UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

ELNORA CARTHAN, et al., Plaintiffs,	
v.	Case No. 5:16-cv-10444-JEK-MKM
RICK SNYDER, et al., Defendants.	Hon. Judith E. Levy Magistrate Judge Mona K. Majzoub

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OPPOSITION OF DEFENDANTS VEOLIA NORTH AMERICA, LLC, VEOLIA NORTH AMERICA, INC., AND VEOLIA WATER NORTH AMERICA OPERATING SERVICES, LLC TO PLAINTIFFS' MOTION FOR CLASS CERTIFICATION

STATEMENT OF ISSUES PRESENTED

1. Should the Court certify Plaintiffs' proposed principal class or proposed subclasses?

   VNA answers: "No."

   Plaintiffs answer: "Yes."

2. In the alternative, should the Court certify Plaintiffs' proposed issue class?

   VNA answers: "No."

   Plaintiffs answer: "Yes."

CONTROLLING OR MOST APPROPRIATE AUTHORITIES

Amchem Prods. Inc. v. Windsor, 521 U.S. 591 (1997)

Comcast Corp. v. Behrend, 569 U.S. 27 (2013)

Ebert v. Gen. Mills, Inc., 823 F.3d 472 (8th Cir. 2016)

Gates v. Rohm & Haas Co., 655 F.3d 255 (3rd Cir. 2011)

Henry v. Dow Chem. Co., 473 Mich. 63 (2005)

Martin v. Behr Dayton Thermal Prods. LLC,
896 F.3d 405 (6th Cir. 2018)

Parkhurst v. D.C. Water & Sewer Auth.,
No. 2009 CA 000971 B,
2013 D.C. Super. Lexis 4 (D.C. Super. Ct. Apr. 8, 2013)

Powell-Murphy v. Revitalizing Auto Cmtys. Envtl. Response Tr.,
No. 348690, 2020 WL 4722070 (Mich. Ct. App. Aug. 13, 2020)

Steering Comm. v. Exxon Mobil Corp.,
461 F.3d 598 (5th Cir. 2006)

Woodman ex rel. Woodman v. Kera LLC, 486 Mich. 228 (2010)

Fed. R. Civ. P. 23

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INTRODUCTION

This massive federal case arising out of the Flint water crisis involves over 100,000 putative class members, suing 27 different defendants, asserting harm from at least four toxic substances, and seeking at least six types of damages, including personal injury, property damage, and lost business profits. Despite the many differences across those claims, Plaintiffs seek to have them all proceed together in one combined class action. Plaintiffs propose a principal class of all current and former Flint residents who received Flint water at any time during an 18-month period, along with subclasses for minors, property owners, and businesses.

This opposition is filed by Veolia North America, LLC, Veolia North America, Inc., and Veolia Water North America Operating Services, LLC (VWNAOS; collectively, VNA). The only remaining cause of action against VNA is for professional negligence. Each plaintiff's claim against VNA overwhelmingly depends on that plaintiff's individual circumstances. For example, each claim for personal injury depends on factors personal to that plaintiff, including when and how the plaintiff used Flint water, the type of service lines and interior plumbing at the locations the plaintiff used the water, and the plaintiff's medical history. Each claim for property damage depends on, among other things, the condition of the property's service lines and interior plumbing, and the age, size, and layout of the property.

And each claim for business losses depends on individualized factors, including the sales history, operations, and finances of the particular business.

Further, each plaintiff must prove that he, she, or it suffered an injury because of VNA's actions—not just from the Flint water crisis in general. VNA was in Flint only for a limited, one-month engagement, nearly ten months after the City switched from Detroit water to Flint River water. To recover from VNA, each plaintiff must establish that VNA caused his or her injuries, as opposed to the government officials who created and then covered up the problems with Flint water. And then the jury would need to allocate fault among all defendants and non-parties. Those are all inherently individualized inquiries.

Courts usually do not certify classes in mass-tort cases because causation and injury are so individualized. This case is much more complicated than most. Individualized issues for the more than 100,000 Flint residents (including an estimated 20,000 minors), 35,000 residential properties, and 700 businesses would overwhelm any common ones. This would be one of the most complex class actions ever tried.

Plaintiffs attempt to avoid individualized litigation by presenting experts who claim that they can offer class-wide proof. But the only way those experts do that is by relying on hypotheticals and assumptions and ignoring all actual data about Flint residents, properties, and businesses. No expert went to Flint, examined any person,

tested the pipes in any home, or analyzed the finances of any business—let alone did that for all class members. As the accompanying *Daubert* motions show, Plaintiffs cannot make out their claims using solely class-wide proof. And in any event, VNA has a right to put on individualized defenses. So one way or another, a class trial would involve individualized testimony, medical records, property inspections, and expert evidence for each member of the proposed classes. There would not be one class trial, but effectively tens of thousands of individual trials. That would be completely unmanageable.

There is no need for the Court to undertake that burdensome process. A superior alternative—the bellwether process—is readily available and underway. In that process, each plaintiff can put on the facts of his or her individual case, and VNA can put on its individualized defenses. In a class trial, in contrast, Plaintiffs would try to cut corners with class-wide evidence, and the case eventually would become individualized at the causation and damages stages anyway.

The proposed subclasses—especially the minors subclass—have a number of unique problems. And all of the classes are overinclusive as defined, because they begin before VNA arrived in Flint. The Court also should not certify the issue class, because it would have no practical benefit, as Plaintiffs would have to show individualized causation and damages to be able to recover from VNA.

The Court should deny Plaintiffs' motion for class certification.

BACKGROUND

A. Factual Background

City and state officials caused the Flint water crisis by switching Flint's drinking water to a new source without ensuring that doing so would be safe for Flint residents. They then compounded the water crisis by downplaying and covering up the problems with the water and by refusing to take (and then delaying) steps to remediate the problems. *See* Flint Water Advisory Task Force, *Final Report* 1 (Mar. 2016), ECF No. 1208-109, PageID.36953 (Task Force Report) ("The Flint water crisis is a story of government failure, intransigence, unpreparedness, delay, inaction, and environmental injustice.").

The state environmental agency, the Michigan Department of Environmental Quality (MDEQ), "failed in its fundamental responsibility to effectively enforce drinking water regulations." *Task Force Report* 1. Then federal environmental regulators, tasked with overseeing the State's compliance with federal water standards, trusted the State to comply with applicable standards, even as they grew concerned that state officials were providing misleading and inaccurate information. *Id.* And the state health agency, the Michigan Department of Health and Human Services (MDHHS), "failed to adequately and promptly act to protect public health." *Id.*

In 2013, the City of Flint decided to stop buying drinking water from Detroit. *See* Ex. 2, COF_FED_0043822 at COF_FED_0043824. But the City's new system would not be ready until 2016 at the earliest. *See* Ex. 3, COF_FED_0032174 at COF_FED_0031274. The City's temporary solution was to use the existing Flint Water Treatment Plant to treat and distribute Flint River water. *See id*. Since 1967, the City had used the plant only in emergencies. *See* Ex. 4, Oct-7-2019 EGLE0058088 at 1. But the City decided to overhaul the plant for full-time use during the interim period, based on studies and proposals by Lockwood, Andrews & Newnam, Inc., Lockwood, Andrews & Newnam, P.C., and Leo A. Daly Company (collectively, LAN). *See id.* at 8-10; Ex. 5, LAN_FLINT_00063890 at LAN_FLINT_00063904. The Governor's Office, the MDEQ, and the Treasurer's Office all approved that plan. *See* Task Force Report 16-17, PageID.36968-36969; *see, e.g.*, Ex. 6, 6-6-2016 SOM-MASON 00063591; Ex. 7, Mar-30-2020 TREAS037224.

The refurbishment of the Flint Water Treatment Plant was woefully inadequate. The City knew that the Flint River water was challenging to treat because of high levels of industrial run-off in the water. *See* Ex. 4, Oct-7-2019 EGLE0058099 at 4, 7-8. But the City did not budget enough money for the refurbishment, did not upgrade the Plant to include all the necessary treatment equipment, and did not adequately train the Plant's staff. *See* Ex. 8, Green Dep.

30:8-34:8; Ex. 9, COF_FED_0540536 at COF_FED_0540574; Ex. 10, 04-15-2016 SOM0024921. Further, the MDEQ, the lead regulatory agency in charge of supervising the water-source switch, told the City it did not need to use corrosion controls and did not need to fully study the corrosion-control issue before the switch. *See* Task Force Report 27, PageID.36979; Ex. 11, Glasgow Dep. 73:18-74:8, 218:12-16.

A week before the switch, the Plant's manager, Michael Glasgow, warned city and state officials that his staff and equipment were not prepared for the switch. *See* Ex. 10, 04-15-2016 SOM0024921. But the officials, including public works manager Howard Croft, utilities administrator Daugherty Johnson, and MDEQ employees Michael Prysby and Stephen Busch, ignored the warnings. *See* Ex. 11, Glasgow Dep. 479:20-480:6. On April 25, 2014, the City switched to Flint River water. *See* Ex. 3, COF_FED_0032174.

Almost immediately, Flint residents complained of problems. Ex. 11, Glasgow Dep. 488:16-20. Residents stated that the water smelled bad and was discolored, and that they felt ill after drinking it. *See id.* at 512:6-15; Ex. 12, Johnson Dep. 569:9-17. Other health problems quickly arose. By the summer of 2014, the Michigan Department of Health and Human Services (MDHHS) reported a spike in cases of Legionnaires' disease in Flint. *See* Ex. 13, 07-05-2016 SOM-Kidd 0005870. In August and September 2014, the City issued boil-water advisories due

to high levels of *E. coli*. *See* Ex. 14, COF_FED_0042553; Ex. 15, COF_FED_0007288; Ex. 16, COF_FED_0010485.

The City responded to the *E. coli* problem by increasing the concentration of chlorine in the water. *See* Ex. 16, COF_FED_0010485. That higher concentration of chlorine led to increased levels of a disinfection byproduct called trihalomethanes (TTHMs), which can be toxic and carcinogenic above a certain level. *See* 40 C.F.R. § 141.64 (setting an upper limit on the levels of TTHMs in drinking water). In December 2014, when the TTHM levels in Flint water exceeded federal standards for the second quarter in a row, the MDEQ sent the City a violation notice. *See* Ex. 17, COF_FED_1151191. To address that issue, the City issued a request for proposals for a company to help the City "review and evaluate the water treatment process and distribution system." Ex. 18, COF_FED_0029138.

VNA responded to the City's request. Although VNA proposed to conduct a full review of the Flint water system, the City ultimately hired VNA for a much more limited project. *See* Ex. 19, VWNAOS018930 at 9. City officials made it clear to VNA that VNA should focus on TTHMs, not any other water contaminant. *See* Ex. 20, COF_FED_0072895 (City explaining to State officials that "Veolia's commissioned scope of work was to focus on the TTHM concerns"); Ex. 21, VWNAOS087372 at 2 ("[T]he primary focus of [VNA's] review was based on solving the TTHM problem."). City officials also instructed VNA *not* to review the

decision to switch to Flint River water and *not* to recommend switching back to Detroit water. Ex. 22, Gnagy Dep. 150:20-151:9; *see* Ex. 23, VWNAOS020165 at 2 (noting that "the change from [Detroit water] or the history of the [Flint] utility" was "[n]ot in scope").

The City and VNA (specifically, VWNAOS) signed the contract on February 10, 2015. VNA completed the project on March 12, 2015. *See* Ex. 21, VWNAOS087372 at 1. Pursuant to the contract, the City paid VNA $40,000 for its limited review. *See* Ex. 19, VWNAOS018930 at 9.

Throughout the project, the City hid critical information from VNA. For example, on February 18, 2015, the City learned of test results showing elevated lead levels at the home of Flint resident Leanne Walters. *See* Ex. 24, CROFT-0000000125. The City never shared those test results with VNA, even though VNA's engineers were on site at the Flint Water Treatment Plant at the time. *See* Ex. 22, Gnagy Dep. 691:10-692:10. Instead, the City provided other test results to VNA—results that did not show any problems with the water. *See id.* at 223:22-227:23, 651:8-24; Ex. 25, VWNAOS134132; Ex. 26, VWNAOS020758.

Based on the test results the City selectively provided, VNA issued an interim report stating that Flint water was within applicable state and federal safety limits. *See* Ex. 23, VWNAOS020165 at 3. Nonetheless, VNA's engineers told City officials that the corrosivity of the water, if left untreated, could create problems with

lead and copper in the future, and they recommended that the City consider implementing corrosion controls at the Flint Water Plant. *See* Ex. 24, CROFT-0000000125. VNA repeated that advice to City, MDEQ, and EPA officials at a meeting about the Flint water system in early March 2015. Ex. 27, VWNAOS060386 at 3 (presentation expressly recommending that the City "add corrosion control").

In its final report, VNA provided the City with a number of recommendations to address Flint's water-quality problems. To address TTHMs, VNA recommended that the City add a charcoal filter and increase dosages of ferric chloride, a chemical that helps remove impurities in the water. *See* Ex. 21, VWNAOS087372 at 9-10. VNA also recommended that the City "initiate discussions with the State on the addition of a corrosion control chemical," such as "0.5mg/L [of] phosphate." *Id.* at 10. The State has since acknowledged that this recommendation was "perfectly appropriate" and "sensible." Ex. 28, Oswald Dep. 223:3-17, 458:2-20. Ultimately, the City adopted only the recommendation to add a filter; it did not increase ferric chloride dosages to the level VNA recommended to address the TTHM levels. *See* Ex. 8, Green Dep. 41:11-42:23; Ex. 11, Glasgow Dep. 646:23-647:6. LAN similarly recommended that the City increase dosages of ferric chloride; the City did not adopt that recommendation, either. *See* Ex. 8, Green Dep. 64:2-24.

In the summer and fall of 2015, the problems with Flint water continued. During that time, city and MDEQ officials knew that there was a lead problem with the water, and they covered it up. *See* Ex. 29, COF_FED_0103992; Ex. 11, Glasgow Dep. 756:7-758:18; Ex. 30, 04-15-2016 SOM0007271. Glasgow, the manager of the Flint Water Treatment Plant, falsified test results to make it appear that the water was within legal limits, when in fact it was not. *See* Ex. 11, Glasgow Dep. 722:10-25:9; Ex. 31, Mar-23-2020 GOV0206271 at 2-3. MDEQ officials falsely represented to the EPA that the City had implemented corrosion controls, even though the MDEQ knew that the City had not done so. *See* Ex. 32, Aug-14-2019 EGLE0260445.

By July 2015, the EPA knew "that there was a systemic problem" with lead in Flint water. McCarthy Testimony 1, ECF No. 1208-1, PageID.34579. The EPA Administrator admitted that the EPA "spent too long trusting the state that they were going to do the right thing." *Id.* When the EPA pressed state officials to address the problem, they agreed to address it, but "then all they did was slow walk it." *Id.* In October 2015, Governor Snyder finally ordered the City to switch back to Detroit water. *See* Ex. 33, 04-15-2016 SOM0008786.

Later investigations revealed that the principal cause of the problems with Flint water was that the City failed to address corrosion concerns associated with the switch to the Flint River. During the years of using Detroit water, the metal in

service lines or interior pipes made of iron or lead had reacted with the chemicals in that water to form a protective scale on the inside of the pipes. Ex. 34, Duquette Report 8. The City did not assess how the scale would fare when exposed to water from the Flint River, which has a different chemistry than Detroit water. *Id*. at 8-9. When the City started using Flint River water, the outer layers of the scale started to break down, and pieces of the scale (which included particles of lead and iron) entered the water supply. *Id.*

Nearly all of the scale release associated with the switch to Flint River water occurred within the first few months of the switch. Dr. Marc Edwards, a professor at the Virginia Polytechnic Institute and State University, was one of the first experts to discover the cause of the problems with Flint water. *See* Ex. 35, Edwards Dep. 300:13-20. By analyzing biosolids in Flint sewage water, he determined that the release of scale particles containing lead, and any resulting effects on Flint residents, largely ended by summer 2014. *See* Ex. 36, Edwards Dep. Ex. 33 at 480-81. That is, the lead release and the harms caused by it occurred within the first few months after the switch—well before VNA arrived on the scene. The water lead levels spiked in June through August 2014, then returned to pre-switch levels by September 2014. *See* Ex. 35, Edwards Dep. 253:12-254:14; Ex. 36, Edwards Dep. Ex. 33 at 478.

