THE OFFICIAL PUBLICATION OF THE MICHIGAN RURAL WATER ASSOCIATION

CLARIFIER

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2026 MRWA ANNUAL CONFERENCE RECAP

MARCH 17–20, 2026
SOARING EAGLE, MT. PLEASANT

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ISSUE 2 2026

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MRWA MISSION STATEMENT

To provide resources, education and networking to all members, future members and their customers in order to enhance quality of service.

MICHIGAN RURAL WATER ASSOCIATION
2127 University Park Drive, Suite 340
Okemos, MI 48864
P: 517-657-2601
www.mrwa.net

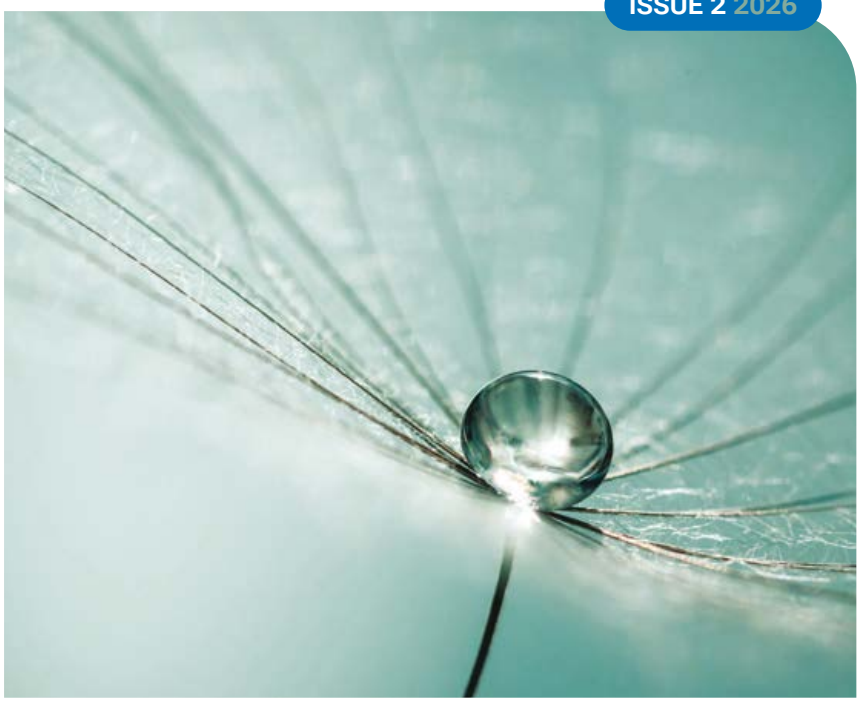
PUBLISHED FOR MRWA BY: Craig Kelman & Associates

P: 866.985.9780
info@kelman.ca
www.kelmanonline.com

MANAGING EDITOR Lauren Drew
DESIGN/LAYOUT Kiersten Drysdale
MARKETING MANAGER Al Whalen
ADVERTISING COORDINATOR Sabrina Simmonds

FEATURES

ISSUE 2 2026



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Lawton, MI 49065
Phone: 269-624-6406
Phone: 269-624-6401
hackenbergt@lawtonmi.gov

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Ron Bogart, City of Leslie
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PO Box 496
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Phone: 517-589-8236
Phone: 517-257-3094
manager@cityofleslie.org

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Phone: 269-506-6800
mthibideaucentreville@gmail.com

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Mattawan, MI 49071
Phone: 269-668-2300
Phone: 269-217-4921
tom@mattawanmi.com

DIRECTOR
Darin Dood, Village of Lakeview
208 S Lincon Street
Lakeview, MI 48850
Phone: 989-352-6322
Phone: 989-289-3110
manager@villageoflakeview.org

DIRECTOR
Andrea Schroeder, City of Davison
200 E Flint Street, Suite 2
Davison, MI 48423
Phone: 810-653-2191
Phone: 810-845-1682
aschroeder@cityofdavison.org

DIRECTOR
Randy Seida, Lansing Charter Township
3209 W Michigan Avenue
Lansing, MI 48917
Phone: 517-485-5476
Phone: 517-819-8720
seidar@westsidewater.com

NATIONAL DIRECTOR
Chris Kenyon, City of Ionia DPU
720 Wells Street
Ionia, MI 48846
Phone: 616-523-0165
Phone: 616-813-1263
ckenyon@ci.ionia.mi.us

ASSOCIATE DIRECTOR
Bob Masters, Peerless-Midwest, Inc.
505 Apple Tree Drive
Ionia, MI 48846
Phone: 616-527-0050
Phone: 616-690-8139
bob.masters@peerlessmidwest.com

ASSOCIATE DIRECTOR
Dale Stewart, Northern Pump & Well
6837 W Grand River Avenue
Lansing, MI 48906
Phone: 517-322-0219
Phone: 517-242-8949
dstewart@northernpumppwco.com

EXECUTIVE DIRECTOR
Tim Neumann
Michigan Rural Water Association
2127 University Park Drive, Suite 340
Okemos MI 48864
Phone: 616-401-5436
tneumann@mrwa.net

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Todd Hackenberg, President,
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Understanding Cross Connections in Water Systems

Protecting drinking water is one of the most important responsibilities of any water system, and one of the most common threats comes from something known as a cross connection.

A cross connection is any physical link between a potable (safe drinking) water supply and a source of contamination. This could be as simple as a garden hose submerged in a pool, a boiler system connected without proper protection, or irrigation systems that allow fertilizers or chemicals to flow back into the water supply. When pressure changes occur – such as during a water main break or heavy usage – these connections can allow contaminants to be siphoned back into the drinking water system, a process known as backflow.

Cross connections pose serious health risks, potentially introducing bacteria, chemicals, or other harmful substances into the public water supply. Because many of these risks occur on private property, they can often go unnoticed without proper oversight.

To prevent these issues, water systems implement cross connection control programs. These programs typically include inspections, testing of backflow prevention devices, and public education. Devices such as reduced pressure zone (RPZ) valves and double check assemblies are commonly installed to ensure that water flows in only one direction – keeping contaminants out of the drinking water system.

Public awareness is also key. Simple actions, like not leaving hoses submerged in water or ensuring proper backflow devices are installed on irrigation systems, can go a long way in protecting water quality.

Ultimately, preventing cross connections is a shared responsibility between water utilities, businesses, and residents. Through proactive measures and education, communities can safeguard their drinking water and ensure it remains clean and safe for everyone.

