District. Flows are treated via screening, settling, and chlorination, and either held and dewatered to the Great Lakes Water Authority's Water Resource Recovery Facility (WRRF), or discharged to a canal that connects to Lake St. Clair when capacity is exceeded. In the early 2000's, a 700-foot portion of the canal was integrated into the 28-million-gallon (MG) RTB as an open-water treatment canal with control structure gates, adding 3 MG of storage capacity and moving the discharge point downstream. The canal was also used to draw water from the lake after storm events to flush any remaining solids in the basin to the WRRF.

In response to increasing wet weather frequency and intensity, the MCPWO sought a creative solution to further expand the treatment canal's capacity to reduce treated CSO discharges to Lake St. Clair as well as the risk of flooding. Wade Trim served as the prime consultant, providing design and construction oversight for the Chapaton RTB Canal Rehabilitation project. Limited by the facility's existing footprint, the treatment canal was widened and deepened, and concrete and steel sheeting were vertically installed to raise the canal above the 500-year flood elevation. The control structure gates were replaced with an innovative pneumatic weir gate system to optimize storage capacity and discharge flows over top of the gates. In addition, a direct, 24-inch-diameter, process water pipe to the lake was added to flush the basin more cost-effectively, and storm sewer was installed on 9 Mile Road to separate drainage from 14 acres that previously entered the combined system.

With a new total storage capacity of 17 MG, the rehabilitated treatment canal provides the MCPWO with superior operational flexibility to retain and send more flows to the WRRF and improve the quality of treated CSO discharges when they occur. Flooding risk for 9 Mile Road and residential areas is greatly reduced and aesthetics, public access, and recreational amenities have been upgraded. The project is expected to reduce treated CSO discharges to Lake St. Clair by 50% as well as sediment loading to improve water quality, fish and wildlife habitat, and recreational use.

## B. ROLE OF OTHER CONSULTANTS

Applied Science Inc. provided hydraulic design services. NTH Consultants provided geotechnical services. Fishbeck provided 9 Mile Road sewer separation and road replacement design.



*The Chapaton RTB Canal Rehabilitation project will reduce treated CSO discharges to Lake St. Clair as well as the risk of flooding. Working within the existing site's constraints, the canal was widened, deepened, and raised above the 500-year flood elevation.*



*An innovative pneumatic weir gate system optimizes the canal's storage capacity and enables precise control of the water level and rate of discharge over top of the gates, minimizing impacts on settled sediment.*

### **C. ENTRANT'S CONTRIBUTION TO THE PROJECT**

#### **UNIQUENESS AND/OR INNOVATIVE APPLICATION OF NEW OR EXISTING TECHNIQUES**

Using a pneumatic weir gate system to control inflow and outflow of water in the Chapaton facility's treatment canal is a new application of spillway gates and an innovative way to provide operational flexibility over a wide range of conditions. Typically used in reservoirs and dams, the system's steel gate panels are hinged at the bottom and supported by a multi-segment, inflatable air bladder. Bidirectional gate operations are controlled using an air tank in the control building and level sensors that monitor water elevations in both the canal and lake. The air bladder can be inflated to raise the gate panels to maximize the canal's storage capacity during a wet weather event or deflated to lower the gate panels to discharge treated flows over the top when the RTB's capacity is exceeded. In addition, when the water level in the lake is higher than the water level in the canal, the gate panels can be raised to prevent lake water from backfilling the canal.

Expanding the treatment canal's capacity by more than five times within the facility's existing footprint and near residents required a unique design solution to maintain its open-water characteristics. The existing canal bottom was roughly lined with large, concrete rip rap pieces that could not be cleaned after storm events. Pooling and aquatic plant growth, including invasive phragmites, required periodic maintenance. Regulatory requirements for environmental clearances and construction permits for the rehabilitation had to be addressed working closely with permitting agencies. Biweekly meetings were held to review progress and discuss and collaborate on various aspects of the project. To attenuate potential environmental, noise, and odor concerns, concrete and steel sheeting were installed to isolate the canal from neighboring residents. The canal bottom was upgraded with a continuous concrete surface that facilitates cleaning of dried solids after storm events using a skidsteer with broom attachment. Water lines installed along the north side of the canal can also be used for cleaning. In addition, heavy clay soil below the concrete greatly reduces the potential for treated CSO water to leach into the groundwater.