B. Procedural Background

1. Plaintiffs' Professional Negligence Claims Against VNA

The named plaintiffs in this case are ten Flint residents—three adults, two minors, two property owners, and three business owners. Fifth Am. Compl. ¶¶ 11-33, ECF No. 1187-3, PageID.28596-28606 (Compl.). Plaintiffs seek damages caused by at least four substances in Flint water—lead, TTHMs, *E. coli*, and *legionella*—although the named plaintiffs allege injuries only from lead. *See* Mem. in Supp. of Pls.' Mot. for Class Cert. 64, ECF No. 1207, PageID.34501 (Mot.). Plaintiffs seek to recover for a wide variety of injuries, including personal injuries, property damage (costs of remediating service lines and interior plumbing, plus diminution in property values), and economic losses (lost business profits and various out-of-pocket expenses).

Plaintiffs sued more than two dozen defendants, including City and State officials, the City, several State agencies, LAN, and VNA. Compl. ¶¶ 35-78, PageID.28606-28622. All defendants other than LAN and VNA have preliminarily agreed to settle the claims against them. *See* Mem. in Supp. of Pls.' Mot. to Establish Settlement Claims Procedures 1 & n.1, ECF No.1318, PageID.40263.

Plaintiffs' only remaining cause of action against VNA is for professional negligence. *See In re Flint Water Cases*, 384 F. Supp. 3d 802, 874 (E.D. Mich. 2019). To prevail on that cause of action, each Plaintiff must establish the elements

of duty, breach, causation, and injury with respect to VNA, and then must establish each person's damages. *See In re NM Holdings Co.*, 622 F.3d 613, 618 (6th Cir. 2010) (citing *Haliw v. Sterling Heights*, 464 Mich. 297, 309-10 (2001)). Plaintiffs allege that VNA was negligent in: (1) failing to perform a "root cause analysis" of the problems with Flint water; (2) failing to more forcefully recommend that the City institute corrosion controls; (3) recommending that the City increase its dosages of ferric chloride to help remove TTHMs; (4) not recommending that the City switch back to Detroit water; and (5) stating in reports and public statements that Flint water was "safe." *See* Mot. 57, PageID.34494; Russell Report §§ 4.1-3, ECF No. 1208-67, PageID.35419-35423; Ex. 37, Russell Dep. 258:15-259:10, 265:22-267:14; Gardoni Report § 6.2, ECF No. 1208-114, PageID.37181-37183.

2. Plaintiffs' Motion For Class Certification

Proposed classes. Plaintiffs seek certification of one principal class and three subclasses to encompass their myriad theories of recovery. *See* Mot. xii, PageID.34436. The proposed classes are defined as:

> **Principal class:** "All current and former residents of the City of Flint who, for any period of time between April 25, 2014, and October 16, 2015, received drinking water supplied by the City of Flint regardless of whether the resident purchased the water from the City." Mot. xii, PageID.34436.
>
> **Minors subclass:** "All children who, during the period from May 1, 2014, to January 5, 2016, were (a) in utero or between the ages of 0 to 10 years old, (b) lived in an identified residence or attended an identified school or day care, and (c) were exposed through ingestion to unfiltered Flint public water at such residence, school, or day care for at least 14 days within a 90 day period."

> Mot. xii, PageID.34436. Plaintiffs specify that "exposed through ingestion" means that the minor or the mother drank unfiltered Flint tap water or ate food prepared with unfiltered tap water. *Id.* at 32 n.128, PageID.34469.
>
> **Residential property subclass:** "All persons and entities who, from April 25, 2014, to present, owned residential property within the City of Flint." Mot. xii, PageID.34436.
>
> **Business subclass:** "All persons and entities who, as of April 25, 2014, owned and operated a business within the City of Flint." Mot. xii, PageID.34436.

Plaintiffs seek both damages and injunctive relief for the principal class and minors subclass, and only damages for the residential property and business subclasses. *See* Mot xii, PageID.34436. They estimate that there are over 100,000 members of the principal class (including over 20,000 minors); that the residential property subclass includes over 35,000 residential properties; and that the business subclass contains over 700 businesses. *Id.* at 35, PageID.34472.

In the alternative, Plaintiffs seek certification of the principal class as an issue class. Mot. 31, 97, PageID.34468, 34534; *see* Fed. R. Civ. P. 23(c)(4). They identify the common issues as "factual and legal questions pertaining to [VNA's] duty to the Class" and "issues relating to [VNA's] role in contaminating Flint's drinking water." Mot. 98-99, PageID.34535-34536.

Proposed experts. Plaintiffs contend that they can use expert testimony to establish the elements of professional negligence on a class-wide basis. Those experts generally assume that there are no individual variations among class members. They base their opinions on blanket assumptions for hypothetical

plaintiffs—assumptions they did not attempt to validate. None of Plaintiffs' experts visited Flint; examined an actual Flint resident, property, or business; or reviewed evidence for any individual Flint resident, property, or business—not even for the named plaintiffs.

Plaintiffs' experts admit that in an individual case, they would not rely on unverified class-wide assumptions, but would examine the individual person, property, or business. *E.g.*, Ex. 37, Russell Dep. 50:7-51:6; Ex. 38, Reicherter Dep. 411:22-413:19. Many of the experts' assumptions are disproven by actual data about Flint residents, including from the named plaintiffs. As one example, Plaintiffs' experts assume that the service lines and interior plumbing in every home in Flint must be replaced because of the Flint water crisis, *see* Mot. 67-68, PageID.34504-34505, even though inspections of two named plaintiffs' homes reveal no detectable damage from the crisis, *see* Ex. 34, Duquette Report 25.

Claims for personal injuries. Plaintiffs seek to recover damages for personal injuries for both the minors subclass and the principal class. But their experts address only the minors subclass, and not any adult plaintiffs. Further, Plaintiffs' experts only address lead-related injuries, not any injuries related to TTHMs, *E. coli*, or *legionella*. Thus, Plaintiffs do not even attempt to show that they can prove liability using common evidence for the adults or for any injuries other than those caused by lead.

For claims for lead injuries in minors, Plaintiffs rely on the following expert testimony to try to establish liability on a class-wide basis:

- Dr. Larry Russell and Dr. Paolo Gardoni state that LAN and VNA were negligent in not recommending that the City use corrosion controls. Mot. 55-60, PageID.34492-34497.
- Dr. Clifford Weisel says that the City's lack of corrosion controls at the time of the switch to Flint River water caused lead particles to enter the City's drinking water. Mot. 74, PageID.34511.
- Dr. Pierre Goovaerts identifies homes, schools, and daycare centers that Plaintiffs contend had elevated water lead levels. Mot. 74, PageID.34511.
- Dr. Panos Georgopoulos asserts that any minor who drank unfiltered Flint water at one of the locations Dr. Goovaerts identified for 90 days during the class period likely had elevated blood lead levels. Mot. 75, PageID.34512.
- Dr. Howard Hu and Dr. Bruce Lanphear contend that any minors who meet Dr. Georgopoulos's criteria likely "sustained non-negligible impairment of their neurobehavioral development." Mot. 75-76, PageID.34512-34513.
- Dr. Alan Ducatman asserts that those minors will require ongoing medical monitoring and treatment. *See* Mot. 70-71, PageID.34507-34508.[1]

None of the experts examined or reviewed the medical records of any minor in Flint. None visited or examined any of the properties Dr. Goovaerts identified as places of potential exposure to lead. No opinion links any alleged injury to VNA. And many expert opinions depend on another expert's opinion—so if one is unreliable, the

[1] Plaintiffs' two other experts, Dr. Daniel Keating and Dr. Daryn Reicherter, claim that all Flint residents will require mental-health services to treat the "mental and behavioral health issues" caused by the "community trauma" of the Flint water crisis. Mot. 71-72, PageID.34509-34510.

other is unreliable as well. Finally, Plaintiffs acknowledge that each minor's lead-related damages would have to be determined using individualized evidence. *See* Mot. 85, PageID.34522.

Property damage. Plaintiffs contend that they can use common evidence to establish liability for the cost of remediating service lines and interior plumbing and for diminution in property values. To determine liability and damages for plumbing remediation, Plaintiffs rely on the following expert testimony:

- Dr. Russell asserts that all plumbing in Flint was severely damaged by the Flint water crisis, so every home in Flint must have all of its service lines and interior plumbing replaced. *See* Mot. 67-68, PageID.34504-34505.
- Bruce Gamble and David Pogorilich estimate remediation costs for all residential properties in Flint using a "prototypical" single-family detached home of 1,100 square feet. Pogorilich Report 6-7, ECF No. 1208-132, PageID.37647-37648.

Those experts did not visit any home in Flint and did not make any effort to determine whether any service lines, interior pipes, or fittings actually sustained damage. They also did not determine the actual costs of remediation for any home in Flint. And they did not attempt to determine whether any property damage is attributable to an action by VNA, as opposed to the initial switch to Flint River water before VNA arrived.

For diminution in property values, Plaintiffs rely on another damages expert, Dr. David Keiser. He estimates a city-wide fall in property values due to the Flint water crisis using a model that compares property prices in Flint to prices in other

cities. Mot. 77-78, PageID.34514-34515. He did not consider the results of any appraisal of any individual property in Flint. *See* Ex. 39, Keiser Dep. 482:13-21.[2]

Economic loss. For the business subclass, Plaintiffs contend that they can use common evidence to prove lost profits and to establish the amount of damages. Plaintiffs rely on Dr. Robert Simons, who identifies 26 industry subsectors that he says were negatively affected by the Flint water crisis and then assumes that all business closures and revenue declines in those sectors were caused by the Flint water crisis. *See* Mot. 78-79, PageID.34515-34516. Dr. Simons did not review any actual business's records. *See* Ex. 40, Simons Dep. 456:21-457:16.

For the principal class, Plaintiffs contend that Dr. Keiser can calculate aggregate damages for two types of out-of-pocket expenses—the cost of buying bottled water and filters, and the cost of paying water bills for contaminated water.

[2] On January 4, 2020, Plaintiffs served a supplemental expert report for Dr. Keiser—more than six months after the deadline for Plaintiffs' expert reports and only three days before the deadline for VNA's class certification opposition and accompanying *Daubert* motions. Because that supplemental report was filed so close to the deadline for the class certification opposition, VNA was not able to depose Dr. Keiser about the supplemental report, and VNA's experts had insufficient time to review and respond to that report properly. As a result, VNA could not address the supplemental report in its class certification opposition or *Daubert* motions.

VNA intends to move to strike the supplemental Keiser report because it was filed so late, at great prejudice to VNA. The Court should grant that motion, but in the event it does not do so, VNA would like the opportunity to re-depose Dr. Keiser, supplement its responsive expert report, and respond to Dr. Keiser's supplemental report in a supplemental class certification brief and supplemental *Daubert* motion.

Mot. 65-66, 69-70, PageID.34502-34503, 34506-34507. Dr. Keiser did not perform those calculations; he just said he could do so after additional discovery. *See id.* at 65, PageID.34502.

Proposed trial plan. Plaintiffs provided a perfunctory, four-page trial plan that proposes a three-phase trial: (1) a jury determines liability; (2) if the jury imposes liability, the Court could enter an injunction that requires class-wide medical monitoring and treatment; and (3) from that medical monitoring and treatment, Plaintiffs could establish actual injuries and seek damages for those injuries. *See* Pls.' Proposed Trial Plan 2-3, ECF No. 1208-93, PageID.36064 (Trial Plan).

In phase one, which would last five to six weeks, Plaintiffs say the parties could litigate:

- Liability and entitlement to injunctive relief for the claims of the minors subclass for personal injuries related to lead exposure, Trial Plan 2, PageID.36064;
- "[L]iability, causation, injury, and class-wide damages" for all other claims for personal injuries (although they never explain how they could do so for adults or non-lead injuries), Trial Plan 2, PageID.36064;
- "[A]ll issues," including "causation, injury, and damages" for claims for property damage, Trial Plan 2, PageID.36064; and
- "[A]ll issues," including "causation, injury, and damages" for claims for business losses, Trial Plan 2, PageID.36064.

Plaintiffs' plan would require the parties to litigate causation and injury for over 100,000 Flint residents, as well as causation, injury, and damages for over 35,000 different residential properties and for over 700 businesses, in one six-week trial.

In phase two, Plaintiffs propose to adjudicate the minors' individualized damages claims. Trial Plan 3, PageID.36065. They envision the Court entering an injunction establishing a medical monitoring and treatment program to evaluate each minor's injuries. *Id.* at 2, PageID.36064. They would then use those evaluations to determine each person's damages. *Id.* That is, the injunction is just a way for subclass members to try to discover injuries in order to make a claim for money damages. Plaintiffs admit that the damages would need to be adjudicated on an individual basis, for over 20,000 minors. *See id.* at 3, PageID.36065.

In phase three, Plaintiffs say they will adjudicate all "[r]emaining issues." Trial Plan 2, PageID.36064. The only issues they identify are individualized damages for personal injuries for the principal class. *Id.* at 4, PageID.36066. Plaintiffs say that phase three "may proceed in parallel with" phase two, although they do not explain how the Court could feasibly adjudicate damages for the more than 20,000 members of the minors subclass at the same time as the more than 80,000 other members of the principal class. *Id.*

Plaintiffs do not provide any additional detail explaining how their proposed trial would unfold.

3. The Court's Order For Supplemental Briefing On The Proposed Minors Subclass

The Court asked the parties to address three questions about the minors subclass: (1) how the Court could feasibly identify all the members of the proposed minors subclass and appoint guardians for each member; (2) whether minors can be bound by the outcome of a class trial on liability; and (3) whether minors can be bound by a class settlement. *See* Order on Suppl. Briefing 6-7, ECF No. 1308, PageID.39855-39856. Plaintiffs have filed a supplemental brief responding to those questions. *See* Suppl. Br., ECF No. 1327, PageID.41421 (Suppl. Br.). VNA addresses the Court's questions in this opposition.

LEGAL STANDARD

Plaintiffs have the burden to show that their proposed class and subclasses meet the requirements for class certification. *See Wal-Mart Stores, Inc. v. Dukes*, 564 U.S. 338, 350 (2011). They must show that each proposed class meets the four prerequisites of Rule 23(a)—numerosity, commonality, typicality, and adequacy of representation—as well as one of the requirements of Rule 23(b). *See* Fed. R. Civ. P. 23.

Rule 23(b) contains two options, based on whether a plaintiff is seeking injunctive relief or damages. To obtain injunctive relief under Rule 23(b)(2), Plaintiffs must show that the proposed class is cohesive and that the class seeks "final injunctive relief." *Coleman v. Gen. Motors Acceptance Corp.*, 296 F.3d 443, 446

(6th Cir. 2002). To recover damages under Rule 23(b)(3), Plaintiffs must show that common issues predominate over individualized issues and that a class action would be superior to other forms of adjudication. *See* Fed. R. Civ. P. 23(b)(3).

Rule 23 also permits certification of an issue class. To obtain certification of an issue class in the Sixth Circuit, Plaintiffs must show that common issues exist; that common questions predominate over individual questions within those issues; that issue-class certification would be the superior method for adjudicating the case; and that proceeding with an issue class would not violate the Seventh Amendment. *See Martin v. Behr Dayton Thermal Prods. LLC*, 896 F.3d 405, 411-12 (6th Cir. 2018), *cert. denied*, 139 S. Ct. 1319 (2019); *see also* Fed. R. Civ. P. 23(c)(4).

The trial court should conduct a "rigorous analysis" to determine whether proposed classes meet the requirements for class certification. *Comcast Corp. v. Behrend*, 569 U.S. 27, 33 (2013) (internal quotation marks omitted). That analysis includes considering the merits of the plaintiffs' claims to the extent needed to decide class-certification issues; the trial court may not uncritically accept the plaintiffs' allegations. *Id.*; *see Halliburton Co. v. Erica P. John Fund, Inc.*, 573 U.S. 258, 275 (2014) ("[P]laintiffs wishing to proceed through a class action must actually *prove*—not simply plead—that their proposed class satisfies each requirement of Rule 23.").