MRWA STAFF

MRWA OFFICE
2127 University Park Drive
Suite 340
Okemos, MI 48864
Phone: 517-657-2601
www.mrwa.net

EXECUTIVE DIRECTOR
Tim Neumann
Phone: 616-401-5436
tneumann@mrwa.net

DIRECTOR OF TRAINING/ ASSISTANT DIRECTOR
Mike Engels
Phone: 231-878-3285
mengels@mrwa.net

FINANCE DIRECTOR
Jennifer Lewis
Phone: 517-657-2601
finance@mrwa.net

MEMBERSHIP/ MARKETING DIRECTOR
Melisa Lincoln
Phone: 517-657-2601
membersvcs@mrwa.net

MEMBERSHIP/ MARKETING ASSISTANT
Cheri Laverty
Phone: 517-657-2601
training@mrwa.net

COMMUNITY WATER AND WASTEWATER SPECIALIST
Kyle Bond
Phone: 989-745-4405
kbond@mrwa.net

WATER CIRCUIT RIDER
John Monsees
Phone: 989-529-1342
jmonsees@mrwa.net

WATER CIRCUIT RIDER
Jonathan Edwards
Phone: 231-429-3289
jedwards@mrwa.net

WATER CIRCUIT RIDER
Troy Weiss
Phone: 989-621-1057
tweiss@mrwa.net

WATER QUALITY ACTION SPECIALIST
John Holland
Phone: 989-506-0439
jholland@mrwa.net

EPA TRAINING SPECIALIST
Joe VanDommelen
Phone: 517-525-4553
jvandommelen@mrwa.net

SOURCE WATER PROTECTION SPECIALIST
Kelly Hon
Phone: 989-621-2361
khon@mrwa.net

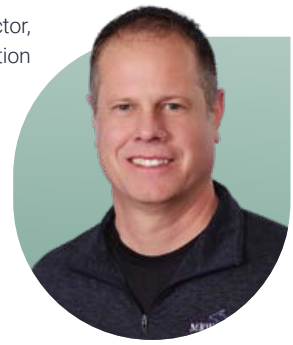
WASTEWATER TECHNICIAN
Matt Lumbert
Phone: 269-908-3792
mlumbert@mrwa.net

WASTEWATER TECHNICIAN
Amanda White
Phone: 616-633-4070
awhite@mrwa.net

ENERGY EFFICIENCY TECHNICIAN
Ginger Van Conet
Phone: 517-444-1321
ggrant@mrwa.net

APPRENTICESHIP COORDINATOR
Rob Splane
Phone: 586-596-0005
rsplane@mrwa.net

Tim Neumann, Executive Director,
Michigan Rural Water Association



Updates from MRWA: A Busy Start to the Year

It has been an eventful and productive first third of the year at MRWA, and it's hard to believe how quickly the months have passed. Between national advocacy efforts, our annual conference, policy engagement, and the many trainings we continue to deliver across the state, our team has remained focused on supporting Michigan's water and wastewater utilities.

In February, I had the opportunity to join our delegation at the National Rural Water Rally in Washington, D.C. This annual event brings together Rural Water associations from across the country to advocate for the needs of small and rural systems. In addition to celebrating excellence through the Great American Water Taste Test, the Rally provides a critical platform to meet directly with members of Congress and their staff.

Our message this year remained consistent: the importance of continued investment in technical assistance programs and infrastructure funding. These programs – including the USDA Water and Waste Disposal Loan and Grant Program and the Drinking Water and Clean Water State Revolving Funds – are essential tools that allow communities to maintain and improve their systems while keeping services affordable.

With the release of the President's proposed budget, we are seeing mixed results. While some programs received the funding levels we advocated for, others – particularly the USDA loan and grant program and the revolving funds – were proposed at significantly reduced levels compared to prior years. As the appropriations process moves forward, MRWA will continue working closely with NRWA and our partners in Congress to advocate for restoring these critical funding sources. Your voice is an important part of that effort, and I strongly encourage you to reach out to your Congressional representatives to share how these programs impact your community.

In March, we welcomed members and partners to our Annual Management and Technical Conference at the Soaring Eagle Resort in Mt. Pleasant. This year's conference was a tremendous success, bringing together 324 attendees and 104 exhibitors. With 40 technical sessions and pre-conference opportunities, participants were able to earn up to 1.7 CECs while gaining valuable knowledge and insights across a wide range of topics.

> **BEYOND THE NUMBERS, WHAT CONTINUES TO STAND OUT IS THE VALUE OF CONNECTION – OPERATORS, MANAGERS, AND INDUSTRY PARTNERS COMING TOGETHER TO SHARE EXPERIENCES, CHALLENGES, AND SOLUTIONS. THESE INTERACTIONS ARE WHAT STRENGTHEN OUR INDUSTRY AND ENSURE WE CONTINUE TO MOVE FORWARD TOGETHER.**

Beyond the numbers, what continues to stand out is the value of connection – operators, managers, and industry partners coming together to share experiences, challenges, and solutions. These interactions are what strengthen our industry and ensure we continue to move forward together. We are already looking ahead to 2027 and hope to see you in Traverse City at the Grand Traverse Resort, March 23–26.

In April, I also had the opportunity to attend NRWA's second annual Rural Water Policy Forum. This event is becoming increasingly important as we navigate a rapidly evolving landscape in the water sector.

Panel discussions highlighted practical, community-driven approaches to regional partnerships, demonstrated the proven success of small systems, and reinforced that the viability of rural water systems is not only achievable but already happening across the country. These conversations are critical as we continue to advocate for policies and programs that recognize and support the unique needs of rural communities.

As we move into the remainder of the year, MRWA remains committed to providing high-quality training, responsive technical assistance, and strong advocacy on your behalf. Thank you for the work you do every day to provide safe, reliable water and wastewater services to your communities. We are proud to support you.

2026 MRWA ANNUAL CONFERENCE RECAP

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SCENES FROM AROUND ANNUAL CONFERENCE

AWARDS

WATER TASTE TEST
Village of Mattawan

WATER UTILITY OF THE YEAR
City of Munising

WASTEWATER UTILITY OF THE YEAR
City of Mason

EMERGING PROFESSIONAL WATER OR WASTEWATER
WATER: Jayden Krosnicki, City of Yale

WATER OPERATIONS SPECIALIST
Jerrett Loomis, Village of Muir

WASTEWATER OPERATIONS SPECIALIST
Elizabeth McLeod, Clam Union Utility

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City of Mt. Pleasant

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Brad Lear, Northville Township

MRWA PERSON OF THE YEAR
Stephen Guy, City of Fenton

ASSOCIATE PARTNER LIFETIME ACHIEVEMENT AWARD
Dale Stewart, Northern Pump and Well

ENVIRONMENTAL PROTECTION
City of Ironwood

ROLLY OLNEY LIFETIME ACHIEVEMENT AWARD
Susan Craft, Village of Muir

WATER TOWER BUILDING CONTEST

Team Captain: Troy Weiss, MRWA
Shane Faunce, Village of Freeport
Collin Crumback, Village of Freeport

POKER RUN

Dan Heckman, Village of Muir

CORNHOLE TOURNAMENT

1st Place
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Chris Carpenter, Village of Lake Orion

2nd Place
Cody Soyka, City of Lowell
Jerrett Loomis, Village of Muir

3rd Place
Jerry Staggs, City of Olivet
Kevin Spyhalski, EJ

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Jonathan Edwards,
MRWA Water Circuit Rider

Briley Township (Atlanta)

Where Nature, Heritage, and Adventure Meet

Situated in the heart of Montmorency County, Briley Township is a scenic and vibrant community in northern Michigan. Established in 1881, the township covers more than 68 square miles of forests, rivers, and lakes. It includes the community of Atlanta, the county seat, and an area proudly known as the "Elk Capital of Michigan."

Anchored by small town charm, abundant wildlife, and year round outdoor pursuits, Briley Township draws residents and visitors seeking natural beauty, friendly faces, and authentic northern Michigan experiences.

A HISTORY DEEP IN NORTHERN MICHIGAN

Briley Township was one of the original townships formed when Montmorency County was organized, and it quickly became a center for settlement and community life in the region.