Repurposing a large, abandoned box culvert for sewer separation along 9 Mile Road is a resourceful solution to decrease the amount of storm flows sent to the RTB for treatment as well as surface flooding. Previously, the 14-acre area drained to the combined sewer system. Because the basin and road were hydraulically connected, backups would occur on 9 Mile Road during storm events when RTB capacity was full and cause flooding. As part of this project, new storm sewer was installed through the box culvert to bypass drainage to the lake. To help protect water quality, flow passes through a shallow hydrodynamic separator that traps and retains debris and sediment. To prevent lake water from entering the storm sewer, a duckbill check valve was installed at the discharge point. The valve opens and closes using line pressure and backpressure, eliminating the need for any outside energy source.

## FUTURE VALUE TO THE ENGINEERING PROFESSION AND ENHANCED PUBLIC AWARENESS OF ENGINEERING

The operational flexibility achieved using a pneumatic weir gate system as the RTB's control structure demonstrates its potential viability to more precisely control the water level and discharge rate from CSO storage facilities. Typically, RTBs use a fixed weir system that opens from the bottom and stirs settled sediment during discharge to a natural water system. Since the pneumatic weir gate system enables discharges over the top of gates, impacts on settled sediment are minimized. The amount of discharge can also be more precisely controlled since each gate can be moved separately and at different elevation levels. To minimize any potential risks, a bypass would likely need to be integrated into the design of any RTB using this type of gate system.

Detailing operational constraints and specifications for construction in wet weather facilities is an effective way to maintain operations and minimize wet weather impacts to schedules. Since wet weather is highly variable, extra precautions are needed to monitor the weather and take action to protect the safety of workers and facility operations. Though careful not to dictate the contractor's means and methods, the team reviewed the contractor's processes to account for operations when developing their plan for construction. In addition, the construction contract established 100 stop work days for rain events over the 24-month period. Proactively adding this variance into the schedule was an effective measure to mitigate potential claims.

Public awareness for this project was inherently high given the canal's proximity to Lake St. Clair, construction near residences, and a 2-year closure of the popular 9 Mile Public Boat Launch. Residents and business owners were generally enthusiastic about the project's long-term water quality benefits, welcoming engineering solutions that support their quality of life and the local economy. Decreased flooding during wet weather events was also a tangible benefit that drew public support.

## SOCIAL, ECONOMIC, AND SUSTAINABLE DEVELOPMENT CONSIDERATIONS

The rehabilitated canal enables the Chapaton facility to retain and send more flows to the WRRF for both primary and secondary treatment and improves the quality of discharges to Lake St. Clair when they occur. The canal's increased storage capacity also enables flows to be held for longer chlorine contact time and greater sediment settling. When discharges occur, the top of the stored water with less particles overflows the gates, reducing overall sediment loading on the lake. This is a significant improvement over the previous gates that opened from the bottom, stirring settled sediment during discharge. In addition, each gate can be moved separately and at different elevation levels to more precisely control the amount of discharge.

Improving community flood resilience and recreational opportunities and making sure the Chapaton facility is a good neighbor were priorities. The canal is flanked by residences on both sides as well as an access road on the north side that leads to the public boat launch and a park-like peninsula. To reduce noise from RTB operations and road use, a decorative, 8-foot sound barrier wall, fencing, and new trees were added behind



*With a new capacity of 17 million gallons, the 700-foot, open-water treatment canal can retain and send more flows to GLWA's WRRF for full treatment, and improve the quality of treated CSO discharges when they occur.*



*Aesthetics for neighboring residents, public access, and recreational amenities were improved. Highlights include a sound barrier wall, fencing, trees, access road reconfiguration and paving, buried power lines, and decorative pole lighting.*

residences on the north side. The road was reconfigured and repaved, overhead power lines were buried, and decorative pole lighting was added. A new storm sewer system was installed between the road and wall to capture surface drainage. In addition, boat launch use was improved with a larger paved area that accommodates boat trailer turning and ADA-accessible parking, as well as a new guard shack. Peninsula enhancements included seawall clean up, decorative fencing, and a gravel path upgrade.