The trial court should rule on challenges to the plaintiffs' experts at the class-certification stage. That means resolving *Daubert* motions, to decide whether the

proposed expert evidence and methods are sufficiently reliable and relevant to support class certification under Rule 23. *See In re Zurn Pex Plumbing Prods. Liab. Litig.*, 644 F.3d 604, 611-12 (8th Cir. 2011); *In re FCA US LLC Monostable Elec. Gearshift Litig.*, 382 F. Supp. 3d 687, 692 (E.D. Mich. 2019); *see also Daubert v. Merrell Dow Pharms.*, 509 U.S. 579 (1993).[3] If the court decides that the testimony of plaintiffs' experts is reliable and relevant under *Daubert*, the court should not automatically credit that evidence, but instead should evaluate the competing testimony of the defendant's experts. *See, e.g.*, *In re Lamictal Direct Purchaser Antitrust Litig.*, 957 F.3d 184, 194 (3d Cir. 2020); *Blades v. Monsanto Co.*, 400 F.3d 562, 575 (8th Cir. 2005); *Serrano v. Cintas Corp.*, No. CIV. 04-40132, 2009 WL 910702, at *6 (E.D. Mich. Mar. 31, 2009), *aff'd sub nom. Davis v. Cintas Corp.*, 717 F.3d 476 (6th Cir. 2013).

[3] Courts in this district sometimes go further and decide whether the experts' testimony and supporting evidence actually would be admissible at trial. *See, e.g.*, *In re FCA US LLC Monostable Elec. Gearshift Litig.*, 382 F. Supp. 3d at 692; *Schechner v. Whirlpool Corp.*, No. 2:16-CV-12409, 2019 WL 978934, at *3 (E.D. Mich. Feb. 28, 2019). Some circuits do not require that, *see Sali v. Corona Reg'l Med. Ctr.*, 909 F.3d 996, 1003 (9th Cir. 2018); *In re Zurn Pex Plumbing Prod. Liab. Litig.*, 644 F.3d at 614; the Sixth Circuit has not decided the issue, *see Hicks v. State Farm Fire & Cas. Co.*, 965 F.3d 452, 465 (6th Cir. 2020). The important point is that, even if the expert testimony is not yet in a form that would be admissible at trial, the court at the class-certification stage should "scrutinize[] the reliability of the expert testimony in light of the criteria for class certification and the current state of the evidence," to determine whether plaintiffs can make out their claims using class-wide proof. *In re Zurn Pex Plumbing Prod. Liab. Litig.*, 644 F.3d at 614. Here, that means determining whether the expert testimony is sufficiently reliable and relevant to establish liability and damages attributable to VNA on a class-wide basis.

The court also should consider "how a trial on the merits would be conducted if a class were certified," to ensure that a class action would promote judicial economy and be fair to both sides. *Sandusky Wellness Ctr. LLC v. ASD Specialty Healthcare, Inc.*, 863 F.3d 460, 468 (6th Cir. 2017); *see Amchem Prods. Inc. v. Windsor*, 521 U.S. 591, 613 (1997). That includes evaluating how the defendants would litigate their defenses; "a class cannot be certified on the premise that [the defendants] will not be entitled to litigate [their] . . . defenses to individual claims." *Wal-Mart*, 564 U.S. at 367.

SUMMARY OF ARGUMENT

This case is one of the most complex mass-tort cases ever litigated. It would be unprecedented and unwise to allow it to proceed as a class action.

Individualized issues overwhelm any common ones, and so Plaintiffs cannot show predominance under Rule 23(b)(3), or even commonality, typicality, and adequacy of representation under Rule 23(a). Plaintiffs seek recovery for many different types of injuries—personal injury, property damage, and economic losses such as lost business profits—each of which will depend on individualized issues. At a minimum, the elements of causation and injury, and the amount of damages, will be highly individualized. And VNA then will put on individualized evidence in defense—to show, for example, that a person stopped drinking Flint water before VNA arrived in Flint, so he or she cannot have injuries attributable to VNA; or that

a home inspection shows no detectable damage due to the Flint water crisis. Most mass-tort cases have individualized issues, and this case is much more complicated than most.

Plaintiffs argue that their experts can establish the elements of class members' claims for professional negligence using class-wide evidence, but they are mistaken. Their experts paper over the substantial differences among class members by presenting opinions about hypothetical plaintiffs. None of their experts went to Flint and examined any person or property. And none of their experts consulted any data about any actual class member—not even for any named plaintiff. So the experts cannot testify as to any actual injuries or causation, or say that their hypothetical plaintiffs resemble any class member. They also do not account for when any injury occurred, so they cannot say that the injury was caused by VNA. And anyway, VNA has the right to put on individualized evidence in defense, just as it would in a case involving a single plaintiff.

A class action would not be superior to individual adjudication, as Rule 23(b)(3) requires. The bellwether trials for adjudicating individual claims are scheduled to begin in June 2021. The bellwether process will provide a fair process for adjudicating each plaintiff's claim, while allowing VNA to fully defend against that claim. In contrast, a class trial would be completely unmanageable. Very few

issues, if any, could be decided on a class-wide basis, and the trial would devolve into tens of thousands of individual trials on causation and injury.

Plaintiffs' proposed minors subclass has those problems, plus more. The subclass is not practically ascertainable, as is required under Rule 23(b)(3); the Court would need to conduct individual trials even to determine class membership. Beyond that, Michigan law provides robust protections for minors' claims that could not manageably be accommodated in the proposed class action.

Plaintiffs' proposed principal class and minors subclass should not be certified as injunctive classes. Plaintiffs do not seek "final injunctive relief" as required by Rule 23(b)(2); they seek a fund to pay for medical monitoring and treatment programs, which they intend to use to make claims for damages. Further, the classes are not cohesive enough for class-wide injunctive relief.

Issue class certification is not warranted here. Plaintiffs assert that duty and breach are common issues, but even if that is true, resolving those two issues would barely advance any class member's claims, because causation, injury, and damages would be highly individualized. Little, if any, efficiency would be gained by using an issue class, and it would present a serious risk that the second jury would reexamine the findings of the first jury in violation of the Seventh Amendment.

Finally, all of the class definitions are overbroad, because the class periods start nearly ten months before VNA's involvement in Flint. And all of the subclasses

are broader than the principal class, meaning that they will require separate notice and class trials.

Certifying a class in this complex toxic-tort case would lead to a complex and unwieldy trial that would not efficiently resolve any class member's claims. The Court should deny Plaintiffs' motion for class certification.

ARGUMENT

I. Individualized Questions Will Swamp Any Common Ones, Precluding Certification Under The Predominance Requirement Of Rule 23(b)(3) And The Commonality, Typicality, And Adequacy Of Representation Requirements Of Rule 23(a)

Plaintiffs' professional negligence claims against VNA are too individualized for class adjudication—particularly with respect to causation, injury, and damages. Any class action would inevitably devolve into a series of individual trials. As a result, Plaintiffs' proposed classes do not meet the Rule 23(a) commonality, typicality, and adequacy of representation requirements—much less the "far more demanding" Rule 23(b)(3) predominance requirement. *Amchem Prods. Inc. v. Windsor*, 521 U.S. 591, 624 (1997).[4]

[4] VNA does not deny that Plaintiffs satisfy Rule 23(a)'s numerosity requirement; Plaintiffs contend that the proposed principal class consists of over 100,000 members. Mot. 35, PageID.34472.

A. Mass-Tort Cases Rarely Are Appropriate For Class Certification Because They Present So Many Individualized Issues, And This Case Is No Exception

Courts rarely certify classes in mass-tort cases because causation and injury are highly individualized. *See, e.g.*, *Madison v. Chalmette Ref. LLC*, 637 F.3d 551, 555-56 (5th Cir. 2011); *Mays v. Tenn. Valley Auth.*, 274 F.R.D. 614, 626-27 (E.D. Tenn. 2011) (*Mays v. TVA*); *Ball v. Union Carbide Corp.*, 212 F.R.D. 380, 389 (E.D. Tenn. 2002), *aff'd*, 385 F.3d 713 (6th Cir. 2004); Fed. R. Civ. P. 23 advisory committee's note to 1966 amendment (class certification is "ordinarily not appropriate" in mass-tort cases "because of the likelihood that significant questions . . . of liability and defenses of liability would be present, affecting the individuals in different ways."). The "overwhelming majority of post-*Amchem* decisions in federal and state court have rejected class certification in mass tort and related property damage cases irrespective of the claims asserted by plaintiffs." 1 *McLaughlin on Class Actions* § 5:41 (17th ed. 2020).

Cases with highly individualized issues are not appropriate for class certification because a class action would "sacrific[e] procedural fairness." *Amchem*, 521 U.S. at 615 (internal quotation marks omitted). Under the Rules Enabling Act, a plaintiff cannot use the class-action device to deprive a defendant of its rights. *See* 28 U.S.C. § 2072(b) (rules of procedure "shall not abridge, enlarge or modify any substantive right"); *see also Amchem*, 521 U.S. at 613. That includes a

defendant's due process rights to cross-examine the plaintiffs and to present plaintiff-specific evidence in defense. *See, e.g.*, *Lindsey v. Normet*, 405 U.S. 56, 66 (1972). A court may permit a case to proceed as a class action only if there are few individualized issues and the "substantive issues that will control the outcome" are common across the class. *Sandusky Wellness Ctr.*, 863 F.3d at 468 (internal quotation marks omitted). When that condition is satisfied, individualized issues will be of little importance, so the defendant is not harmed by being unable to present plaintiff-specific evidence.

This case is not the rare mass-tort case appropriate for class adjudication. On the contrary, the individualized issues in this case are particularly complex. A single-accident, single-defendant mass-tort case (*e.g.*, plane crash or one-time release of toxic agents) may meet the requirements for class certification when "the disaster is a single course of conduct which is identical for each of the plaintiffs." *Sterling v. Velsicol Chem. Corp.*, 855 F.2d 1188, 1197 (6th Cir. 1988). In that circumstance, the court may be able to "determine liability (including causation) for the class as a whole." *Olden v. LaFarge Corp.*, 383 F.3d 495, 508 (6th Cir. 2004).

Here, Plaintiffs cannot prove liability on a class-wide basis. They propose a broad class of disparate individuals and businesses, who used Flint water in different ways at different times, at different locations with service lines and interior plumbing composed of different materials. The class members have nothing in common other

than a bare allegation that they all were harmed by Flint water. And Plaintiffs have sued more than two dozen defendants who took different actions at different times, with different knowledge and different responsibilities, over multiple years. The fact that many of those other defendants have agreed to settle their claims does not make this litigation any less complex, because under Michigan's comparative-fault system, the jury will allocate fault across all parties and non-parties. As a result, individualized questions of injury, but-for causation, proximate causation, damages, and allocation of fault will overwhelm any class action. *See Sterling*, 855 F.2d at 1197 (class certification may not be appropriate in "complex" cases, "where no one set of operative facts establishes liability" and "no single proximate cause equally applies to each potential class member and each defendant").

In a similar putative class action involving alleged lead exposure from a municipal water system, the trial court denied class certification because of the number of individualized issues in the case. The plaintiffs in *Parkhurst v. D.C. Water & Sewer Auth.*, No. 2009 CA 000971 B, 2013 D.C. Super. Lexis 4 (D.C. Super. Ct. Apr. 8, 2013) (attached as Exhibit 41), alleged that a change in the District of Columbia's corrosion controls in its water supply caused lead to leach out of pipes and fittings and into plaintiffs' drinking water. *Id.* at *3-*4. They sought certification of a class of minors who consumed the allegedly contaminated water.

Id. at *12. The court denied class certification, finding that individualized issues of injury, causation, and damages overwhelmed any common issues. *Id.* at *39.

That is even more true here. This case is more complex than *Parkhurst* and presents many more individualized inquiries. *Parkhurst* involved only claims against one defendant, for one kind of injury (personal injuries), caused by one kind of toxic substance (lead), brought by one type of plaintiff (minors). This case involves claims against over two dozen defendants and non-parties, for three kinds of injuries (personal injury, property damage, and economic losses), caused by at least four toxic agents, brought by three types of plaintiffs (adults, minors, and businesses). All of those disparate claims will require individualized adjudication, precluding class certification.

B. Plaintiffs Will Need To Prove Injury On An Individual Basis

To bring a tort claim, each class member must prove that he, she, or it suffered a "present physical injury" to person or property. *Henry v. Dow Chem. Co.*, 473 Mich. 63, 72 (2005). Claims for injuries that the class member "may suffer in the future" are "precluded as a matter of law," because "Michigan law requires more than a merely speculative injury." *Id.* And as this Court has recognized, Plaintiffs cannot hold VNA liable for any harm suffered before VNA was in Flint. Tr. of Nov. 6, 2019, Status Conference 22-23, ECF No. 1009, PageID.26085-26086 (Nov. 6, 2019, Tr.); *see Naccarato v. Grob*, 384 Mich. 248, 255 (1970) (a second tortfeasor

who acted after a first tortfeasor "ought to be liable for only that portion of damages fairly found to have occurred after" the second tortfeasor's allegedly negligent actions). VNA entered into its contract with the City on February 10, 2015, *see* Ex. 19, VWNAOS018930 at 8, and issued its interim report on February 18, 2015, *see* Ex. 23, VWNAOS020165 at 2. The earliest plausible date on which VNA's liability could start is February 18, 2015. So each class member must prove that he, she, or it suffered a cognizable, incremental injury after that date.

Plaintiffs claim three types of injuries—personal injury, property damage (damage to service lines and interior plumbing, and diminution in property values), and economic loss (lost business profits and out-of-pocket expenses). *See* Mot. 64-70, PageID.34501-34507. They propose to use experts to prove that class members suffered those harms on a class-wide basis. But all of their experts' proposed methodologies depend on blanket assumptions across all class members, and none of them takes into account evidence from any individual person, property, or business. Further, Plaintiffs' experts cannot determine when any injuries occurred on a class-wide basis, so they cannot establish whether any class member suffered an incremental injury as a result of VNA's alleged professional negligence, as opposed to the many actions taken by government officials before that time.

1. Claims For Personal Injuries Will Require Individualized Inquiries

Plaintiffs assert that the "fact of personal injury damages can be shown on a common, class-wide basis," Mot. 64, PageID.34501, but they are wrong. There is no class-wide method for proving that each class member suffered a cognizable personal injury that is attributable to VNA. Each class member would have to testify about his or her injuries and when the injuries manifested, and would have to introduce the results of medical examinations and diagnoses in support. For example, establishing injury from lead exposure requires individual neuropsychological testing, along with other individualized evidence such as a medical history, school records, and academic testing. Ex. 42, Gaitanis Report 1-2; *see* Ex. 43, McCaffrey Report 4-5. Plaintiffs recognize as much. *See* Pls.' Omnibus Reply in Supp. of Mot. to Establish Settlement Claims Procedures 13, ECF No. 1350, PageID.41965 ("[N]eurocognitive testing . . . is considered the gold standard in establishing lead related injury in children in any case brought in court."). The same is true for other types of personal injury—they require individualized testimony, medical diagnoses, and other evidence. *See, e.g.*, Ex. 44, D. Davis Dep. 68:17-69:15 (named plaintiff Darrell Davis testifying that [redacted], and presenting medical records from that event).

Plaintiffs do not cite a single mass-contamination case in which a court held that the fact of injury could be determined on a class-wide basis, and VNA has not found such a case. *See Quinteros v. Dyncorp Aerospace Operations LLC*, No. 06-61760-CIV, 2007 WL 9700783, at *3 n.5 (S.D. Fla. May 23, 2007) ("[M]ass tort cases involving highly individualized personal injuries are not appropriate for the class action mechanism."). Even in *Sterling*, a mass-contamination case that Plaintiffs cite repeatedly, the Sixth Circuit acknowledged that the "nature" of any class member's injuries, "if any," was an individualized issue. 855 F.2d at 1197.

Notably, Plaintiffs do not propose any class-wide method for establishing injury for all members of the principal class. That is not surprising, because the class includes so many different types of plaintiffs and so many different claimed injuries. The only group for which Plaintiffs propose class-wide proof of injury is for minors, and only for lead-related injuries. *See* Mot. 73-76, PageID.34510-34513. Plaintiffs' do not even attempt to show that injury can be proven on a class-wide basis for most members of the principal class.