The community of Atlanta was first established in 1881 by Civil War veteran Alfred J. West, who named it after Atlanta, Georgia. The area's growth was driven initially by lumbering and agriculture, two industries that shaped much of northern Michigan's early economy. Later, Atlanta was designated the county seat by popular vote in 1893, helping cement Briley Township's role as a civic hub.

Over the decades, the region transitioned beyond its logging roots. With the reforestation of cutover lands and the expansion of roadways, communities like Atlanta and the township at large became known for recreation, hunting, and the natural landscapes that define the area today.

NATURAL WONDERS AND RECREATIONAL ATTRACTIONS

Briley Township's rolling hills, dense woodlands, and waterways make it a haven for outdoor enthusiasts. From spring through winter, residents and visitors enjoy hiking, fishing, snowmobiling, and exploring miles of trails through state and national forests. Elk and white tailed deer roam freely in the surrounding landscape, and wildlife viewing is a popular activity year round.

Atlanta proudly calls itself the Elk Capital of Michigan, a distinction officially recognized by the state legislature in 1986 due to the unusually large elk population found in the surrounding forests.

Winter brings a particularly exciting tradition to the area: the Sno*Drift Rally. Held annually in Montmorency County with its headquarters in Atlanta, this rally competition is the first major event of the American Rally Association national season and is known for its challenging snow and gravel courses. Competitors, including notable racers like Travis Pastrana, have taken part in this demanding winter rally.

Whether it's fishing for trout in crystal clear streams, chasing fall colors on an ATV trail, or watching rally cars roar through snowy forests, Briley Township offers year round outdoor adventure.

COMMUNITY AND LOCAL LIFE

Briley Township thrives on the spirit of its residents. The community reflects a deep connection to the land and to one another, where neighbors gather for seasonal festivals, wildlife events, and local traditions. Small businesses, from diners and shops in Atlanta to outfitters and service providers throughout the township, help sustain the local economy and add to the area's character.

Annual events help bring the community together and showcase local pride. The Elk Festival, for example, highlights both the local wildlife and community spirit, drawing visitors from across the region to celebrate northern Michigan's culture and natural heritage.

THE BRILEY TOWNSHIP WATER SYSTEM

An essential part of life in Briley Township is its dependable water system, which supports homes, businesses, and seasonal visitors. The township's water infrastructure draws from local groundwater and is treated to meet state and federal quality standards for safe drinking water. Routine monitoring and system maintenance ensure a reliable supply for residents and local events alike – including large gatherings associated with the Sno*Drift Rally and other community activities. This dependable water service is vital to both daily life and the economic vitality of the township.

CONCLUSION: NORTHERN MICHIGAN CHARM

Briley Township and its central community of Atlanta may be small in size, but they offer a rich tapestry of history, nature, and community pride. From its roots in Michigan's logging past to its modern identity as a destination for wildlife lovers and rally fans, the township celebrates both its heritage and its landscapes. Whether you're drawn here for the thrill of winter racing, the peaceful trails in autumn, or the welcoming spirit of a small northern community, Briley Township stands as a testament to the enduring appeal of Michigan's Northwoods. ●

Inflow and Infiltration and Energy Costs

By **John Holland**, Water Quality Action Specialist, Michigan Rural Water Association
and **Ginger Van Conet**, Energy Efficiency Technician, Michigan Rural Water Association

INFLOW AND INFILTRATION

Inflow and Infiltration or I&I is the process where water from sources other than domestic wastewater enter the sanitary system. Inflow sources are direct connections into the sanitary system. Typical inflow sources include sump pumps, roof drains and cache basins. Infiltration is groundwater entering sanitary sewers through areas such as defective pipe joints, manhole joints and broken pipes. Separating the amount of water caused from inflow versus infiltration can be quite difficult. However, once in the system the effects are rather similar in nature. One of the primary effects on the system is that of increased energy costs.

Inflow enters the system quite rapidly, while infiltration enters slowly over time. A quick and dirty estimation of I&I entering a system is by comparing the drinking water pumping. While not 100% accurate it does give an operator somewhat of an estimate.

Smoke testing for I&I, smoke rising from a broken sewer lead.

Smoke testing on a broken clean out.

Depending on the system the costs can vary. Systems with mechanical wastewater plants will have additional pumping at the headworks high service pumps, higher RAS pumping in activated sludge plants, higher recirculation rates in trickling filter plants, and could increase energy costs associated with having to run UV systems at higher intensities due to high flows. In the collection system, lift and pump stations are the most affected by energy costs.

MRWA staff have encountered many systems in the state that have significant I&I flows. An example encountered on a system showed an estimated seven-year average was 74% of the WWTP influent was I&I, while another WWTP had an estimated flow of 50%. While these are somewhat extreme examples, these numbers are not uncommon. Nationwide the sanitary sewer infrastructure is aging with an estimated 50% of the collection systems being more than 45 years old.

ENERGY USE

A crack in your sewer line is not costing your community very much money when you look at an individual hourly amount, but when you look at a bigger picture you might want to reconsider and look at it with this information.

A 5 hp submersible pump for a wastewater lift station on average uses 3.73 kw of energy in an hour at 100 % efficiency. You get this by using a known conversion factor of 1 hp=746watts.

Therefore 5 hp x 746 watts = 3.73 kw at 100% efficiency.

Most pumps and motors operate at 85% to 90% efficiency even when they are new. It will become much less when you consider that they are processing fats, oils, grease and sharps.

A 5 hp pump operating at 85% efficiency will use 4.39 kw to operate for one hour. When you look at many communities here in Michigan, they are averaging about $0.18 per kwh for their energy cost.

When you take the 4.39 kw of energy used for that hour and multiply it by the cost of $0.18, it costs $0.79 to operate that pump for an hour. Multiply that out to a cost per month and you will get $0.79 per hour X 24 hours per day = $18.96 per day X 30 days per month = $568.80.

This same 5 hp pump operating at 90% efficiency will use 4.14 kw to operate for one hour. This may not look like a very big difference, but when you look at the numbers it shows that the 5% difference of the higher efficiency will save you 4.14 kw X $0.18 = $0.745 per hour X 24 hours per day = $17.88 X 30 days per month = $536.40 for the month to operate.

Therefore, when you compare an 85% efficient pump to the same pump operating at 90% efficiency you will save $1.08 per day or $32.40 per month. Additionally, if this was a lift station on one of the examples above, reducing pumping by 50–75% would save $194.40 to $291.60 a year in energy costs.

The above information not only shows you the possible cost per month, but it also shows you why it is important to track the hours a pump operates or the meter readings daily on your energy meter to know if you are using more energy due to a float getting stuck or an impeller wearing out on your pump.