New flushing systems for the basin and canal are delivering operational cost savings. After a wet weather event, settled solids must be flushed and conveyed to the WRRF before the next event. Previously, the water came from the treatment canal that had to be completely filled by drawing from the lake. This large amount of water was conveyed as metered sewer flow. To improve flushing efficiency and reduce metered sewer flow, two new, remotely operated 3-foot by 3-foot flushing gates were installed at the base of the RTB effluent weir wall to provide additional basin flushing capabilities using the stored volume of treated CSO in the canal. A 24-inch process water pipe directly from the lake to the RTB's flushing system was installed, minimizing water use and impacts on aquatic wildlife, and saving an estimated \$200,000 annually. In addition, a 2-inch water line was added to the north side of the canal with valve hookups at regular intervals for flushing. A 24-inch valve was added next to the flushing line that runs directly into the canal for cleaning if needed.

Sustainability was a through line from the project's purpose to its execution. The canal rehabilitation increases the MCPWO's ability to reduce treated CSO discharges to Lake St. Clair as well as the risk of flooding. They now have greater operational flexibility to improve water quality that protects human health and the environment. Sustainable design achievements include completing the rehabilitation within the facility's existing footprint and reusing existing sheet pile for the canal walls and an abandoned culvert for sewer separation.

## COMPLEXITY

Maximizing the canal's storage capacity within the facility's existing footprint required a design that balanced geotechnical, hydraulic, and site engineering constraints. The greatest amount of volume was derived by changing the canal's angular, sloped shape into a wider, rectangular shape with deeper sides, excavated vertically. The existing canal was lowered by 4 feet to provide additional storage capacity and the grade was sloped for dewatering. Steel sheet pile wall extending down to the clay layer and up above the 500-year flood elevation provides a barrier along the sides of the canal to prevent inflow of Lake St. Clair water. The walls are structurally supported by a berm on the south side, and tie-backs connected to a steel anchor wall on the north side for greater capacity. Ultimately, the pneumatic weir gate system is the critical structure that isolates the canal and RTB from Lake St. Clair. The canal's hydraulic design provides enough capacity to discharge during a storm event to prevent backups in the system. An emergency bypass at the gate structure can also be used to discharge more flow to the lake during an event if operations require it.



*RTB operations were maintained throughout the 24-month construction period using detailed operational constraints and specifications, careful work sequencing, and robust weather monitoring.*

Maintaining full RTB operations throughout the 24-month construction period required careful work sequencing and robust monitoring. The contractor's sequencing plan and means and methods of construction were reviewed from both operational and hydraulic standpoints. Construction began with mass excavation and concrete and steel sheeting installation. The new gate structure and a bypass culvert for treated discharges were then constructed simultaneously. The new gate structure was built behind the existing control structure to the lake level elevation of 575 feet so flows could spill over it as needed until the critical bypass culvert to the lake was operational. Existing controls and a water quality sampling pump in the control building had to remain operational and be supported with temporary measures throughout construction. A new screening structure for the basin, new control structure building, and concrete canal bottom were completed before the old gates could finally be removed. A daily lockout/tagout system was enforced to make sure control gates were shut down while workers were in the canal. Area rain forecasts were monitored closely and impending storms required immediate removal of workers, equipment, and materials. All equipment and materials that weren't permanently placed from the canal had to be removed on a daily basis.