For lead-related injuries to minors, Plaintiffs argue that their experts can establish that every member of the subclass likely sustained an injury. Their approach is as follows: First, Dr. Weisel sets out criteria for identifying properties with likely elevated water lead levels, and Dr. Goovaerts makes a list of properties that satisfy those criteria. Mot. 74-75, PageiD.34511-34512. Then Dr.

Georgopoulos asserts that minors exposed to water at those locations for at least 90 days during the class period likely would have elevated blood lead levels. *Id.* at 75, PageID.34512. Finally, Dr. Hu states that minors with those elevated blood levels likely have "sustained non-negligible impairment of their neurobehavioral development." *Id.* at 76, PageID.34513. The experts never specify which water or blood lead levels are necessary to cause the claimed injury, and Dr. Hu admits that the injury he identifies is not medically diagnosable or measurable in individuals.

There are at least five problems with Plaintiffs' approach.

Problem #1: Plaintiffs' use of hypotheticals does not prove that any member of the class actually was injured. The experts' opinions are based entirely on blanket assumptions. *E.g.*, Ex. 45, Goovaerts Dep. 174:9-12. The experts admit that they did not consult any data about any person in Flint, not even for the named plaintiffs. *E.g.*, Ex. 46, Hu Dep. 186:10-15 ("Q. . . . [Y]ou have not reviewed any medical records with respect to any individual Flint citizens, is that correct? A. Correct."). In fact, Dr. Georgopoulos says that his approach was meant only to provide a "preliminary demonstration" for a "generic" class member; he admits that it is not representative of any actual class member. Ex. 47, Georgopoulos Dep. 52:16-54:12, 147:22-148-2. So at most, Plaintiffs' models establish that a hypothetical minor could have been injured, not that any particular member of the class actually was injured. *See* Ex. 46, Hu Dep. 282:6-9 ("Q. . . . [I]s it fair to say

that you are not offering any opinions with respect to any individual children; is that right? A. That's correct."). The experts took that approach here even though they admitted that in a typical case, they would rely "on [] specific medical diagnos[es] that had been made for each of the plaintiffs involved." *Id.* at 172:6-10 (Dr. Hu).

Hypothetical injury to hypothetical plaintiffs is not enough for class certification. Courts regularly reject plaintiffs' attempts to obtain class certification by using hypothetical, "average" models that "gloss[] over the many individualized issues underlying" their claims. *Rowe v. E.I. duPont de Nemours & Co.*, Civil Nos. 06-1810, 06-3080, 2008 WL 5412912, at *15 (D.N.J. Dec. 23, 2008). Plaintiffs cannot "substitute" "evidence of hypothetical, composite persons" for evidence from "actual class members" "in order to gain class certification." *Gates v. Rohm & Haas Co.*, 655 F.3d 255, 266 (3rd Cir. 2011). Put another way, plaintiffs may not litigate "on behalf of a 'perfect plaintiff' pieced together for litigation," forcing the defendant "to defend against [that] fictional composite without the benefit of deposing or cross-examining the disparate individuals behind the composite creation." *Broussard v. Meineke Discount Muffler Shops, Inc.*, 155 F.3d 331, 344-45 (4th Cir. 1998). Yet that is exactly what Plaintiffs propose to do here.

Problem #2: The experts' methodologies are flawed. Each of the steps of Plaintiffs' approach is flawed, because their experts rely on flawed assumptions and unreliable methodologies.

First, Plaintiffs' experts do not establish that the properties they identify actually had elevated water lead levels. Dr. Goovaerts compiled his list of properties with supposedly elevated water lead levels based on assumptions (supplied by Dr. Weisel) that are demonstrably false. Dr. Weisel assumed that all properties built in 1986 or earlier would have interior pipes and fittings that contained lead, because lead pipes and fittings were banned in 1986. Ex. 45, Goovaerts Dep. 173:9-174:8. But that assumption is wrong, because some homes never had lead pipes or fittings to begin with, while others had their pipes and fittings replaced before 2014. Named plaintiff Rhonda Kelso, for instance, replaced all of her internal plumbing with copper pipes in 2000. Ex. 48, Kelso Am. Resp. to Uniform RFAs 13. At his deposition, Dr. Goovaerts admitted that his list is "inaccurate" because it includes some homes without lead pipes or fittings. Ex. 45, Goovaerts Dep. 174:24-175:11. So at the very least, individualized inspections would be needed to determine which properties to exclude from Dr. Goovaerts' list. *See id.* at 180:12-20.

Further, Dr. Goovaerts assumes that the principal source of elevated water lead levels was interior plumbing containing lead. *See* Ex. 45, Goovaerts Dep. 176:3-17. In fact, lead service lines were the main contributor to water lead levels, and the City's data show that most homes did not have lead service lines. Ex. 49, Gagnon Report 3-7. Dr. Goovaerts did not consider that critical fact. Ex. 45, Goovaerts Dep. 95:11-21. Nor did he consider any test results showing that many

properties did not have detectable water lead levels during the class period. *Id.* at 181:18-182:3.

Second, Plaintiffs' experts do not establish that people who drank the water at the properties on Dr. Goovaerts's list actually had elevated blood lead levels. They do not account for the amount of water that any minor drank, even though Dr. Hu admits that the "volume of water that was being consumed" should be an "important consideration" in determining injury. Ex. 46, Hu Dep. 296:12-19; *see id.* at 273:18-274:9. Plaintiffs' approach includes a person who drank only a small amount of unfiltered water while brushing his or her teeth each day—even though such a small amount of water would not cause a measurable increase in blood lead levels. Ex. 50, Finley Report 53-54.[5]

Further, even if a person drank a significant quantity of water with elevated lead levels, that would not automatically correspond to elevated blood lead levels. The extent to which a person's body absorbs lead from drinking water varies from

[5] Dr. Hu suggests that the 14-day and 90-day criteria in the definition for the minors subclass ensure that class members ingested some significant minimum amount of water. *See* Hu Decl. ¶ 13, ECF No. 1208-90, PageID.35889; Ex. 46, Hu Dep. 286:21-287:1. But Dr. Georgopoulos chose the criteria so that he could use a standard model for estimating blood lead levels based on water lead levels. Georgopoulos Decl. ¶ 15, ECF No. 1208-137, PageID.37960. The criteria do not require any minimum volume. If the volume of water ingested were very small, the model would estimate an insignificant blood lead level. Ex. 50, Finely Report 43-44. In other words, the 14-day and 90-day criteria do not by themselves ensure that each class member experienced significant increases in blood lead levels.

person to person, depending on individual habits, physiology, and genetics. Dr. Hu made just this point in his declaration. *See* Hu Decl. ¶ 10, PageID.35884-35885 ("[E]ven if an individual's level of exposure to tap water is known, that individual's internalized 'dose' of lead, *i.e.*, amount of lead that would be absorbed from the gastrointestinal tract into blood . . . can be expected to vary based on that individual's nutritional status . . . as well as biological factors," including age and genetics.). Dr. Georgopoulos agreed. *See* Georgopoulos Decl. 21, PageID.37969 ("Within a group of similarly exposed children, [blood lead levels] would be expected to vary among children as a result of inter-individual variability in media intakes, absorption, and biokinetics."). An individualized analysis is needed to determine the effect of drinking water with an elevated lead level on a particular person.

Third, Plaintiffs' experts do not establish that any actual person suffered a cognizable physical injury. Lead is ubiquitous; everyone has some blood lead level. So the fact that a person has lead in his or her blood does not necessarily mean that he or she has a cognizable injury. As one of VNA's epidemiological experts, Dr. Douglas Weed, explains, minors with the same blood lead levels do not invariably experience the same health effects and are not expected to have the same health outcomes. Ex. 51, Weed Report 82-84. A child with even a moderate level of lead in the blood may not manifest any injuries. *Id*. at 76. Thus, there is no way to

determine whether a member of the minors subclass suffered a cognizable physical injury without an individual medical examination and diagnosis.

Plaintiffs' experts have two responses, both of which are mistaken. First, they argue that no safe level of lead exists, and ingesting of any amount of lead constitutes an injury. Mot. 50, PageID.34487. But the Michigan Supreme Court has squarely rejected the notion that "mere exposure to a toxic substance . . . constitutes an 'injury' for tort purposes." *Henry*, 473 Mich. at 72-73. The Sixth Circuit similarly has held that a defendant in a toxic-tort case cannot be liable with "a bare demonstration of minimal exposure." *Stark v. Armstrong World Indus.*, 21 F. App'x 371, 376 (6th Cir. 2001) (applying Michigan law); *see Martin v. Cincinnati Gas & Elec. Co.*, 561 F.3d 439, 443 (6th Cir. 2009) (applying Kentucky law, which uses the same liability standard as Michigan law). As VNA's experts explain, there is no biologically sound basis for concluding that a small amount of exposure to lead could have appreciable health effects. Ex. 42, Gaitanis Report 1; Ex. 51, Weed Report 57-63; Ex. 52, Benson Report 25-43; *see Parkhurst*, 2013 D.C. Super. Lexis 4, at *38-*39 (following lead exposure, "some class members suffer no physical injury"); Ctrs. for Disease Control & Prevention, Advisory Comm. on Childhood Lead Poisoning Prevention, *Interpreting and Managing Blood Lead Levels <10 µg/dL in Children and Reducing Childhood Exposures to Lead*, 56 Morbidity & Mortality Weekly Rep. 1, 4 (2007) ("Although lead is a risk factor for developmental

and behavior problems, its presence does not indicate that these problems will necessarily occur.").

The experts' second idea is to claim an undefined, unmeasurable injury. Dr. Hu asserts that all members of the minors subclass likely suffered "non-negligible impairment of their neurobehavioral development." Hu Decl. ¶ 22, PageID.35895. That is not a recognized medical diagnosis; Dr. Hu admits that he cannot provide a definition of a "negligible impairment." *See* Ex. 46, Hu Dep. 274:16-275:18. Dr. Hu suggests that a loss of even 0.5 IQ points would qualify as a "non-negligible impairment"—but he admits that it is impossible to measure such a small change. *Id.* at 278:8-279:17, 343:19-23; *see* Ex. 51, Weed Report 44-47, 79. Michigan law requires a "discoverable appearance" or observable "physical manifestation[]" of harm for a cognizable injury. *Henry*, 473 Mich. at 72, 79 (internal quotation marks and emphasis omitted). Plaintiffs' experts cannot say that class members had that. Dr. Hu admits that; he cannot say that a class member "actually suffered from any condition associated with exposure to lead." Ex. 46, Hu Dep. 200:19-24; *see id.* at 399:5-400:20; Hu Decl. ¶ 34, PageID.35915. And another of Plaintiffs' experts, Dr. Keating, admits that some members of the minors subclass "may . . . not [have] had a negative impact" and would not need medical treatment. Ex. 53, Keating Dep. 369:19-371:19.

Problem #3: The experts' methodologies do not match the class definition. Even if Plaintiffs' approach were valid, it would not prove injury for every class member because Plaintiffs' experts ignored a key part of the class definition. The minors subclass includes all minors who ingested unfiltered Flint water for at least 14 out of 90 days during the class period. Mot. xii, PageID.34436. But in estimating the blood lead levels for a hypothetical class member, Dr. Georgopoulos assumed that the person ingested water for the full 90 days. Georgopoulos Decl. ¶ 11(a), PageID.31710; Ex. 46, Georgopoulos Dep. 86:10-87:2. He did not estimate the blood lead level for a person who drank water for only 14 days—likely because the blood lead level would have been negligible. Ex. 50, Finley Report 43-44.

The result is that Dr. Georgopoulos's opinion does not apply to the members of the subclass who ingested water for less than 90 days. Because Dr. Georgopoulos's model is not "consistent with [Plaintiffs'] liability case," it cannot support class certification. *Comcast Corp. v. Behrend*, 569 U.S. 27, 35 (2013) (internal quotation marks omitted). And since Dr. Hu's opinion depends on Dr. Georgopoulos's opinion, *see* Hu Decl. ¶ 20, PageID.35891, Dr. Hu's opinion also cannot support class certification.

Problem #4: Plaintiffs' experts do not establish injury caused by VNA. The experts' approach does not attempt to prove injury attributable to VNA. The experts' opinions cover the entire period of the minors subclass, May 2014 to January 2016.

Hu Decl. ¶ 24, PageID.35903-35904. But VNA did not arrive in Flint until February 2015. The experts do not propose any class-wide method for determining which class members were injured before VNA arrived in Flint, and which were injured after that. Many—if not most—minors in Flint stopped drinking Flint water shortly after the switch to Flint River water, well before VNA arrived in Flint. For example, named plaintiff Kelso testified that she and her daughter K.E.K. stopped drinking Flint water in October 2014 and stopped eating food prepared with Flint water in January 2015. Ex. 54, Kelso Dep. 17:19-18:3, 28:11-13. So even if the Court were to admit the experts' opinions, Plaintiffs still would need to present individualized evidence to establish that class members suffered a physical injury during the time period relevant to VNA.

Problem #5: VNA would introduce individualized evidence in defense. Further, VNA would introduce individualized evidence of lack of injury in its defense. The Court should "consider potential defenses" in assessing whether Plaintiffs meet the Rule 23 requirements and should not give individualized issues "less weight" because they are "defense" issues rather than part of Plaintiffs' case in chief. *Myers v. Hertz Corp.*, 624 F.3d 537, 551 (2d Cir. 2010).[6]

[6] *See, e.g., Romberio v. UnumProvident Corp.*, 385 F. App'x 423, 429 (6th Cir. 2009) (reversing class certification because district court did not "look . . . closely at . . . the defenses that [the defendant] might raise"); *In re Prempro*, 230 F.R.D. 555, 567 (E.D. Ark. 2005) ("When affirmative defenses may depend on facts peculiar to

Here, for example, named plaintiff Kelso testified that her daughter K.E.K. [redacted] Ex. 54, Kelso Dep. 91:6-93:19. At trial, VNA would present that testimony, [redacted]. And VNA should be permitted to present that type of evidence for other members of the minors subclass as well.

One way or another, the injury question will become highly individualized. Plaintiffs want to use their hypothetical models as a substitute for individualized litigation, but they "cannot circumvent" their obligation to prove injury for each class member "by simply relying on assumptions about the general population." *Rowe*, 2008 WL 5412912, at *14. The "reality" is that establishing injury "is fraught with individualized issues"—precluding class certification. *Id.* at *15; *see In re Rail Freight Fuel Surcharge Antitrust Litig.-MDL No. 1869*, 725 F.3d 244, 252-53 (D.C. Cir. 2013) (class certification is inappropriate "where there exists no reliable means of proving classwide injury in fact").

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each plaintiff's case, class certification is erroneous." (internal quotation marks omitted)); *see also Wal-Mart Stores, Inc. v. Dukes*, 564 U.S. 338, 367 (2011) (courts cannot replace a defendant's right to put on individualized defenses with "Trial by Formula").

2. Claims For Property Damage Will Require Individualized Inquiries

Plaintiffs seek to recover the cost of replacing service lines and interior plumbing and the diminution in residential property values. *See* Mot. 65, 67-69, PageID.34502, 35404-34506. But Plaintiffs cannot identify which properties suffered cognizable property damage or diminution in value on a class-wide basis, let alone specify which injuries are attributable to VNA, as opposed to the initial switch to Flint River water.

Remediation. To establish that a property suffered damage requiring remediation, a class member would need to put on individualized evidence. That evidence likely would include the results of a home inspection, which would establish the age, type, and condition of the property's service lines and interior plumbing. *See, e.g.*, Ex. 55, Butler Decl. ¶ 11. The plaintiff also would need to introduce evidence as to when the damage occurred. *See, e.g.*, *id.* And the class member would have to account for whether any service lines or interior plumbing already were repaired or replaced after the Flint water crisis.

Plaintiffs' experts propose a short-cut, where they presume that every property in Flint suffered significant damage as a result of the water switch, requiring a complete replacement of service lines and interior plumbing. Mot. 67-68, PageID.34504-34505; *see* Russell Report §§ 4.9, 5.3, PageID.35424, 35432;

Pogorilich Report ¶ 16, PageID.37636. That presumption is unsupported and unwarranted.