When you are considering looking at possible infiltration to your sewer system this simple cost explanation may help you understand why it is important to upgrade your pumps to a higher efficiency or to complete that sewer project to reduce infiltration. ●

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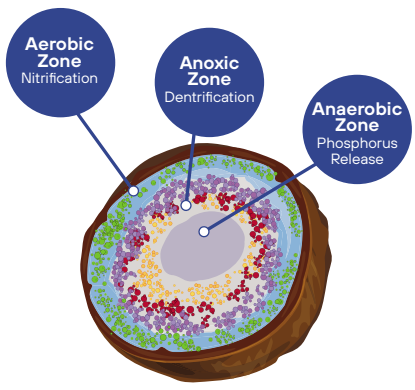

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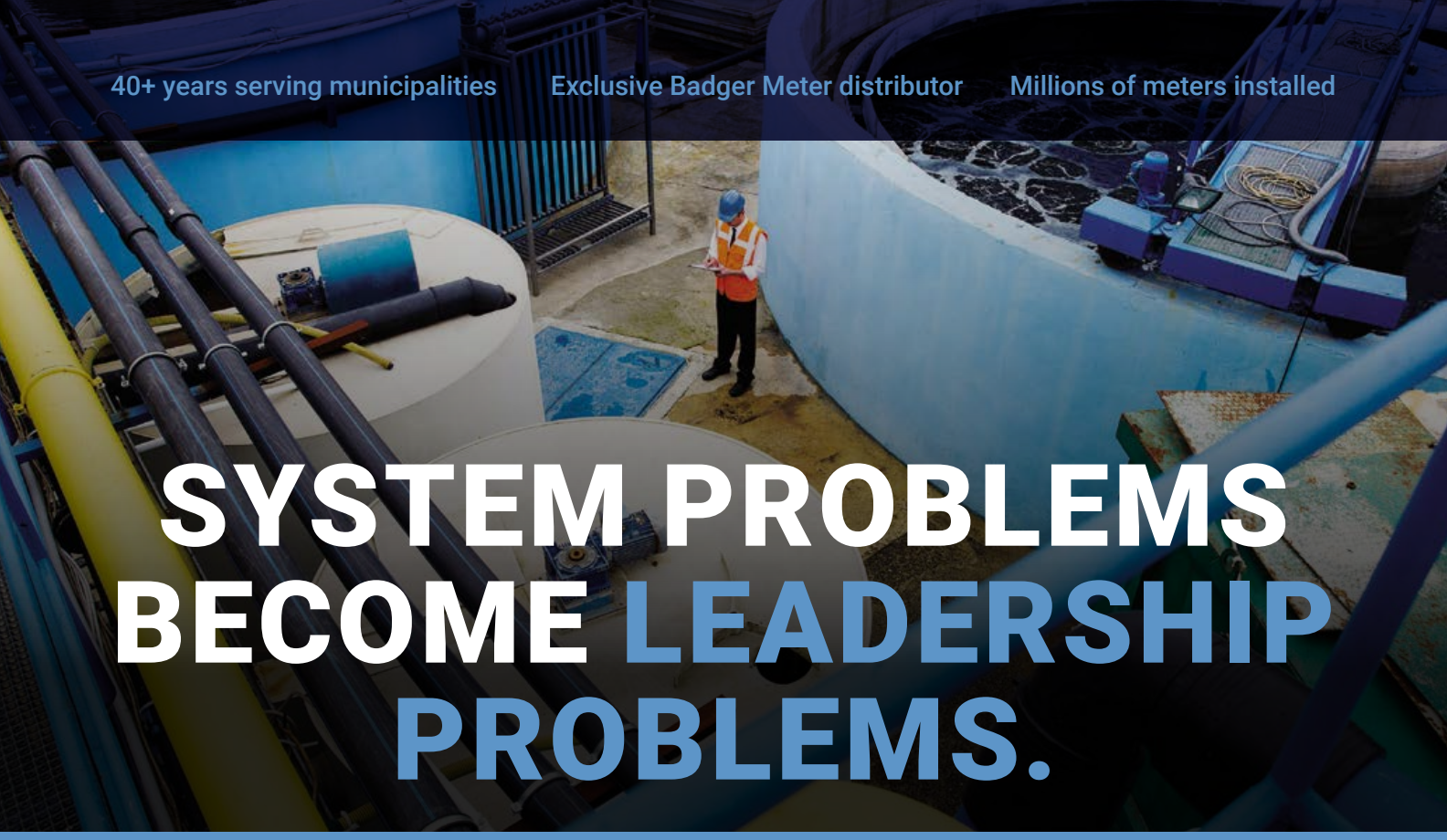

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DISCOLORATION WOES

By **John Monsees**, Water Circuit Rider,
Michigan Rural Water Association

Over the years, I have had numerous conversations with the City of Caseville about the colorization of drinking water. They were heartfelt about what can be done to correct the problem. In early 2000, some of the conversations were about what ideas did the Department of Environment, Great Lakes, and Energy (EGLE) have to recommend. At that time EGLE didn't offer a lot of insight as to why the finished drinking water in the summers would have color for usually two to three months. The City was following all drinking water standards and was sampling excessively to ensure the water was safe to drink. Over the years in my conversations with Troy Hartz, DPW Supervisor, and the water plant team along with the staff in the DPW, we would throw ideas out – flushing was a first thought to help. Maybe there was something in the water mains – possibly cast-iron, chlorine, or could be oxidation of the iron turning the water color (the water did resemble what oxidize iron looks like). But flushing only seemed to make the water more colored, and when doing iron sampling while flushing there was no presence of iron throughout the city. Again, what was going on for two to three months in the summer to have colorization in the drinking water? Some years had more color than others. Around 2023–2024 there were more meetings with EGLE, with recommendations for an engineering study; the City was already in contact with their engineer.

I stopped in to the water plant after the summer of 2024; Troy was frustrated with all the concerns and complaints that he takes very seriously. The conservation again was about why the drinking water has color in it in the summers. Troy started talking about the clear well and the sedimentation and who can sample. We talked about what the water treatment plant (WTP) could sample for that they have not already done. Trace Analytical Laboratories was suggested to sample the clear well sedimentation and it was suggested to sample the water when there is no color and then sample again when there is color, and compare the samples. Dan Sorka was contacted with Trace Analytical Laboratories for sample bottles and what tests should be performed; Dan had me talk to Jon Mink, their chief chemist. We received the sample bottles and the WTP team collected the samples to be sent back to the lab.

Caseville water plant received the results back from the labs. I can't remember all the parameters that the lab tested for but there were

three that had my interest: manganese, phytoplankton (algae), and water hardness and why. Remember, Caseville water plant is surface water; yes, I would expect algae, but where was the manganese coming from that exceeded the secondary Maximum Contaminant Level of 0.05 ppm and then the hardness of water that is in a category of 'very hard.' I know the water plant team and DPW staff personally and they are very dedicated and show professionalism in their jobs, working to find a solution. I talked with Troy and the WTP team about instead of using chlorine in the low lift where the intake is located, switch to potassium permanganate which would oxidize the manganese better than chlorine and help decrease the disinfection by-product. And we talked about using powder activation carbon (PAC) for treatment for color and taste. When Caseville WTP team started researching PAC for treatment, the research showed that the PAC would obstruct the membrane filters.

The first idea everyone had was: did the manganese and hardness come from Pigeon River? And they started testing the river. The Pigeon River results showed the presence of manganese and the water was hard. The test results did not match the raw water intake test results that are significantly higher at times, primarily in the summer.

At the start of summer 2024, the water became warmer and the increase of chlorine was needed for disinfection of the drinking water. Concerns and complaints started to be a daily occurrence for the Health Department, EGLE, and the City along with the local newspaper and TV station. Not only does the City follow up with the concerns, EGLE and the Health Department also follow up with the residents. I was given some examples of residents' worries.