#### **SUCCESSFUL FULFILLMENT OF CLIENT/OWNER NEEDS**

The Chapaton RTB Canal Rehabilitation project significantly increases the MCPWO's ability to reduce treated CSO discharges to Lake St. Clair as well as the risk of flooding. An innovative pneumatic weir gate system provides superior operational flexibility to retain and send more flows to the WRRF, and improve the quality of treated CSO discharges when they occur. Operational cost savings were also achieved. An anticipated 50% reduction in treated CSO discharges from this project is the final step in achieving the MCPWO's overarching goal to reduce total treated CSO discharges by 75% within the 8.5 Mile Relief Drain Drainage District, demonstrating measurable progress and regional impact.

Navigating the complexities of construction on a wet weather facility was critical for success. Full RTB operations were maintained throughout the 24-month construction period with acute attention paid to the contractor's sequencing plan and means and methods of construction. Since wet weather is highly variable, the contract established 100 days over the 24-month construction period where work would be required to stop for rain events. Building this variance into the schedule proactively helped mitigate potential claims.

Throughout the project, the MCPWO worked closely with the project team, making scope additions and changes during construction that would increase operational, maintenance, and aesthetic benefits. For instance, grading and fencing changes were made to improve access for facility maintenance, and access road and peninsula improvements benefited the neighbors and public use. The project team adapted well to integrate these changes, including providing design during construction, to optimize the canal's performance and the MCPWO's infrastructure investment. The canal rehabilitation has greatly enhanced the Chapaton RTB's overall performance while strengthening resiliency and long-term environmental protection.













# CHAPATON RTB CANAL REHABILITATION



In response to increasing wet weather, the Macomb County Public Works Office (MCPWO) expanded the Chapaton Retention Treatment Basin's (RTB) capacity to reduce treated combined sewer overflow (CSO) discharges to Lake St. Clair as well as the risk of flooding. The facility's 700-foot, open-water treatment canal was widened and deepened, and concrete and steel sheeting were installed to raise the canal above the 500-year flood elevation. An innovative pneumatic weir gate system is the control structure that optimizes storage capacity and enables precise control of the water level and rate of discharge over top of the gates.

The rehabilitated canal provides superior operational flexibility to retain and send more flows to GLWA's WRRF for full treatment, and improve the quality of treated CSO discharges when they occur. Flooding risk for 9 Mile Road and residential areas is lower and aesthetics, public access and recreational amenities were upgraded. The project is expected to reduce treated CSO discharges to the lake by 50% as well as sediment loading to improve water quality and fish and wildlife habitat.








Before



After

## PROJECT HIGHLIGHTS

-  New application of spillway gates provides RTB operational flexibility over wide range of conditions
-  Canal capacity increased from 3 MG to 17 MG within existing footprint by balancing geotechnical, hydraulic and site engineering constraints
-  RTB operations maintained during 24 months of construction using detailed operational constraints and specifications
-  \$200,000 savings in annual operational costs from flushing system improvements
-  Sheet pile reused for canal walls and abandoned box culvert repurposed for sewer separation



**PROJECT:** Chapaton RTB Canal Rehabilitation, St. Clair Shores, MI

**OWNER:** Macomb County Public Works Office, Clinton Township, MI **FIRM:** Wade Trim, Taylor, MI



## **PRESENTATION SCRIPT**

The Macomb County Public Works Office increased the Chapaton Retention Treatment Basin's capacity to reduce treated combined sewer overflow discharges to Lake St. Clair as well as the risk of flooding. Wade Trim provided design and construction oversight for the facility's canal rehabilitation to retain and send more flows to Detroit for full treatment, and improve the quality of treated discharges when they occur. The canal's pneumatic weir gate system provides operational flexibility and flushing system improvements have saved costs. Flooding risk for 9 Mile Road and residential areas is lower and aesthetics, public access, and recreational amenities were upgraded.

## **BROCHURE TEXT**

The Macomb County Public Works Office increased the Chapaton RTB's capacity to reduce treated CSO discharges to Lake St. Clair as well as the risk of flooding. The facility's open-water treatment canal was widened, deepened, and raised above the 500-year flood elevation, and operational cost savings were achieved.

## **AWARD INFORMATION**

Chapaton RTB Canal Rehabilitation

Macomb County Public Works Office

Wade Trim