None of Plaintiffs' experts considered data from any actual property, or any evidence of damage to any service line, pipe, or fitting in Flint. Ex. 37, Russell Dep. 131:16-18; Ex. 56, Gamble Dep. 142:9-144:2, 188:16-24; Ex. 57, Pogorilich Dep. 204:6-22. They instead base their opinions on assumptions about properties in Flint. As Dr. Russell admitted, he would not normally use those short-cuts; in a typical case, he would work with a metallurgist who would inspect sections of pipes to evaluate whether there was damage. Ex. 37, Russell Dep. 50:7-51:6. And many of Dr. Russell's assumptions are false. For example, he assumes that a significant proportion of the service lines in Flint are made of lead, *see* Russell Report § 5.3, PageID.35432, when in reality fewer than 20% of the service lines are lead, *see* Ex. 49, Gagnon Report 4. Dr. Russell also does not account for repairs or replacements that have occurred, so he does not exclude class members who would not require remediation. And he does not account for when any damage occurred, so he cannot say that any damage occurred only after VNA arrived in Flint. *See* Ex. 37, Russell Dep. 227:12-24.

Inspections of individual plaintiffs' homes confirm that many homes did not suffer any detectable damage. For example, the inspections of the homes of two named plaintiffs show that their homes do not have any detectable damage to interior

plumbing from Flint water. Ex. 34, Duquette Report 25. VNA would perform similar inspections of all residents' properties to determine whether any of the interior plumbing was in fact damaged.

In light of the home inspections of the named plaintiffs, Plaintiffs changed their tune. Now, they say only that "corrosive water and lead contamination at the levels observed in Flint are *likely* to damage any internal pipe and fixture system." Ex. 58, Kelso Resp. to VNA's 4th RFP 3-4 (emphasis added). That "likely" cannot be squared with their experts' opinions that "[e]very home and business suffered property damage" and "all homes would have had endured one or more" of five specific issues. Russell Report § 4.9, PageID.35424; *see* Ex. 37, Russell Dep. 226:3-7. This just underscores that Plaintiffs will not be able to establish actual property damage without individual property inspections.

Diminution in value. Proving that a property lost value also will require individualized evidence. As Plaintiffs' damages expert, Dr. Keiser, admits, different homes in Flint saw different rates of change in value over the period of the Flint water crisis. *See* Ex. 39, Keiser Dep. 485:6-20. Courts routinely decline to certify classes because proving diminution in property value requires individualized inquiries. *See, e.g.*, *Dvorak v. St. Clair Cty.*, No. 14-CV-1119, 2018 WL 514326, at *8 (S.D. Ill. Jan. 23, 2018) (declining to certify classes in a case involving a conspiracy to fix property taxes because the "fact of injury"—the effect of the

conspiracy on each piece of property—was "not susceptible to common class proof"); *Cannon v. BP Prods. N. Am., Inc.*, Civil Action No. 10-CV-00622, 2013 WL 5514284, at *15 (S.D. Tex. Sept. 30, 2013) (denying class certification because plaintiffs would have to present individual appraisals for each property to prove diminution in property values); *Mays v. TVA*, 274 F.R.D. at 635-36 (declining to certify classes in a mass-contamination case because there was no class-wide method for determining the diminution in the values of the allegedly contaminated properties).

Plaintiffs again attempt to use their experts to take a short-cut. Dr. Keiser estimates the effect of the Flint water crisis on property values using a model. *See* Mot. 65, 77-78, PageID.34502, 34514-34515. That model compares changes in residential property values in Flint to changes in values in other cities and claims that any difference between Flint and the control cities is due to the Flint water crisis. Keiser Report 29-30, ECF No. 1208-128, PageID.37508-37509. As detailed in the motion to exclude Dr. Keiser's opinions, the model has many flaws, including that the control cities Dr. Keiser chose are not comparable to Flint, and that the model excludes nearly half of the homes in Flint. Ex. 59, Redfearn Decl. ¶¶ 92-117, 148.

But even if the model were valid, it presents only an average drop in property values across all properties in Flint. Ex. 39, Keiser Dep. 116:14-18. Dr. Keiser does not attempt to identify which properties suffered any drop in prices, or when.

Instead, he simply assumes that all properties lost value in identical proportion. *Id*. Dr. Keiser also does not account for the fact that many properties have not been sold and that some properties may recover any loss in value by the time they are sold. To actually determine which class members' properties lost value, the Court would need to consider individualized evidence.

3. Claims For Economic Losses Will Require Individualized Inquiries

Plaintiffs' third category of injury is for economic losses. They identify three types: lost profits for the proposed business-damages subclass, Mot. 78-79, PageID.34515-34516; out-of-pocket expenses for buying bottled water and water filters for the principal class, *id.* at 65, PageID.34502; and water bills paid for Flint water by the principal class, *id.* at 69-70, PageID.34506-34507. Proving those injuries will require individualized evidence.

Lost business profits. To recover against VNA for lost profits, each business will have to present an individualized assessment of its operations to show how VNA's role in the Flint water crisis affected it. As VNA's economic expert, Dr. Edelstein explains, any business's performance depends on a myriad of factors unique to that business. *See* Ex. 60, Edelstein Decl. ¶¶ 35-41. Those factors include the business's history, operations, and finances. *See id.* ¶ 39. That is an "inherently individualized" inquiry that is "not easily amenable to class treatment." *Broussard*, 155 F.3d at 342; *see, e.g.*, *Pioneer Valley Casket Co. v. Serv. Corp. Int'l*, Civil Action

No. H-05-3399, 2008 WL 11395528, at *9 (S.D. Tex. Nov. 24, 2008), *R&R adopted*, 2009 WL 10695539 (S.D. Tex. Mar. 26, 2009) (when lost profits cannot be assumed, "individualized analysis as to fact of damage is required and class certification is inappropriate"); *Bradford v. Union Pac. R.R.*, No. 05-CV-4075, 2007 WL 2893650, at *14 (W.D. Ark. Sept. 28, 2007) (denying certification in part because "[h]ighly individualized evidence will have to be presented on each business in order to determine if there has been an economic loss").

Plaintiffs' economic expert, Dr. Simons, does not engage in a business-by-business analysis of lost profits. Instead, he starts by identifying 26 industry subsectors that he assumes were negatively affected by the problems with Flint water. *See* Simons Report 14-15, ECF No. 108-95, PageID.36149-36150. He then assumes that all businesses in those sectors that failed or showed revenue declines between 2014 and 2018 suffered lost profits due to the Flint water crisis. *Id.* That sort of speculation does not establish that any business actually lost profits. *See* Ex. 60, Edelstein Decl. ¶¶ 56-64. Dr. Simons's approach focuses on revenues, not profits, so it does not match Plaintiffs' theory of harm, which is that businesses would have had more profits but for the Flint water crisis. Ex. 61, Murphy Dep. 96:4-97:23. In fact, under Dr. Simons's approach, one of the named plaintiffs (635 S. Saginaw LLC) [redacted]. *Id.* at 92:13-15, 105:3-18. His focus on revenue declines

also is flawed because a business may have had revenue declines without losing profits (if it also cut costs). Anyway, Dr. Simons's approach does not avoid the need for individualized inquiries, because VNA would put on individualized evidence about each business in defense.

Cost of buying bottled water and water filters. Plaintiffs' damages expert, Dr. Keiser, asserts that he can calculate aggregate, community-wide estimates for the costs of buying bottled water and water filters. *See* Keiser Report 23-24, 28, PageID.37501-37502, 37506. But he does not propose any method for determining which plaintiffs actually incurred those costs. Many Flint residents—including all of the named plaintiffs—received some or all of their bottled water for free from the City and State, churches, and other civic organizations. *See, e.g.*, Ex. 62, Williams Dep. 116:8-23; *see also* Settlement Agreement at 54-56, *Concerned Pastors for Social Action v. Khouri*, No. 16-cv-10277 ECF No. 147-1, PageID.7408-7410 (requiring the State to continue to provide bottled water to Flint residents). Those residents could not recover for the cost of buying that bottled water. Yet Dr. Keiser does not propose any method for identifying and excluding those purchases. Without a class-wide method for determining which class members paid for bottled water and when, the fact of injury here also will require individualized inquiries.

Dr. Keiser also does not propose any method for identifying when any class member bought bottled water or water filters. So he cannot say which class members

incurred the cost after VNA's engagement in Flint and thus cannot tie those expenses to VNA.

Water bills. Plaintiffs allege that the members of the principal class suffered an economic injury from paying bills for Flint water that was unsafe to drink and therefore valueless. Mot. 69-70, PageID34506-34507. But the water was unsafe to drink only if the water exceeded federal and state standards for lead or other contaminants, and that would happen only if a class member's residence had service lines, pipes, or fittings made of lead that had leached into the water. *See* Ex. 37, Russell Dep. 169:22-170:11; Ex. 34, Duquette Report 16-26. The results of lead level tests taken during the class period reveal that many homes in Flint did not have detectable levels of lead, perhaps because they did not have service lines, pipes, or fittings made of lead. Ex. 50, Finley Report 24. Accordingly, individualized inquiries will be required to determine which residents received unsafe water and suffered an economic injury from paying for that water.

In sum, Plaintiffs cannot prove the fact of injury class-wide for any of their proposed types of injuries. That is by itself a reason to deny class certification.

C. Plaintiffs Will Need To Prove But-For Causation On An Individual Basis

Every class member also will need to prove causation. Causation can be very complicated in a toxic-tort case. Here, the causation inquiry has two components: (1) but-for causation, meaning whether VNA's alleged negligence in fact

contributed to his or her injury; and (2) proximate causation, meaning whether VNA should be held legally responsible for that injury. *See Adas v. Ames Color-File*, 160 Mich. App. 297, 301 (1987); *Poe v. City of Detroit*, 179 Mich. App. 564, 576-77 (1989).

But-for causation will be highly individualized for each type of injury asserted. The analysis will depend on evidence specific to each individual, property, or business, particularly when it comes to ruling out alternative causes of injury. For lead-related injuries in particular, each class member's preexisting lead exposure will be relevant. Each class member will have to prove that he or she suffered an incremental exposure due to the actions of VNA, and that the additional exposure caused his or her injuries.

Plaintiffs contend that their experts can prove but-for causation on a class-wide basis, but they are wrong. For personal injuries, their experts do not propose any class-wide method of proving but-for causation for adults who claim lead-related injuries (only minors), or for any injuries caused by TTHM, *E. coli*, or *legionella*. Further, Plaintiffs' experts use unreliable methodologies and unrealistic assumptions, assumptions that are proven false by the discovery conducted to date. In fact, some of the experts ultimately concede that whether any class member's injuries were caused by Flint water will depend on that class member's specific circumstances. They also admit that their methods cannot isolate when any injuries

occurred—so they cannot show that any class member suffered injuries after VNA began its work in Flint, much less that VNA caused those injuries.

1. Determining Whether VNA In Fact Caused Plaintiffs' Personal Injuries Will Require Individualized Inquiries

To establish but-for causation for a personal-injury claim under Michigan law, each class member must establish three things:

- **Exposure**: The class member was exposed to a particular quantity of a toxic substance in Flint water due to VNA's alleged negligence, *see Powell-Murphy v. Revitalizing Auto Cmtys. Envtl. Response Tr.*, No. 348690, 2020 WL 4722070, at *5 (Mich. Ct. App. Aug. 13, 2020);
- **General causation:** That level of exposure generally was capable of causing the class member's alleged injury, *Powell-Murphy*, 2020 WL4722070, at *5; and
- **Specific causation:** That exposure, as opposed to some other source, specifically caused the class member's injury, *Powell-Murphy*, 2020 WL 4722070, at *5.

Each class member would have to prove that for each toxic substance alleged. Here, Plaintiffs have alleged that putative class members were exposed to four allegedly toxic substances—lead, TTHMs, *E. coli*, and *legionella*. But their experts only address exposure to lead.

a. Exposure Is Highly Individualized

Proving exposure to a toxic substance due to VNA's alleged negligence will require individualized evidence. Each class member must show that he or she was exposed to a particular amount of a toxic substance in Flint water and that exposure was caused by VNA. That showing will depend on individualized evidence.

Using lead as an example, exposure depends on many factors. Those include where the class member lived, worked, or studied; the conditions of the class member's residence, office, or school; and when and how much the class member used Flint water after February 18, 2015 (the date of VNA's initial report). Plaintiffs' experts admit that those individualized factors affect exposure. Dr. Hu, for example, explains that "'exposure' to water lead levels stemming from the Flint water crisis at the level of a typical residential tap can be expected to vary spatially (*i.e.* across locations within the city depending on the condition and type of service line, connectors, and indoor plumbing at each location an individual consumes tap water or item prepared with tap water); temporally (*i.e.* over time—the course of a day, week, and month, because of flushing, water flow, local pipe and interior plumbing conditions); and frequency of an individual's consumption of the tap water." Hu Decl. ¶ 10, PageID.35884-35885.

All of the evidence that a class member would use to prove exposure would be individualized. That evidence could include:

- The class member's testimony about his or her use of water, including in particular whether and when the plaintiff used a water filter, *e.g.*, Ex. 44, D. Davis Dep. 52:8-53:7, 56:4-19;
- Other witnesses' testimony about the class member's use of water (*e.g.*, other household members, teachers, and co-workers), *e.g.*, Ex. 62, Williams Dep. 115:10-21;
- "[D]irect measurements of lead in blood ('blood lead levels') at different intervals," and information about the type of test and how it measured

blood lead level, Hu Decl. ¶ 10, PageID.35884; Ex. 51, Weed Report 43; *see, e.g.*, Ex. 63, Williams Dep. Ex. 7;

- The results of other medical examinations and diagnoses, *e.g.*, Ex. 46, Hu Dep. 172:7-10; and
- The results of water lead tests and property inspections, which would establish the age, type, and condition of the service lines and interior plumbing, and the levels of lead in paint, dust, and soil in the home, workplace, or school, *see, e.g.*, Ex. 64, Carthan Dep. Ex. 12.

Not only would Plaintiffs need to present that evidence in general, but they would need to present evidence specific to VNA. For example, Plaintiffs allege that if VNA had used "better wording" in advising the City to use a corrosion inhibitor, the City would have started using a corrosion inhibitor earlier than it did. Ex. 37, Russell Dep. 267:3-14. If that is Plaintiffs' theory of causation, then they have to show that each class member used water after the date on which the City would have started using a corrosion inhibitor, because VNA's supposed omission could not have been the cause of any injuries before that point.

Each class member would need to account for previous exposure to lead. All of the experts agree that each Flint resident already had some exposure to lead before the switch to Flint River water. *E.g.*, Ex. 52, Benson Report 4-5; Ex. 53, Keating Dep. 100:11-101:1. Water lead levels in Flint, both before and after the switch to Flint River water, are similar to the levels in other urban areas with older piping infrastructure. Ex. 50, Finley Report 49. So in order to prove that an injury was caused by the switch to Flint River water, each class member would have to show a

measurable incremental increase in lead exposure. And as to VNA, each class member must show that he or she suffered additional exposure because of VNA's alleged negligence.

Courts in toxic-tort cases regularly conclude that individualized issues about exposure preclude class certification.[7] Plaintiffs cite a handful of toxic-tort cases in which courts certified classes, but those cases do not help them. Plaintiffs rely principally on the Sixth Circuit's decisions in *Sterling* (a case about contaminants leaking from a landfill) and *Olden* (a case about pollutants from a cement manufacturing plant). *See* Mot. 76, PageID.34513. As an initial matter, the *Manual for Complex Litigation* "caution[s]" courts against relying on *Sterling*, because *Sterling* predates the Supreme Court's more recent class-certification decisions in *Amchem*, *Comcast*, and *Wal-Mart*. *Manual for Complex Litigation (Fourth)* § 22.71

[7] *See, e.g.*, *Gates*, 655 F.3d at 266; *Steering Comm. v. Exxon Mobil Corp.*, 461 F.3d 598, 602 (5th Cir. 2006); *Modern Holdings, LLC v. Corning, Inc.*, Civil Action No. 13-cv-405, 2018 WL 1546355, at *16 (E.D. Ky. Mar. 29, 2018); *Hencke v. Arco Midcon, L.L.C.*, No. 10-CV-86, 2014 WL 982777, at *16 (E.D. Mo. Mar. 12, 2014); *Mays v. TVA*, 274 F.R.D. at 626-27; *Benefield v. Int'l Paper Co.*, 270 F.R.D. 640, 651 (M.D. Ala. 2010); *Myers v. BP Am. Inc.*, Civil Action No. 08-0168, 2009 WL 2341983, at *6 (W.D. La. July 29, 2009); *Rowe*, 2008 WL 5412912, at *21; *Rhodes v. E.I. du Pont de Nemours & Co.*, 253 F.R.D. 365, 375 (S.D. W. Va. 2008); *Taylor v. CSX Transp., Inc.*, 264 F.R.D. 281, 294 (N.D. Ohio 2007); *Salvant v. Murphy Oil USA, Inc.*, Civil Action No. 06-8700, 2007 WL 2344912, at *2 (E.D. La. Aug. 13, 2007); *Snow v. Atofina Chems., Inc.*, No. 01-72648, 2006 WL 1008002, at *16 (E.D. Mich. Mar. 31, 2006); *Ball*, 212 F.R.D. at 391; *Newton v. So. Wood Piedmont Co.*, 163 F.R.D. 625, 632 (S.D. Ga. 1995).