- There is no reason that this (yellow water) continues year after year.
- Our water in Caseville/Pigeon area is brown/yellow all summer and tastes funky. Nothing be done about it. We pay good money.
- Recently (within last three months) water is brownish and tastes rusty.
- Brownish water. Told it is rust. Why are we drinking rusty water? This needs to be fixed. Tired of band aids. We pay good money for it to be rusty or brownish.
- Discoloured water.

This is just five of 21 concerns shared with me, with more complains that EGLE received and more with the City of Caseville and the state.

From a document from EGLE:

Troy Hartz City of Caseville

DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY WARREN DISTRICT OFFICE
September 12, 2024
6767 West Main Street P.O. Box 1049 Caseville, Michigan 48725

Dear Troy Hartz: WSSN: 01190 County: Huron PHILLIP D. ROOS DIRECTOR
SUBJECT: City of Caseville Discoloration Issue – Engineering Study Recommendation

This letter confirms the Department of Environment, Great Lakes, and Energy (EGLE) has been made aware of numerous complaints in conjunction with the seasonal discoloration issue in the City of Caseville water system. The complaints have been aesthetic concerns primarily with a few claiming illnesses due to the water. EGLE met with City officials and consultants on August 29, 2024, to inspect the water system and gather information, and continues to monitor and respond to customer complaints to better understand the nature of the problem. From the data shared with EGLE to date, there is evidence that the City's Lake Huron/Saginaw Bay source is being influenced from another source such as ground water or river water. While the seasonal discoloration issue is concerning, all water quality monitoring and monthly operation reports continue to show the water is meeting primary health standards and required treatment techniques. EGLE has been in frequent contact with City staff to help understand and respond to the discoloration issue. Given the numerous complaints and customers' hesitation to consume the water, it is imperative the City perform a comprehensive engineering study to diagnose the problem and propose solutions. EGLE and/or U.S. EPA's Compliance Assistance Program are available to assist with developing the study scope and a request for proposal, if needed. EGLE funding may also be available to help with study costs. Please contact this office by September 27, 2024, to acknowledge receipt of this letter and to respond to the recommendations provided. The study should be completed within 12 months of the date of this letter.

If you have any questions, please contact me by telephone at 586-506-6137, or by email at *johnsons18@michigan.gov*.

Sincerely,
Stephanie Johnson, P.E.
Surface Water Treatment Specialist

City of Caseville did request help from the EPA Compliance Assistance Program, which was approved.

When talking with the WTP team trying to put something together for this article, I got an email from the team – this is a small portion of the data that I can share.

Caseville Water Treatment Plant Hardness/Discoloration Study

The Caseville Water Treatment Plant personnel began collecting data, as requested by EGLE, on January 16, 2025. Alkalinity, hardness, manganese, iron, and dissolved oxygen were to be checked on a weekly basis. Dissolved oxygen wasn't checked until January 30. Most of the data collected between the dates of January 16 and February 21 appear to be poor data due to variables exposed while learning how to execute the test procedures properly. Current sample tests appear to align more with samples sent to Trace Analytical Laboratories. Manganese is between 30–40 parts per billion higher than that of Trace Analytical Laboratories.

In late February, the raw water was analyzed for hardness and alkalinity. The results of this led to the discovery of a large slug of elevated hardness that is entering the plant. The slug of elevated hardness was captured from the raw plant tap and test results were 850 mg/L of $CaCO_3$. The following week the slug of elevated hardness was captured at the low lift station, raw plant tap, and Unit 1 filtrate sample port. This test was conducted on the date of 3/3/2025 and the following list contains times and levels:

Location	Time and Date	Hardness	Iron	Manganese
Low Lift	0812 3/3/25	832 mg/L	.28 mg/L	.088-.100 mg/L
Raw Plant Tap	0900 3/3/25	618 mg/L	Not Ran	Not Ran
Unit 1 Filtrate	0855 3/3/25	880 mg/L	.02 mg/L or ND	.071-.076 mg/L

The Low Lift and Unit 1 Filtrate, and Pigeon River water samples were sent to Trace Analytical Laboratories. The results are listed below.

Location	Time and Date	Iron	Manganese
Low Lift	0812 3/3/25	.31 mg/L	.063 mg/L
Unit 1 Filtrate	0855 3/3/25	ND	.044 mg/L
Pigeon River	1330 3/5/25	3.1 mg/L	.064 mg/L

Further sampling and testing continued after 3/3/25, which verified some of the assumptions that were developed after discovery of the slug of elevated hardness. One of the observations made was that when the slug entered the plant and passed through the Clearwell, a drop in chlorine was observed on the online monitor. The hardness tested at this point from the Clearwell, or plant tap would test at an elevated level. Manganese and Iron were tested during this period and found to be lower than what had come in the slug but still elevated. After the slug had passed through the Clearwell the Chlorine and hardness would return to values that are anticipated. Hardness values are generally 230 to 270 mg/l.

Location	Time and Date	Hardness	Iron	Manganese
Raw Tap	0712 3/12/25	258 mg/L	Not Tested	Not Tested
Raw Tap	0758 3/12/25	254 mg/L	Not Tested	Not Tested
Raw Tap	0818 3/12/25	256 mg/L	Not Tested	Not Tested
Raw Tap	0828 3/12/25	406 mg/L	Not Tested	Not Tested
Raw Tap	0833 3/12/25	964 mg/L	Not Tested	Not Tested
Raw Tap	0838 3/12/25	906 mg/L	.28 mg/L	.113 mg/L
Raw Tap	0843 3/12/25	684 mg/L	Not Tested	Not Tested
Raw Tap	0848 3/12/25	546 mg/L	Not Tested	Not Tested
Raw Tap	0856 3/12/25	424 mg/L	Not Tested	Not Tested
Raw Tap	0913 3/12/25	362 mg/L	Not Tested	Not Tested
Raw Tap	1300 3/12/25	275 mg/L	.07 mg/L	.025 mg/L

Location	Time and Date	Hardness	Iron	Manganese	Free Chlorine
Unit 1 Filtrate	0838 3/12/25	850 mg/L	Not Detected	.075 mg/L	1.91 mg/L
Filtrate Confluent	0844 3/12/25	740 mg/L	Not Detected	.053 mg/L	1.90 mg/L
Plant Tap	0856 3/12/25	350 mg/L	Not Tested	Not Tested	1.80 mg/L
Plant Tap	0902 3/12/25	530 mg/L	Not Tested	Not Tested	1.70 mg/L
Plant Tap	1300 3/12/25	266 mg/L	Not Detected	.025 mg/L	1.93 mg/L

Note: Yellow highlighted values more than likely would be Non-Detect with EGLE or Trace Analytical Laboratory procedures.

From the chart above and data collected 3/3/25, that is not listed, we can roughly calculate the size of the elevated hardness slug. The slug appears to last between 20–30 minutes, if we multiply this amount of time by an average speed of 816 gallons per minute, we find the slug is estimated to be between 16,320–24,480 gallons. We can also see that there are detectable amounts of iron contained in our raw water, that appears to oxidize from the chlorine addition at the low lift and is removed from by micro filter membranes. The traceable amount of manganese also appears to be oxidizing and removed somewhat by the micro filter membranes. Dissolved Oxygen was also tested on the slug of elevated hardness and found to be at 11.20 mg/L. Many of these tests were performed too in subsequent days and the elevated slug was found to be repeatable.

Data below was obtained on 3/18/25.