& n.1310 (2004). In any event, *Sterling* is distinguishable—it involved only a single defendant, and exposure could be determined on a class-wide basis. *See* 855 F.2d at 1197. As for *Olden*, the Sixth Circuit in that case expressly distinguished cases involving lead, recognizing that exposure issues in lead cases usually are individualized. *See* 383 F.3d at 510.[8]

b. General Causation Is Highly Individualized

In addition to showing exposure, each class member would need to prove that that particular "level of exposure could cause [his or her] symptoms." *Pluck v. BP Oil Pipeline Co.*, 640 F.3d 671, 679 (6th Cir. 2011). That also will require individualized evidence, likely in the form of expert testimony. "[A] plaintiff's evidence of general causation should be tailored to the estimated amount and

[8] Plaintiffs also cite (Mot. 76 n.211, PageID.34513) three district court cases, but none has persuasive value. First, *Stepp v. Monsanto Research Corp.*, No. 91-cv-468, 2012 WL 604328 (S.D. Ohio Feb. 24, 2012), contains virtually no reasoning regarding predominance. The district court largely upheld its previous certification order, but that earlier order is not publicly accessible. *See id.* at *8-*9.

Second, the court in *Bentley v. Honeywell International, Inc.*, 223 F.R.D. 471 (S.D. Ohio 2004), refused to consider the defendants' arguments that exposure required individualized determinations, because the court believed that it could not consider merits arguments at the class-certification stage. *Id.* at 477 n.9. The Supreme Court has since rejected that view. *See Wal-Mart*, 564 U.S. at 351-52 & n.6. Here, Plaintiffs' own expert (Dr. Hu) acknowledges that lead exposure *is* an individualized issue. *See* Hu Report ¶ 10, PageID.35884-35885.

And in *Boggs v. Divested Atomic Corp.*, 141 F.R.D. 58 (S.D. Ohio 1991), individual class members' exposure was not at issue because the plaintiffs sought only injunctive relief. *Id.* at 66-67.

duration of exposure at issue," because "whether [a] toxin can cause harm" depends on the plaintiff's specific "exposure level." *Lowery v. Enbridge Energy Ltd.*, 500 Mich. 1034, 1043-44 (2017) (Markman, J., concurring) (emphasis omitted).[9] In this case, each class member will have to show the specific exposure level allegedly caused by VNA, which will be different from person to person depending on when the person used Flint water in relation to VNA's actions.

For lead exposure, each class member would need to prove that his or her incremental exposure attributable to VNA was capable of producing his or her injury. The potential for harm from incremental lead exposure varies depending on the class member's preexisting level of exposure. *See* Ex. 50, Finley Report 10-11. The same increase in lead exposure likely would cause different harm in someone with a low preexisting level of lead exposure than compared to someone with a high preexisting level. *See* Georgopoulos Decl. 32, PageID.37980; Ex. 46, Hu Dep. 192:3-193:23. Each class member therefore will need to present evidence specific to his or her preexisting level and the incremental increase in lead exposure attributable to VNA. That showing necessarily would be individualized.

[9] The Michigan Court of Appeals adopted Justice Markman's concurrence in *Lowery* as establishing the standard for proving causation in toxic-tort cases. *See Powell-Murphy*, 2020 WL 4722070, at *5.

c. Specific Causation Is Highly Individualized

Individualized evidence will be needed to prove that exposure to Flint water was the actual cause of each plaintiff's claimed injury—and not just exposure in general, but incremental exposure due to VNA. Under Michigan law, each class member must produce a "differential etiology"—a medical analysis that eliminates alternative sources of the toxic agent as well as other agents that could have caused the same injuries. *Powell-Murphy*, 2020 WL 4722070, at *5-*6 & n.3. That inquiry necessarily is individualized.

Taking lead as an example, there are multiple potential alternative sources of exposure, including from the historical use of lead-based paint and leaded gasoline. Ex. 51, Weed Report 39; *see Maltagliati v. Wilson*, No. CV 970575612, 1999 WL 971116, at *10 (Conn. Super. Ct. Oct. 7, 1999); *Reilly v. Gould, Inc.*, 965 F. Supp. 588, 603-04 (M.D. Pa. 1997). Many older homes in Flint still contain lead paint, which can be released during home renovations, *Reilly*, 965 F. Supp. at 603, or just as a result of wear and tear, Ex. 52, Benson Report 5. Similarly, emissions from leaded gasoline have settled into the environment, including in soil. Ex. 50, Finley Report 12-14; *Reilly*, 965 F. Supp. at 603-04. Plaintiffs' experts recognize those many alternative sources of lead exposure. *See* Georgopoulos Decl. ¶ 16(a), PageID.37963; Hu Decl. ¶ 10, PageID.35884; Ex. 65, Weisel Dep. 214:10-23. Each plaintiff alleging lead exposure from Flint water therefore will have to present

individualized evidence (such as property inspections) to rule out lead exposure from the home, school, and workplace. *See Olden*, 383 F.3d at 510; Ex. 42, Gaitanis Report 1-2.

Each plaintiff also would have to rule out lead exposure from Flint water that occurred before VNA's involvement in Flint. Dr. Edwards found that water and blood lead levels in Flint rose shortly after the switch to Flint River water in April 2014, and came back down to pre-switch levels within a few months. Ex. 36, Edwards Dep. Ex. 33 at 480-81. So to prove a case against VNA, each class member would have to rule out that increase as a source of his or her injuries. Further, as Dr. Edwards testified, there was a large, unexplained spike in water lead levels in Flint in 2011 (when Flint was using Detroit water), and a correlated spike in minors' blood lead levels. Ex. 35, Edwards Dep. 449:11-15; Ex. 36, Edwards Dep. Ex. 33 at 479. Any class member who lived in Flint in 2011 also would have to rule out that spike as a source of injury. That includes all named plaintiffs except T.W.

Further, many other substances, diseases, and circumstances can cause the same types of injuries as lead poisoning. The most severe injuries from lead poisoning include developmental delays and learning disabilities. Many other things can cause those injuries, including premature birth, autism spectrum disorders, genetic disorders, viral and bacterial infections, fetal alcohol spectrum disorders, and the home and family environment. Ex. 51, Weed Report 21-38; Ex. 52, Benson

Report 12-15; *see Parkhurst*, 2013 D.C. Super. Lexis 4, at *39. Each plaintiff would need to present a medical examination ruling out those other potential causes, and VNA "will likely counter each individual's doctor's opinion with another medical doctor also familiar with that individual." *Fulford v. Transp. Serv. Co.*, Nos. 03-2472, 03-2636, 2004 WL 1208513, at *3 (E.D. La. May 27, 2004). Thus, determining whether the exposure at issue caused the alleged injury "will be a highly individualized issue." *Id.*

Plaintiffs' medical histories prove the point. Many of the named plaintiffs have extensive medical histories: [redacted] *see* Ex 53, [redacted] Dep. 30:7-46:14; [redacted], *see* Ex. 44, [redacted] Dep. 81:4-10, 127:13-128:19; and [redacted], *see* Ex. 66, [redacted] Dep. 16:3-10, 164:12-22. Many of those conditions could cause or exacerbate the types of physical injuries those people allege resulted from Flint water; each plaintiff would have to rule out those preexisting conditions as the source of the claimed injury.

Plaintiff Kelso also would need to rule out lead paint as a potential alternative source of lead exposure. An inspection of her residence revealed critical levels of lead paint in practically every room of the house, including the bedrooms. Ex. 67,

Kelso Dep. Ex. 4 at 3-5; *see* Ex. 50, Finley Report 32. Similarly, Plaintiff T.W. would have to exclude [redacted] as an alternative cause of his premature birth and resulting developmental delays. Ex. 62, Williams Dep. 80:11-16. [redacted], like lead, can cause premature birth, which in turn can cause developmental delays. Ex. 68, Scialli Report 4-5, 7. Plaintiffs do not allege that the Flint water crisis caused Tiantha Williams's [redacted]. *See id.* at 15-20. So at trial, T.W. would have to rule out the [redacted] as a possible cause of his alleged injuries.

These examples demonstrate why proving that the claimed injuries were caused by Flint water would "necessarily dissolve[] into a myriad of individualized causation inquiries." *In re Phenylpropanolamine (PPA) Prods. Liab. Litig.*, 208 F.R.D. 625, 632 (W.D. Wash. 2002). Courts routinely recognize that this type of specific causation issue is a highly individualized issue that makes class certification inappropriate.[10]

[10] *See, e.g.*, *Ebert v. Gen. Mills, Inc.*, 823 F.3d 472, 479-80 (8th Cir. 2016); *Goldstein v. ExxonMobil Corp.*, No. 17-cv-2477, 2019 WL 2603967, at *10-11 (C.D. Cal. Apr. 1, 2019); *Bradner v. Abbott Labs.*, No. 10-cv-3242, 2012 WL 195540, at *4 (E.D. La. Jan. 23, 2012); *Patton v. Topps Meat Co.*, No. 07-cv-654, 2010 WL 9432381, at *3 (W.D.N.Y. May 27, 2010); *Myers*, 2009 WL 2341983, at *6; *Walls v. Sagamore Ins.*, No. 07-cv-1020, 2009 WL 890528, at *8 (W.D. Ark. Mar. 31, 2009); *In re Vioxx Prods. Liab. Litig.*, 239 F.R.D. 450, 459 (E.D. La. 2006); *Campbell v. Purdue Pharma, L.P.*, No 02-cv-163, 2004 WL 5840206, at *5-*6 (E.D. Mo. June 25, 2004); *In re Rezulin Prods. Liab. Litig.*, 201 F.R.D. 61, 66-67 (S.D.N.Y. 2002).

d. Plaintiffs' Experts Cannot Prove But-For Causation Class-Wide

Plaintiffs' experts assert that they can establish but-for causation on a class-wide basis for minors' lead injuries, but they are wrong. And they do not attempt to do so for lead injuries for any other plaintiffs or for non-lead-based injuries.

For lead injuries in minors, Plaintiffs' experts rely on a chain of experts. Using criteria supplied by Dr. Weisel, Dr. Goovaerts purportedly identifies the homes, daycare centers, and schools that are likely to have elevated water lead levels, *see* Mot. 74, PageID.34511; Dr. Georgopoulos says that any minor who drank water at those locations for 90 days during the class period "would more likely than not have had elevated blood lead levels," *id.* at 75, PageID.34512; and Dr. Hu says that any minor exposed to lead in a "sufficient duration and magnitude" likely would have "non-negligent impairment of [his or her] neurobehavioral development," *id.* at 75-76, PageID.34512-34513.

Plaintiffs' approach is no more valid for proving but-for causation than it is for proving injury. It has all of the same problems: No expert examined any minor or reviewed any minor's medical records or other circumstances. Plaintiffs' experts establish causation for a hypothetical plaintiff, not any actual class member. *See* pp. 35-36, *supra*. The experts rely on flawed assumptions, some of which already have been disproven by evidence from Flint residents and properties. *See* pp. 36-41, *supra*. Their expert's model does not match the class definition, because it considers

ingestion for 90 days rather than the 14 days in the class definition. *See* pp. 42, *supra*. No expert can show that any class member ingested water after VNA arrived in Flint, so no expert can link any injury to VNA's actions. *See* pp. 42-43, *supra*. And VNA would put on individualized evidence in its defense. *See* pp. 43-44, *supra*.

Plaintiffs have two additional problems with proving but-for causation for minors alleging lead injuries on a class-wide basis. First, Plaintiffs' experts do not specify the level of lead to which any minor was exposed. Even if the properties Dr. Goovaerts identified had elevated water lead levels, he does not specify what those levels were. *See* Ex. 45, Goovaerts Dep. 179:14-15. All he says is that the lead levels would be "detectable." *Id.* at 184:18-22. Similarly, Dr. Georgopoulos states that minors who drank water at those properties during the class period would have elevated blood lead levels; he never specifies what those levels would be. Ex. 46, Georgopoulos Dep. 53:17-54:12. Without that information, Plaintiffs cannot establish that any minor's exposure to lead actually caused the minor's injuries. *See Lowery*, 500 Mich. at 1043-44 (Markman, J., concurring) (evidence of causation "should be tailored to the estimated amount and duration of exposure at issue"). Plaintiffs attempt to get around that problem by contending that any level of lead exposure is enough to cause injury, but that theory is unsupported by science and has been rejected by courts, including the Sixth Circuit. Ex. 50, Finley Report 53-54; *see* pp. 40-41, *supra*.

Second, Plaintiffs' approach does not account for other potential sources of lead injuries. Ruling out alternative causes is inherently individualized. Plaintiffs assert that their experts' model estimates injury only from lead exposure through Flint water. *See* Mot. 67-69, 74-76, PageID.34504-34506, 35411-34513; Georgopoulos Decl. ¶ 16, PageID.37962. But blood lead levels for the two proposed representatives for the minors subclass, T.W. and K.C., from after the switch to Flint River water [redacted]—so T.W. and K.C. cannot show an injury from Flint River water. Ex. 51, Weed Report 55; Ex. 62, Williams Dep. 121:4-126:22; Ex. 69, Gaines Dep. 73:9-74:12.[11] (In the case of T.W., that is not surprising, since his home had only copper pipes. Ex. 50, Finley Report 45; Ex. 62, Williams Dep. 96:21-97:1.) Dr. Hu admits that establishing that Flint water was the cause of a clinically diagnosable injury requires "*an individual assessment* of the plaintiff . . . determining if the exposure more likely than not was a substantial contributing factor to their diagnosis." Hu Decl. ¶ 34, PageID.35915-35916 (emphasis added). Plaintiffs' only response to this is that they do not have to show a clinically diagnosable injury, just that they had some "non-negligible impairment"—but that is not a legally cognizable injury. *See* pp. 41, *supra*.

[11] Plaintiffs assert that T.W. and K.C. "have suffered elevated lead levels," but they provide no citations for those assertions. Mot. 41, PageID.34478; *see id.* at 39, PageID.34476.

2. Determining Whether VNA In Fact Caused Plaintiffs' Property Damage Will Require Individualized Inquiries

Establishing but-for causation for property damage (the costs of remediating service lines and interior plumbing, and diminution in property values) also will require individualized inquiries.

Remediation. To hold VNA liable for the costs of remediating service lines and interior plumbing, each class member will have to put on evidence establishing that the damage was caused by VNA's actions, and not some other cause. The evidence likely would need to consist of:

- Each property owner's testimony as to the condition of the service lines and interior plumbing on specific dates, and when he or she noticed problems, in relation to when VNA was in Flint;
- Photographic and other documentary evidence regarding the condition of the property on specific dates;
- The results of tests of water chemistry and inspections of all of the service lines and interior plumbing; and
- Expert testimony as to the condition of the service lines and interior plumbing, and the causes of that condition.

All of that evidence would be specific to each individual property. Properties in Flint vary widely, including with regard to the type and quality of the service lines and interior plumbing, the age of construction, and the level of maintenance and repair. Ex. 55, Butler Decl. ¶¶ 10-11; Ex. 59, Redfearn Decl. ¶¶ 63-64. Further, Flint water has gone through many changes, and under Plaintiffs' experts' theory, many of those changes likely caused property damage before the switch to Flint

River water in 2014. For example, before Detroit started supplying water to Flint in 1967, Flint did not use orthophosphates for corrosion control. Ex. 34, Duquette Report 5. According to Plaintiffs' experts' theory, that should have caused damage to service lines and interior plumbing in homes built before that date. *Id.* at 15; Ex. 59, Redfearn Decl. ¶ 62. So for each of those homes, plaintiffs will need to isolate damages caused by the Flint water crisis (and VNA in particular) from any preexisting damage. The need to address those individualized questions precludes class certification. *See, e.g.*, *Crutchfield v. Sewerage & Water Bd. of New Orleans*, 829 F.3d 370, 377 (5th Cir. 2016) (affirming denial of class certification because of the need for individualized inquiries to determine the cause of property damage).

Plaintiffs' experts assert that every property in Flint suffered irreversible damage due to the Flint water crisis and that all service lines and interior plumbing must be replaced. Mot. 67-68, PageID.34504-34505; *see* Russell Report §§ 4.9, 5.3, PageID.35424, 35432. But they do not attempt to account for any other potential cause of damage. Ex. 57, Pogorilich Dep. 261:1-6. Nor do they say when the asserted damage occurred—meaning that they cannot attribute the damage to VNA. *See* Ex. 37, Russell Dep. 329:4-330:22. Even taken at face value, the opinions of Plaintiffs' experts do not demonstrate causation as to VNA. And even if they did, VNA would put on individualized evidence in its defense.

Diminution in value. To recover against VNA for diminution in property values, each class member would have to show that VNA's alleged negligence caused a drop in property value. To do that, the class member likely would put on expert appraisals of the property's value at different times, including before, during, and after VNA's engagement in Flint. He or she likely would also put on expert testimony estimating the portion of the change in value attributable to the Flint water crisis in general and to VNA in particular. After all, there was widespread awareness of problems with Flint's water before VNA arrived. *See, e.g.*, Ex. 14, COF_FED_0042553. The evidence the class member would put on would necessarily be specific to each property; it depends on the property's condition, neighborhood, and other factors.

Plaintiffs offer Dr. Keiser to estimate the effect of the Flint water crisis on property values in Flint on a class-wide basis. Keiser Report 29-30, PageID.37508-37509. But Dr. Keiser did not take into account any variation in individual properties—he assumed that all properties in Flint lost value due to the problems with Flint water, and all by the same percentage. Ex. 39, Keiser Dep. 116:4-7. But given the wide variety of properties in Flint, it is unlikely that all properties lost value due to the problems with Flint water by the same proportion. Ex. 59, Redfearn Decl. ¶¶ 40-74. The named plaintiffs demonstrate that properties changed values at different rates—the assessed value of David Munoz's home [redacted]

between 2014 and 2018, while the value of Elnora Carthan's home [redacted] during that time. Ex. 39, Keiser Dep. 481:9-482:12.

3. Determining Whether VNA In Fact Caused Plaintiffs' Economic Loss Will Require Individualized Inquiries

Establishing but-for causation for Plaintiffs' three categories of economic loss (business losses, bottled water and water filters, and water bills) also will require individualized inquiries.

Lost business profits. Each business will need to prove that it lost profits due to VNA's actions. As VNA's expert economist, Dr. Edelstein, explains, businesses are highly complex, and any number of factors could affect a business's performance. Ex. 60, Edelstein Decl. ¶¶ 34-41. Further, how those factors affect a business's performance is unique to that business. *Id.* For example, for small businesses, a key driver of performance is the skill of the business owner—which is inherently unique to that person. *Id.* ¶ 39.

Accordingly, the evidence that a class member would need to introduce to show that VNA caused lost profits, and not some other cause, would be highly individualized. That evidence likely would include:

- The owner's or manager's testimony about the business's performance before, during, and after VNA's engagement in Flint;
- Financial statements for the business and similarly situated competitors;
- Receipts and other evidence documenting any expenses incurred due to the problems with Flint water;

- Macroeconomic and industry reports, data, and trends; and
- Expert testimony regarding the specific factors that caused the business's performance.

Plaintiffs contend that their damages expert, Dr. Simons, can establish causation for business losses using common proof. But his opinion layers unwarranted assumption on unwarranted assumption. *See* Ex. 60, Edelstein Decl. ¶¶ 46-85. For example, Dr. Simons assumed that the problems with Flint water must have adversely affected some industry sectors—a result-oriented assumption at odds with basic statistical methods. *Id.* ¶ 42-44. Then, for the industry sectors he chose, Dr. Simons assumed that the Flint water crisis was the *only* reason a business experienced a decline in profits. Ex. 40, Simons Dep. 243:24-244:8. That assumption is unwarranted; the problems with Flint water cannot be the only reason why a business's profits declined.

Further, Dr. Simons admits that he did not attempt to determine the contribution of VNA's alleged negligence to any business losses. Ex. 40, Simons Dep. 65:4-13. His opinion thus does not provide a method for determining causation as to VNA. And without such a method, class certification is not appropriate. *See Andrews v. Plains All Am. Pipeline, L.P.*, 777 F. App'x 889, 892 (9th Cir. 2019) (reversing grant of class certification because economic injury required individualized inquiries).

Cost of buying bottled water or water filters and water bills. Each class member claiming economic injury from buying bottled water or water filters or paying water bills must show that he or she would not have suffered those injuries but for VNA's alleged negligence. That showing will vary depending on when the class member bought bottled water or water filters or paid a water bill in relation to VNA's actions.

For example, Plaintiffs contend that VNA was negligent in failing to recommend that the City return to Detroit water. Ex. 37, Russell Dep. 256:15-19. Assuming that the City would have followed such a recommendation (despite the City expressly instructing VNA not to make that recommendation and the Emergency Manager refusing to make the switch when it was recommended by the City Council), it would have taken time for the City to make the switch. VNA's actions could not have been a but-for cause of any purchases of bottled water or water filters or any payments of water bills in the period before the City could have switched back to Detroit water. Accordingly, even determining causation for buying bottled water or paying water bills will require individualized inquiries.

Plaintiffs do not propose any class-wide method for determining but-for causation for economic injuries attributable to VNA. Their expert, Dr. Keiser, assumes that all purchases of bottled water or water filters during the class period were due to the problems with Flint water and that all water bills during the class

period were for valueless water. Keiser Report 24-28, PageID.37503-37507. He admits that his methodology does not account for the different actions, at different times, of each defendant. Ex. 39, Keiser Dep. 189:9-193:20.

The highly individualized nature of causation almost always is a reason why courts do not certify classes in mass tort cases. *See Manual for Complex Litigation (Fourth)* § 22.72. This Court in *Widdis v. Marathon Petroleum Co.*, No. 13-cv-12925, 2014 WL 11444248 (E.D. Mich. Nov. 18, 2014), recognized that causation in a mass-contamination case presents significant individualized issues. And that case involved only a single defendant and a single release of allegedly toxic substances, and the plaintiffs "abandoned" their claims for personal injury and property damage. *Id.* at *8.[12] This case is much more complex; causation "would turn on location, exposure, dose, susceptibility to illness, [and] nature of symptoms," and individualized issues would overwhelm any common ones. *Steering Comm. v.*

[12] In *Widdis*, this Court ultimately bifurcated the causation element, reasoning that common questions could be addressed in a first phase and individualized questions in a second phase. 2014 WL 11444248, at *9. The Sixth Circuit called that approach into doubt in its order granting interlocutory review of the class-certification decision. *See* Order at 2, *In re Marathon Petroleum Co.*, No. 14-0110 (6th Cir. Feb. 25, 2015), ECF No. 7-2 ("[T]he district court's . . . bifurcati[on] [of] an essential element of the liability inquiry . . . raises significant questions about whether the resolution of the issues as bifurcated will drive the ultimate resolution of this litigation."). The Sixth Circuit never decided the issue, however, because the case settled. In any event, bifurcation is not appropriate in this case for the reasons discussed below. *See* pp. 111-12, *infra*.

Exxon Mobil Corp., 461 F.3d 598, 602 (5th Cir. 2006). That should preclude class certification. *See, e.g., id.*

D. Plaintiffs Will Need To Prove Proximate Causation On An Individual Basis

Each class member also must prove that VNA's actions proximately caused his or her injuries. That requires showing that VNA's actions—as opposed to the actions of others—were a "substantial factor" in causing the injury, that the injury was foreseeable, and that there was no superseding cause. *See Poe*, 179 Mich. App. at 576-77. Importantly, Plaintiffs do not propose any method for adjudicating those issues of proximate causation on a class-wide basis; they simply ignore those issues.

Whether VNA's actions were a "substantial factor" in causing any class member's injury will be individualized. Many entities and individuals had a role in causing the problems with Flint water. *See, e.g.*, Ex. 2, COF_FED_0043822. Further, although water lead levels rose immediately after the switch to the Flint River, they returned to pre-switch levels by September 2014—five months before VNA arrived in Flint. *See* Ex. 35, Edwards Dep. 253:12-254:14. Thus, a jury reasonably could find that VNA's actions were too attenuated to be a "substantial factor" in causing certain injuries (depending on when the injuries occurred and what actions other actors took around those times). For example, named plaintiff T.W. was born in December 2015, Ex. 62, Williams Dep. 67:21-23—nine months after VNA completed its engagement in Flint, and two months after Governor Snyder

ordered Flint to switch back to Detroit water. A jury thus could find that VNA's actions were too attenuated to be a substantial factor in causing T.W. any injuries. *See Poe*, 179 Mich. App. at 577 (factors to be considered in determining whether a negligent act is a substantial factor in causing an injury include "the lapse of time").

Similarly, whether another's actions should be considered a superseding cause of any particular class member's injury depends on when the class member suffered that injury. For example, in July 2015, the City falsified the results of lead test reports to make it appear that the lead levels in Flint water were within federal limits. *See* Compl. ¶ 273. The State has secured a criminal conviction against one of the responsible officials. *See* Ralph Ellis & Kristina Sgueglia, *Flint City Employee Reaches Plea Agreement In Water Crisis Investigation*, CNN (May 4, 2016), https://www.cnn.com/2016/05/04/us/flint-water-crisis-plea/index.html. A jury reasonably could find that the falsification of test reports constituted an unforeseeable superseding cause as to any injuries after July 2015—so VNA would not be liable for any injuries after that date. *See MacDonald v. PKT, Inc.*, 464 Mich. 322, 334-35 (2001) (a third party's criminal actions generally are not foreseeable, unless the defendant had special knowledge of a likelihood of criminal behavior).

These are just a few examples of the factual circumstances that will determine proximate causation. Unsurprisingly, courts in toxic-tort cases routinely conclude

that proximate causation presents an individualized issue and deny class certification on that basis.[13]

E. Plaintiffs Will Need To Prove The Amount Of Damages On An Individual Basis

Plaintiffs admit that the amount of any class member's damages will necessarily be individualized, at least for personal injuries. *See* Mot. 64, PageID.34501. Although the Sixth Circuit has held that individualized damages issues do not by themselves preclude class certification, *see In re Whirlpool Corp. Front-Loading Washer Prods. Liab. Litig.*, 722 F.3d 838, 854 (6th Cir. 2013), the fact that damages calculations will be individualized and complicated is a factor that weighs against class certification, *see Cruson v. Jackson Nat'l Life Ins.*, 954 F.3d 240, 258 (5th Cir. 2020); *Crutchfield*, 829 F.3d at 378; *Food Lion, LLC v. Dean Foods Co.*, 312 F.R.D. 472, 496 (E.D. Tenn. 2016).

Plaintiffs argue that they can prove property damages and economic losses on a class-wide basis using expert testimony. But that expert testimony is allowed only

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[13] *See, e.g.*, *Gates*, 655 F.3d at 271-72; *Modern Holdings, LLC*, 2018 WL1546355, at *7; *Lankford v. Carnival Corp.*, No. 12-cv-24408, 2014 WL 11878384, at *10 (S.D. Fla. July 25, 2014); *Mays v. TVA*, 274 F.R.D. at 627; *City of St. Petersburg v. Total Containment, Inc.*, 265 F.R.D. 630, 635-36 (S.D. Fla. 2010); *Snow*, 2004 WL 3768120, at *7; *In re Am. Commercial Lines, LLC*, No. 00-cv-252, 2002 WL 1066742, at *13 (E.D. La. May 28, 2002); *Rink v. Cheminova, Inc.*, 203 F.R.D. 648, 666-67 (M.D. Fla. 2001); *Jones v. Allercare, Inc.*, 203 F.R.D. 290, 306 (N.D. Ohio 2001); *O'Connor v. Boeing N. Am, Inc.*, 180 F.R.D. 359, 381 (C.D. Cal. 1997); *Matton v. City of Pittsfield*, 128 F.R.D. 17, 21 (D. Mass. 1989).

if it fits Plaintiffs' theory of liability. The Supreme Court made that point in *Comcast.* In that case, the district court certified a class of more than two million Comcast customers who sued for antitrust violations. *Comcast*, 569 U.S. at 29-30. That court had relied on the testimony of plaintiffs' expert to conclude that damages could be calculated on a class-wide basis. *Id.* at 31-32. The expert calculated an aggregate amount of damages but did not "isolate damages resulting from any one theory of antitrust impact"—even though the district court had allowed the plaintiffs to proceed on only one of their four theories of antitrust impact. *Id.*

The Supreme Court held that the class should not have been certified. *Comcast*, 569 U.S. at 35-38. The Court explained that, if plaintiffs prevailed on the merits of their claims, "they would be entitled only to damages resulting from reduced overbuilder competition, since that is the only theory of antitrust impact accepted for class-action treatment by the District Court." *Id.* at 35. Thus, their expert's model "must measure only those damages attributable to that theory"; "[i]f the model does not even attempt to do that, it cannot possibly establish that damages are susceptible" to class-wide proof. *Id.* Because the expert's model did not do that, it could not be used to prove damages on a class-wide basis, precluding class certification. *Id.* at 37-38.[14]

[14] The Sixth Circuit has suggested that *Comcast* does not apply when putative class plaintiffs propose to bifurcate liability and damages. *See In re Whirlpool*, 722 F.3d

Here, Plaintiffs argue that their experts can prove damages on a class-wide basis for some of their claims, but those experts' opinions do not fit Plaintiffs' theory of liability, because they do not isolate damages attributable to VNA. The experts' opinions thus cannot support class certification under *Comcast*.

Personal injury (only for minors claiming lead-based injuries). Plaintiffs state that "damages suffered by members of the minors subclass will be established using evidence common to the subclass," Mot. 73, PageID.34510 (capitalization altered), but they do not propose any class-wide method for doing so. Plaintiffs' expert, Dr. Hu, proposes a "grid" for converting water lead levels to blood lead levels, and then blood level levels to decrements in IQ. *See* Hu Decl. § 22(b) tbl.1, PageID.35898. But that approach would not work because Plaintiffs do not provide any method for determining water lead levels or blood lead levels, much less increased levels caused by VNA. Ex. 46, Hu Dep. 266:11-271:15. So they have no inputs for the grid.

Anyway, Plaintiffs concede elsewhere in their brief that "the amount of personal injury damages will vary from one Class member to another" and that those

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at 860. That view of *Comcast* is mistaken; the Supreme Court's opinion in *Comcast* did not mention bifurcation or limit its holding to expert testimony on damages. In any event, Plaintiffs do not propose to bifurcate liability and damages for property damage and business losses; they contend that their experts can prove those damages using class-wide methods. Mot. 77-79, PageID.34514-34516; *see* Trial Plan 2, PageID.36065. So at a minimum, Plaintiffs' claims for property damages and business losses must satisfy *Comcast.*

damages will need to be determined on an individual basis. Mot. 64, PageID.34501. They plan to calculate those damages in the second trial phase, which is an individualized phase. *See* Trial Plan 3, PageID.36065.

Costs of remediation. For the costs of remediating residential properties, Plaintiffs' experts make three key assumptions that they apply across all homes in Flint.

- First, they assume that all service lines and interior plumbing must be replaced. *See* Pogorilich Report 5, PageID.37646.
- Second, they estimate the remediation costs for a "prototypical [] single-family detached residential unit" of 1,100 square feet and assume that the actual costs of remediation scale linearly with square footage. Pogorilich Report 6, PageID.37647.
- Third, they assume that all multi-story units would cost 15% more to remediate than single-story homes and that multi-unit buildings would cost 25% more to remediate than single-unit buildings. Pogorilich Report 7-8, PageID.37648-37649.