Location	Time	Hardness	Alkalinity	Iron	Manganese	Free Cl_2
Raw Tap	0720	270 mg/L	126 mg/L	.07 mg/L	.024 mg/L	Not Tested
Plant Tap	0720	271 mg/L	137 mg/L	ND	.012 mg/L	1.71 mg/L
Raw Tap	0840	266 mg/L	Not Tested	.08 mg/L	.094 mg/L	.18 mg/L
Raw Tap	0845	1022 mg/L	257 mg/L	.30 mg/L	.196 mg/L	.04 mg/L
Plant Tap	0915	507 mg/L	171 mg/L	ND	.046 mg/L	1.50 mg/L
Raw Tap	1300	258 mg/L	126 mg/L	.05 mg/L	.025 mg/L	.24 mg/L
Plant Tap	1300	268 mg/L	136 mg/L	ND	.014 mg/L	1.70 mg/L
Low Lift	0800	260 mg/L	Not Tested	Not Tested	Not Tested	N/A
Low Lift	0810	904 mg/L	Not Tested	.26 mg/L	.096 mg/L	N/A
Low Lift	0820	626 mg/L	Not Tested	Not Tested	Not Tested	N/A

Note: Yellow highlighted values more than likely would be Non-Detect with EGLE or Trace Analytical Laboratory procedures.

The table above only seemed to confirm earlier observations; we know the rough timing of the slug. Testing shows it has elevated hardness or at least something that mimics hardness. We know the slug has iron and manganese at what would be traceable levels with independent laboratories. We found the iron and some manganese is oxidizing and removed by the micro filter membranes. It also appears as if something contained within the slug is causing a decrease in chlorine as it flows into and through the Clearwell, possibly precipitates out in the Clearwell.

All data in the tables are only applicable when the plant speed is at 1.1 million gallons a day or 816 gallons per minute. The slug of elevated hardness is suspected to change in the time of arrival and size when the plant speed is increased or decreased. With the plant speed change, we expect to see changes in how much of the iron and manganese is oxidized. If there is too little contact time from the low lift to the plant the chlorine will not have the contact time to oxidize as much of the iron or manganese. Some or more will pass through the micro filter membranes, due to a more soluble state, and possibly oxidize in the Clearwell or in the distribution system. There are also concerns about feeding excessive amounts of Chlorine and the possible creation of trihalomethanes. Chlorine is dosed at the low lift station at a constant rate. The raw water pumped to the water plant, was a constant flow rate throughout testing. It was noted that during the slug, the chlorine from the low lift was almost completely consumed by the high demand of what is assumed to be iron and manganese. Chlorine is also dosed at the filtrate confluent as it enters the water plant clear well. The dosing rate also remained constant on testing days. Observing the online chlorine monitor you can see the chlorine demand increase and the free residual chlorine drops significantly. The only thing that changed with the water, plant set-up, and chlorine was the slug of elevated hardness and what is contained within the slug. The assumption that the iron and manganese caused the increase in demand that caused our chlorine free residual to drop. Now the testing is moving into a stage of verifying the existence of the slug throughout changes in plant operation speeds and seasons.

> "The hardness could cause several operational issues for our water plant, including but not limited to increased chemical usage for cleaning, decreased membrane efficiency, and possible premature membrane failure."

We are also watching for changes in iron and manganese throughout the day, for example, we always see elevated levels the closer we get to the summer months. Hardness, although not causing the discoloration of the water that is seen in the summer months, is a concern due to the staining or white/gray spots it leaves behind. Hard water is generally not considered a health concern but may cause dry itchy skin and dry scalp, there is no MCL for hardness. The water coming into our water plant is considered very hard by most standards. The hardness could cause several operational issues for our water plant, including but not limited to increased chemical usage for cleaning, decreased membrane efficiency, and possible premature membrane failure. All hardness values contained in this report are to read or recorded as mg/L of Calcium Carbonate or $CaCO_3$.

To convert this to grains of hardness simply divide the mg/L value by 17.12.

An example would be 258 mg/L / 17.12=15.07 grains of hardness.

Iron and manganese are tested with a Hach DR3900 photo spectrometer. The test procedure for used for iron is EPA approved and appears to be accurate. The method for manganese is not EPA approved and the values obtained are used only for internal reference. Water plant personnel are currently evaluating different methods to test the manganese to make it align with tests completed by EGLE and Trace Analytical Laboratories.

Dissolved oxygen is not tested on a regular basis currently. Every test performed for dissolved oxygen has been in the range of 8 mg/L to 11 mg/L. A current theory is that there is a hypoxic or anoxic area in or above the bed causing the iron, manganese, and other items to be more soluble due to change in the oxidized state. It has been proposed that the stones in the bed and possibly the soil below the bed be analyzed for the metal/mineral composition. Another proposal is a dissolved oxygen monitor directly above or in the bed.

In an attempt to locate where the slug of elevated hardness was coming from, we calculated the volume of all the main or pipe between the low lift station and the header of the bed, between the low lift and the plant, and then the bed itself.

The calculation used to determine the volume of a cylinder was: **Cylinder: V = 0.785 x D2 x H**, then the result was multiplied by **7.48 gallons** to determine how many gallons contained by one foot of pipe, this number was then multiplied by the feet of appropriate main to equal total volume. Using an average **816 gpm flow rate** we can determine an approximate origan of the elevated slug of hardness. From this we could calculate the amount of time between each specific location.

Low Lift to Header of the Bed – 16 inch main @ 2,963 feet
.785x1.33x1.33x2963=4114ft^3
4114x7.48=30772.72 gallons
30772.72/816 gpm=37.71 minutes

Low Lift to the Plant – 12 inch main @ 4,838 feet
.785x1x1x4838=3797.83ft^3
3797.83x7.48=28407.77 gallons
28407.77/816gpm=34.81 minutes

Bed Capacity – consists of 18 laterals of 8 inches x 240 feet
18 x ((.66' x .66' x .785) x 240')
18 x 82.07= 1477.2ft^3 x 7.48 = 11050 gallons in laterals
2 manifolds 16" x 290'
2 x (1.33' x 1.33' x .785) x 290' = 805.4 ft^3 x 7.48= 6024.3 gal in manifold

Total Bed Capacity of 17,075 Gallons

CONCLUSION

With pipe capacities / flow rate we are able to consistently capture water from slug.

Bed to low lift 30,772 gal / 816 gpm = 38 minutes (captured 40 minutes after start up)

Low lift to plant 28,407 gal / 816 gpm = 35 minutes (captured 80 to 90 minutes after start up)

Slug is lasting 20 to 30 minutes.
The hardness spikes quickly and takes time to return to normal.

Bed capacity of 17,075 gallons (17,075/816 gpm= 20.93 minutes.

Water blending in transmission water is the main reason for taking time to return to normal.

There are more data points available upon request.

Along with the City of Caseville, the Health Department collected water samples from the residents.
I don't have any data from the Health Department sampling results, but I'm sure the data can be obtained by a request.

Water Sampling Available to Caseville Area Residents

CASEVILLE, Mich., May 27, 2025

The City of Caseville Department of Public Works (DPW), the Huron County Health Department, and the Michigan Department of Health and Human Services (MDHHS) are working together to address discoloration in the drinking water in the Caseville area.

Beginning June 3, staff from both the DPW and MDHHS will be in the City of Caseville, Caseville Township, and the Village of Pigeon knocking on doors of homes with connections to the City of Caseville drinking water distribution system to ask residents for drinking water samples from a faucet inside their home. This sampling will be done free of charge.

The drinking water sample will be taken from a faucet that is frequently used, like a kitchen or a bathroom faucet. Residents will be asked to grant the sampling team's approval to access their home, and an adult must be present during sampling.

All MDHHS staff conducting samplings will have state issued vehicles, visible MDHHS identification and will be wearing MDHHS logoed attire. MDHHS staff will be accompanied by DPW staff.

Residents have noted that a discoloration event occurs annually. The goal of this initial drinking water sampling is to assess the drinking water quality before the discoloration begins. MDHHS plans for additional drinking water sampling during a discoloration event, likely in the summer months of June–August 2025.

This sampling effort is different from the engineering study and monitoring that is being completed by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) and the Environmental Protection Agency (EPA).

If you have any questions about water sampling, please call MDHHS at 800-648-6942.

Troy Hartz
DPW Supervisor
City of Caseville

Jacobs Engineering was hired to perform the study for treatment concepts for the City of Caseville Water Treatment Plant. The engineering firm started the study in the fall of 2024 and submitted their proposed treatment in March 2026.

Cadmus–Jacobs

Preliminary Engineering Report

Caseville, Michigan

Revision: Draft March 9, 2026

Caseville has been facing water quality changes during the summer, which resulted in water discoloration during this period. The discoloration typically occurs annually for two to three months. Sampling results from summer 2025 indicated an exceedance of the EPA's secondary Maximum Contaminant Level (sMCL) for manganese in the distribution system with a high level of water hardness in the raw water and/or in the distribution system. In addition, the raw water contains extremely high levels of phytoplankton density and total algae. Four alternatives were documented, and three alternatives were evaluated in this PER for Caseville as follows:

- Alternative 0 (for documentation only): Regionalization; New Intake Pipeline and Crib; Groundwater Supply; and Lime Softening Treatment
- The cost estimates provided in Table 4-2 represent ballpark numbers which were generated from estimation from other EPA WaterTA projects and an inhouse cost estimating model.

Table 4-2. Estimated Construction Cost – Alternative 0: Regionalization; New Intake Pipeline and Crib; Groundwater Supply; and Lime Softening Treatment

Alternatives	Estimated Construction Cost (Ballpark)
Regionalization (21.5 miles 12 in transmission main from Huron RWA)	>$60M
Constructing a new intake and crib	>$38M
Returning to groundwater supply	>$10M
Lime softening treatment	>$10M

- Alternative 1: Treatment 1 – Greensand Filtration + Ion Exchange Softening + Residual Management after Microfiltration
- Table 4-6 shows the estimated construction cost for Alternative 1. These costs include greensand filtration without pilot study, an IX softening unit, a waste holding tank, and intake bed maintenance modifications. The total estimated construction cost is $11,073,000.

Table 4-6. Estimated Construction Cost – Alternative 1: Treatment 1 – Greensand Filtration + Ion Exchange (IX) Softening + Residual Management after Microfiltration

Project Component	Treatment Markups	Treatment Cost	Intake Markups	Intake Cost
Alt 1 - Greensand filter w/o piloting	-	$2,418,000	-	-
Alt 1 - IX Softening unit	-	$2,818,000	-	-
Alt 1 - Waste holding tank	-	$213,000	-	-
Alt 1 w/ Intake Bed Maintenance Modifications	-	-	-	$178,025
Subtotal – Project Cost		**$5,449,000**		**$178,025**
Additional Project Costs:				
Demolition	1%	$54,490	8%	$15,025
Overall Sitework	2%	$108,980	0%	-
Plant Computer System	6%	$314,160	0%	-
Yard Electrical and Piping	3%	$157,080	0%	-
Subtotal w/o Markups		**$6,083,710**		**$193,050**
Mobilization/Demobilization	5%	$304,186	3%	$8,000
Overhead and General Admin	15%	$912,557	14%	$27,000
Profit	10%	$608,371	10%	$20,000
Bond and Insurance	2%	$121,674	3%	5,000
Total Construction Cost w/ Markups		**$8,030,497**		**$253,050**
Local Adjustment Factor	100	$8,030,497	100	$253,050
Design Contingency	30%	$2,409,149	30%	$75,915
Subtotal Estimated Construction Cost		**$10,440,000**		**$329,000**
Total Estimated Construction Cost		**$10,769,000**		

- Alternative 2: Treatment 2 – Intake Bed Bypass Modifications with Pre-oxidation and Dissolved Air Flotation (DAF) with Coagulant Prior to Microfiltration
- Table 4-9 shows the estimated construction cost for Alternative 2.

These costs include two DAF units with pilot study, pre-oxidation chemical feed storage, rapid mix basin, flocculation basin, liquid chemical feed system for coagulant, as well as intake bypass modifications. The total estimated construction cost is $13,568,000.

Table 4-9. Estimated Construction Cost – Alternative 2: Treatment 2 – Intake Bed Bypass Modifications with Pre-oxidation and Dissolved Air Flotation (DAF) with Coagulant Prior to Microfiltration

Alternatives	Treatment Markup	Treatment Cost	Intake Markup	Intake Cost
Alt 2 - DAF Pilot study	-	$50,000	-	-
Alt 2 - Chemical Feed Storage – Pre-oxidation ($KMnO_4$)	-	$347,000	-	-
Alt 2 - Two (2) Rapid Mix basin	-	$1,000,000	-	-
Alt 2 - Two (2) Flocculation Basin	-	$1,043,000	-	-
Alt 2 - Liquid Chemical Feed – Coagulant	-	$354,000	-	-
Alt 2 - Two (2) DAF Units	-	$4,016,000	-	-
Alt 2 - Intake bypass modification – 42-INCH DIAMETER X 2 FT TALL CYLINDER SCREEN	-	-	-	$189,500
Alt 2 - Intake bypass modification – Electrical	-	-	-	$42,750
Alt 2 - Intake bypass modification – WATEWAY AND MARINE CONSTRUCTION	-	-	-	$78,000
Subtotal – Project Cost		**$6,760,000***		**$310,250**
Additional Project Costs:				
Demolition	1%	$67,600	-	$12,000
Overall Sitework	2%	$135,200	2%	$6,205
Plant Computer System	6%	$405,600	0%	$0
Yard Electrical and piping	3%	$202,800	0%	$0
Subtotal w/o Markups		**$7,571,200**		**$328,455**
Mobilization/Demobilization	5%	$378,560	3%	$9,854
Overhead and General Admin	15%	$1,135,680	11%	$36,130
Profit	10%	$757,120	12%	$39,415
Bond and Insurance	2%	$151,424	2%	$6,569
Total Construction Cost w/ Markups		**$9,993,984**		**$420,422**
Local Adjustment Factor	100	$9,993,984	100	$420,422
Design Contingency	30%	$2,998,195	25%	$105,106
Total Estimated Construction Cost		**$13,042,000**		**$526,000**
Total Estimated Construction Cost		**$13,568,000**		

- *The pilot study is only included in the Total Estimated Construction Cost.

- Alternative 3: Intake Bed Maintenance Modifications with Pre-oxidation and Finished Water Sequestration
- Table 4-12 shows the estimated construction cost for Alternative 3.

These costs include intake maintenance modification, pre-oxidation, sequestration processes and chemical storage tanks. The total estimated construction cost is $2,045,000.

Table 4-12. Estimated Construction Cost – Alternative 3: Intake Bed Maintenance Modifications with Pre-oxidation and Finished Water Sequestration

Project Component	Treatment Markups	Treatment Cost	Intake Markups	Intake Cost
Alt 3 - Pre-oxidation ($KMnO_4$)	-	$62,000	-	-
Alt 3 - Sequestration	-	$25,000	-	-
Alt 3 - Chemical Feed Storage – Pre-oxidation ($KMnO_4$)	-	$347,000	-	-
Alt 3 - Chemical Feed Storage – Sequester	-	$347,000	-	-
Alt 3 - Intake Bed Maintenance Modifications	-	-	-	$178,025
Subtotal – Project Cost	**$781,000**		**$178,025**	
Additional Project Costs:				
Demolition	1%	$7,810	8%	$15,025
Overall Sitework	2%	$15,620	0%	-
Plant Computer System	2%	$15,620	0%	-
Yard Electrical and Piping	2%	$15,620	0%	-
Subtotal w/o Markups		**$835,670**	-	**$193,050**
Mobilization/Demobilization	3%	$25,070	3%	$8,000
Overhead and General Admin	15%	$125,351	14%	$27,000
Profit	10%	$83,567	10%	$20,000
Bond and Insurance	2%	$16,713	3%	$5,000
Total Construction Cost w/ Markups		**$1,086,371**	-	**$253,050**
Local Adjustment Factor	100	$1,086,371	100	$253,050
Design Contingency	30%	$325,911	30%	$75,915
Total Estimated Construction Cost	**$1,412,000**		**$329,000**	
Total Estimated Construction Cost	**$1,741,000**			

The alternatives were evaluated based on a combination of non-monetary factors (Ease of Operation, Residual Management, Permit Needs, Longevity, and Ability to Meet Current or Future Regulations) and financial considerations, including construction cost and 20-year life-cycle cost.

In response to water quality challenges, implementing Alternative 2 is recommended as a long-term solution to address the impaired raw water intake bed and associated water quality challenges it creates. This alternative bypasses the intake bed with a new intake structure designed for shallow waters. Bypassing the intake will reduce water hardness, iron, and manganese levels in the raw water by pulling directly from Lake Huron. Without the intake bed, pretreatment for the microfiltration membranes is required to remove solids in the source water and maintain operational efficiency and effectiveness of the membranes. Due to the elevated levels of phytoplankton, dissolved air flotation (DAF) is recommended over conventional sedimentation to allow the phytoplankton to be removed by floating and skimming the solids from the water stream. Since DAF has not been installed in Michigan, pilot testing is required to verify its performance.

The City of Caseville is working with Fleis & Vanderbrink for chemical feed system design and permitting with added DWSRF project plan and application. The City wants to start piloting feeding sodium permanganate at the low lift pump station. The water study from Cadmus-Jacobs recommends evaluating another oxidant such as permanganate to increase manganese oxidation. The proposed pilot study sides with the recommendation and the City can apply the new system with hopes to remove the color in the distribution system. ●

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Letters regarding the assistance you have received from MRWA are useful in discussing with our lawmakers the need for water programs for small communities. If you have received assistance from MRWA that has been helpful, please consider writing a letter of thanks and sending it to us.

Michigan Rural Water Circuit Rider Sun, Mar 8, 2026 at 1:44 PM

Tom Anthony <tom@mattawanmi.com>
To: "customersatisfaction@nrwa.org" <customersatisfaction@nrwa.org>
Cc: Tim Neumann <tneumann@mrwa.net>

Jonathan is a fantastic, well-dressed clean-cut hard-working person who holds the Distribution S-3 and Limited Treatment D-2 that the Village of Mattawan needed for a temporary operator in charge. I had to have surgery that requires me to be off work for four months. Between the great staff that I have (who have taken many of the Training Courses offered through MRWA), and Jonathan (who has been coming in to do the Monthly Operation Report and helping our new manager do a rate study), I can recuperate without the worry of being in violation.

Where would we be without them? None of our surrounding communities do the treatment that we do. Thanks to the EPA and the USDA and National Rural Water for their help as well.

Forever Grateful

Tom Anthony
Village of Mattawan
Public Works Superintendent
(269) 668-2300

MRWA MAILBAG

Joe Vandommelen Mon, Apr 13, 2026 at 1:34 PM

Art Kale <manager@homermichigan.org>
To: tneumann@mrwa.net
Cc: Joe Vandommelen <jvandommelen@mrwa.net>, Brent Michael <brent.l.michael@saint-gobain.com>

Good afternoon, Tim.

Please know that our Homer Village Council has made it very clear that they wanted me to send a letter of commendation to you about Joe Vandommelen. He has been here a couple times, and even presented to our Council as we reviewed our water and sewer rates for this Spring. Actually, Joe will be here tonight for a Workshop and also plans to present at our May 4 Council Meeting.
He comes across with so much more credibility than I could ever present.

I have been here for over ten years as Village Manager and never has the Council, in unison, ask that I send a letter to a "vendors" Manager expressing our gratitude for this work and effort. Joe has presented himself professionally and is obviously very knowledgeable. He is indeed a great asset for Michigan Rural Water Association.

Thank you for your time and I remain available to discuss further if you would like.

Regards,

Art Kale
Village Manager
Homer, Michigan 49245
Manager@homermichigan.org
517-568-4321 Office 517-206-0871 Cell

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UPCOMING EVENTS

MAY		
21	**Excavation and Trench**	Grand Haven
27	**Advanced Cross Connection**	Ann Arbor
27	**Temporary Traffic Control**	Gaylord
28	**Excavation and Trench**	Gaylord
28	**Advanced Cross Connection**	Mt. Pleasant

JUNE		
2	**Temporary Traffic Control**	Northville
3	**Excavation and Trench**	Northville
3	**Wastewater Operators Meeting**	Caro
4	**Excavation & Heavy Equipment Operation**	Northville
4	**Basic Drinking Water Distribution System O&M**	Gaylord
4	**Wastewater Operators Meeting**	West Branch
16	**Temporary Traffic Control**	Plainwell
17	**Excavation and Trench**	Plainwell
18	**Excavation & Heavy Equipment Operation**	Plainwell
23	**Annual Golf Outing**	Mt. Pleasant
24	**Wastewater PFAS**	Marquette
25	**Wastewater PFAS**	St. Ignace

JULY		
7	**Basic Cross Connection**	Harris
7	**Basic Cross Connection**	ZOOM
8	**Regulatory Monitoring and Sampling**	ZOOM
8	**Regulatory Monitoring and Sampling**	Harris

AUGUST		
12	**2026 August Golf Outing**	
13	**2026 Outdoor Expo**	Brooklyn
26	**Excavation and Trench**	Port Huron

SEPTEMBER		
2	**Wastewater Operators Meeting**	Caro
3	**Wastewater Operators Meeting**	West Branch
25	**Submersible Pump**	Flint

OCTOBER		
13–15	**2026 UP Conference**	Marquette
29	**Hydrant & Valve Op & Maintenance Seminar**	East Jordan

DECEMBER		
2	**Wastewater Operators Meeting**	Caro
3	**Wastewater Operators Meeting**	West Branch
9–10	**Hazard Control Conference, OPERATOR REG**	Frankenmuth

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