Plaintiffs' experts never compared their prototype to any actual homes in Flint and thus cannot say that their model describes any plaintiff's home. Ex. 57, Pogorilich Dep. 199:16-201:15; *see* Ex. 55, Butler Decl. ¶ 10.

Actual home inspections in Flint show that all three of the experts' assumptions are flawed.

- First, inspections revealed that service lines and interior plumbing had no detectable damage beyond ordinary wear and tear. Ex. 34, Duquette Report 25.

- Second, Pogorilich is wrong to assume that the costs of remediation do not vary linearly with square footage; in fact, they vary widely based on many factors, including construction, materials, and age of home. Ex. 55, Butler Decl. ¶ 11; Ex. 70, Richmond Decl. ¶¶ 39-40.

- Third, Pogorilich is wrong to assume that multi-story homes and multi-unit buildings would cost 15% and 25% more to remediate than the prototypical home. Ex. 55, Butler Decl. ¶ 18.

  - In fact, a multi-story home may cost less to remediate than a single-story home on a square-foot basis, because (among other reasons) there may not be a bathroom on the second floor. Ex. 55, Butler Decl. ¶ 13.

  - Similarly, a multi-unit building may cost less to remediate than a single-family home on a square-foot basis, because multiple units may share a water heater. Ex. 55, Butler Decl. ¶ 18.

Further, the experts' model does not account for any preexisting damage to service lines or interior plumbing from before the Flint water crisis. Ex. 57, Pogorilich Dep. 261:1-6. So they cannot show that the damages they estimate were caused by the Flint water crisis. *See Strzelecki v. Blaser's Lakeside Indus. of Rice Lake, Inc.*, 133 Mich. App. 191, 194 (1984) (damages must be limited to those caused by the defendant, which in this case was depreciated value, not replacement value). Plaintiffs' experts also do not account for the fact that some properties already have had service lines or interior plumbing replaced, *see, e.g.*, Ex. 71, Carthan Dep. 91:2-7, so their owners would not be entitled to any additional damages.

Even if Plaintiffs' remediation estimates were reliable, VNA would want to dispute those estimates using individualized home inspections and testimony. That

evidence would show that the cost of remediating individual homes varies dramatically from Plaintiffs' experts' estimates, and the jury would be required to resolve that factual dispute. *See* Ex. 55, Butler Decl. ¶ 11. Plaintiffs' proposed method thus would not avoid the need for individualized damages assessments. *Fisher v. Ciba Specialty Chems. Corp.*, 238 F.R.D. 273, 308 (S.D. Ala. 2006).[15]

Finally, Plaintiffs' experts do not offer any way to isolate the effects of VNA's conduct on the plumbing in Flint. The experts' model estimates the costs of remediation for all damage due to the Flint water crisis. But VNA came to Flint only in February 2015, many months after the City switched to Flint River water in April 2014. According to Plaintiffs' expert, Dr. Russell, exposure to Flint River water would have started causing damage to service lines and interior plumbing shortly after the switch—well before VNA arrived in Flint. Ex. 37, Russell Dep. 227:2-17. If that is true, to recover against VNA, Plaintiffs would have to show that additional damage occurred after VNA began its engagement, and that the additional damage is attributable to VNA. But their experts' model "does not even attempt to do that." *Comcast*, 569 U.S. at 38. In fact, Dr. Russell admits that he cannot identify when any corrosion damage occurred. Ex. 37, Russell Dep. 329:4-330:22. Because Plaintiffs' experts' model for property damages does not "measure only those

[15] *See, e.g.*, *Mays v. TVA*, 274 F.R.D. at 627; *Church v. Gen. Elec. Co.*, 138 F. Supp. 2d 169, 182 (D. Mass 2001); *Thomas v. FAG Bearings Corp. Inc.*, 846 F. Supp. 1400, 1404 (W.D. Mo. 1994).

damages attributable to" VNA, Plaintiffs "cannot possibly establish" that their claims against VNA for property damage "are susceptible of measurement across the entire class." *Comcast*, 569 U.S. at 35.

Diminution in property value. Plaintiffs' proposed method for estimating diminution in property values also does not eliminate the need for individualized evidence. Plaintiffs' expert, Dr. Keiser, estimates that all properties in Flint lost 26% in value between April 2014 and June 2017 as a result of the Flint water crisis. Keiser Report 48, PageID.37527.

Plaintiffs assume that each property in the City was affected in the same way, without taking into account the individual characteristics of any property. *See* Keiser Report 33-38, PageID.37512-37517. But professional valuations of individual homes show great variability, depending on the neighborhood and the condition of the property—including whether the property has had its pipes replaced. Ex. 39, Keiser Dep. 116:19-119:20, 127:2-24. And when that type of property-specific evidence is needed to establish diminution in property values, courts regularly refuse to certify classes because the issues are too individualized. *See, e.g.*, *Ebert v. Gen. Mills, Inc.*, 823 F.3d 472, 479-80 (8th Cir. 2016) (reversing grant of class certification in a mass-contamination case because plaintiffs would have to prove diminution in property values on an individual basis); *Cannon*, 2013 WL 5514284, at *15 (denying class certification because plaintiffs would have to present

individual appraisals for each property to quantify diminution in property values); *LaBauve v. Olin Corp.*, 231 F.R.D. 632, 676-78 (S.D. Ala. 2005) (denying class certification in part because assessing diminution in property values "will be fraught with peril, and will hinge on property-specific determinations").

Dr. Keiser's opinion also flunks *Comcast*. It claims to account for "*all* relevant damages from the Flint water contamination," without proposing any way to quantify damages due to VNA's actions. Keiser Report 53, PageID.37530 (emphasis added).

Economic losses. Plaintiffs' damages expert, Dr. Simons, estimates lost business profits for companies in 26 industry subsectors that he states were negatively affected by the Flint water crisis. *See* Simons Report 19, PageID.36154. His method for selecting those industry subsectors is unscientific and unsupported—essentially, he assumed that some sectors must have been affected by the Flint water crisis, and picked the subsectors that appeared to him to have been most likely to have suffered losses. *See* Ex. 60, Edelstein Decl. ¶¶ 42-51. He then assumed that every business that closed or experienced revenue declines in those subsectors between 2014 and 2018 did so solely because of the Flint water crisis. *See* Ex. 40, Simons Dep. 243:24-244:8. Those assumptions are implausible; during that four-year period many national, regional, industry, and business-specific factors would have contributed to any losses. *See* Ex. 60, Edelstein Decl. ¶¶ 34-41.

Further, that approach does not account for businesses, like named plaintiff 635 S Saginaw LLC, that [redacted]—according to Dr. Simons's analysis, those businesses did not suffer lost profits. *See* Ex. 61, Murphy Dep. 96:4-14. And it does not include any method for allocating damages specifically caused by VNA during its limited engagement in Flint.

For the cost of buying bottled water or water filters, Plaintiffs' expert Dr. Keiser proposes to calculate only aggregate, city-wide estimates. *See* Keiser Report 23-24, 28, PageID.37502-37503, 37507. But some people got their water for free, and different class members used different amounts of water. *Compare* Ex. 44, D. Davis Dep. 56:13-19, 76:9-77:4 (named plaintiff Darrell Davis testified that he used bottled water for drinking, cooking, doing laundry and dishes, and bathing starting in 2014), *with* Ex. 62, Williams Dep. 115:10-12 (named plaintiff Tiantha Williams testified that she drank bottled water starting in December 2015). Dr. Keiser's calculations are not specific to any individual plaintiff—or the actions of any defendant.

Plaintiffs may not use the short-cut of calculating aggregate damages and then dividing that amount by the number of plaintiffs. *See McLaughlin v. Am. Tobacco Co.*, 522 F.3d 215, 232 (2d Cir. 2008) (top-down method of calculating aggregated damages and then allocating them across class members would violate due process

because it deprives the defendant of "the right . . . to challenge the allegations of individual [class members]"), *abrogated on other grounds by Bridge v. Phoenix Bond & Indem. Co.*, 553 U.S. 639 (2008); *see also Bayshore Ford Truck v. Ford Motor Co.*, Civil Action No. 99-741, 2010 WL 415329, at *12 (D.N.J. Jan. 29, 2010) ("[A] common class-wide method may not be used to short cut the requirement of individual damage proof.").

Complicated, individualized damages inquiries will be a significant part of any Flint water litigation. That fact weighs against class certification. *Parkhurst*, 2013 D.C. Super. Lexis 4, at *39-*40.

F. A Jury Will Need To Allocate Fault Among Defendants And Non-Parties On An Individual Basis

The need to allocate fault in this case also presents individualized issues. Under Michigan's comparative-fault regime, the jury must allocate fault among all parties and non-parties. *See* Mich. Comp. Laws § 600.2957(1); *Jones v. Enertel, Inc.*, 254 Mich. App. 432, 434 (2002). As a consequence, each defendant will put on evidence to establish the relative fault of other defendants and non-parties. *See Wall v. Cherrydale Farms, Inc.*, 9 F. Supp. 2d 784, 785-86 (E.D. Mich. 1998). This case is unique because of the many government actors and other parties involved; Plaintiffs sued 27 defendants, and there are other relevant actors who are not defendants (because of immunity or other reasons). *See generally* VNA Notice of Nonparties at Fault, ECF No. 1313, PageID.39934.

The allocation of fault among defendants and non-parties in this case will vary for each class member because class members used Flint water at different times and to different extents. Each defendant and non-party took different actions at different times during the proposed class period. The relative fault of the defendants and non-parties therefore is different at each point during the class period. For example, the allocation of fault for personal injuries would be very different depending on whether the injuries occurred in September 2015 (by which time the City had falsified lead test reports, at the MDEQ's direction, Ex. 11, Glasgow Dep. 722:15-725:9, and the EPA had learned of Flint's problems, Ex. 72, Del Toral Dep. 81:7-15), as opposed to in March 2015 (when the City first learned of elevated lead levels in Leanne Walters's home, Ex. 24, CROFT-0000000125).

At trial, VNA would present evidence and argument to show that the jury should allocate to it only a small degree of fault (if any) for each class member's damages. VNA would question each class member about when and how he or she used Flint water, to determine whether it could possibly be held liable for the claimed injuries. Courts in similar situations routinely conclude that those types of individualized questions about comparative fault "pose[] an almost insurmountable obstacle to certification of any liability issue." *Rink v. Cheminova, Inc.*, 203 F.R.D. 648, 652 (M.D. Fla. 2001) (discussing Florida's comparative-fault system, which is

broadly comparable to Michigan's system).[16] That is another reason why one large class action does not make sense here.

G. Those Individualized Issues Mean That Plaintiffs Cannot Satisfy Rule 23

Because of those individualized issues, Plaintiffs' proposed damages classes do not meet the commonality, typicality, or adequacy prerequisites of Rule 23(a), much less the more demanding predominance requirement of Rule 23(b)(3).

1. The Proposed Classes Do Not Meet The Commonality, Typicality, And Adequacy Of Representation Requirements Of Rule 23(a)

Commonality. Plaintiffs identify two sets of allegedly common questions, but neither is truly common. Plaintiffs assert that the common questions are whether VNA owed a duty of care to the class and whether VNA breached that duty and contributed to the Flint water crisis. *See* Mot. 59-60, 62, PageID.34496-34497, 34499. But some members of the class left Flint or stopped using Flint water before VNA arrived in Flint. Because those class members cannot have claims against VNA, the questions Plaintiffs identify are not common to the entire class. *See Wal-*

[16] *See, e.g.*, *Rivers v. Chalmette Med. Ctr., Inc.*, Civil Action No. 06-8519, 2010 WL 2428662, at *9 (E.D. La. June 4, 2010); *Kelecseny v. Chevron, U.S.A., Inc.*, 262 F.R.D. 660, 675 (S.D. Fla. 2009); *Duncan v. Nw. Airlines, Inc.*, 203 F.R.D. 601, 614 & nn.14-16 (W.D. Wash. 2001) (applying Michigan law); *Neely v. Ethicon, Inc.*, Nos. 00-CV-00569 et al., 2001 WL 1090204, at *11 (E.D. Tex. Aug. 15, 2001); *see also Engle v. Liggett Grp., Inc.*, 945 So. 2d 1246, 1268 (Fla. 2006) (affirming decertification under state class-certification rules, which mirror federal Rule 23).

Mart, 564 U.S. at 350 (common question is one whose resolution "will resolve an issue that is central to the validity of each one of the claims in one stroke"). And determining *which* class members have those claims would require individualized inquiries into each person's circumstances.

Plaintiffs cite two mass-tort cases in which the courts found common questions. But both involved only a single defendant, a single course of conduct by that defendant, and a limited set of plaintiffs who were all affected by the defendant's conduct at the same time and in the same way. *See Widdis*, 2014 WL 11444248, at *1-*4 (cited at Mot. 36-37, PageID.34473-34474) (explosion at a petroleum facility leading to the evacuation of the homes around the facility); *Collins v. Olin Corp.*, 248 F.R.D. 95, 99-100 (D. Conn. 2008) (cited at Mot. 37, PageID.34474) (landfill owner dumped industrial waste that leaked into the surrounding areas).

This case is nothing like *Widdis* or *Collins*. Here, there are multiple defendants and non-parties (including officials in the Governor's Office, MDEQ, MDHHS, the federal EPA, the Emergency Managers, and the City), each of whom took different actions over the course of multiple years. Further, each class member's allegations of harm will differ based on when the class member arrived in or left Flint, where and when the class member drank Flint water, and the type and condition of the service lines and interior plumbing of the class member's home, school, workplace, or business. In this type of "complex, mass, toxic tort" case for

which there is "no single proximate cause [that] appl[ies] equally to each potential class member," there is no commonality. *Modern Holdings, LLC v. Corning, Inc.*, Civil Action No. 13-cv-405, 2018 WL1546355, at *7 (E.D. Ky. Mar. 29, 2018); *see, e.g.*, *Paternostro v. Choice Int'l Servs. Corp.*, 309 F.R.D. 397, 403 (E.D. La. 2015); *Noonan v. Ind. Gaming Co.*, 217 F.R.D. 392, 396-97 (E.D. Ky. 2003).

Typicality. Because each plaintiff's claims depend heavily on individualized issues, the named plaintiffs' claims are not typical of the absent class members' claims. To meet the typicality requirement, the named plaintiffs must advance the "same legal theor[ies]" as the absent class members, *In re Am. Med. Sys., Inc.*, 75 F.3d 1069, 1082 (6th Cir. 1996), and must not present "unique facts," *Nguyen v. Nissan N. Am., Inc.*, No. 16-CV-05591, 2020 WL 5517261, at *11 (N.D. Cal. Sept. 13, 2020). "The premise of the typicality requirement is simply stated: as goes the claim of the named plaintiff, so go the claims of the class." *Sprague v. Gen. Motors Corp.*, 133 F.3d 388, 399 (6th Cir. 1998).

Here, there is no "typical" Flint plaintiff. Plaintiffs seek to bring claims based on exposure to allegedly toxic substances, such as TTHMs and *E. coli* bacteria, that no named plaintiff alleges. *See* Mot. 64, PageID.34501. Even for claims for personal injuries based on exposure to lead, property damage, or business loss, which some named plaintiffs allege, resolving those plaintiffs' claims would not resolve any other class member's claims. That is because whether, when, how, and

to what extent each defendant's actions caused any plaintiff any injury will depend on the unique circumstances of that plaintiff.

For example, for claims for personal injury, six of the named plaintiffs (Carthan, Barbara and Darrell Davis, Kelso, K.E.K., and David Munoz) stopped drinking Flint water before VNA began its limited engagement in Flint. *See* Ex. 71, Carthan Dep. 31:9-24; Ex. 44, D. Davis Dep. 56:4-19; Ex. 54, Kelso Dep. 17:21-18:3; Ex. 73, Munoz Dep. 21:12-21. Those plaintiffs include all of the proposed representatives for the principal class. *See* Mot. 38, PageID.34475 (representatives of the principal class are Kelso, K.E.K., and the Davises). So those plaintiffs' claims against VNA would be limited to injuries from bathing or doing laundry, which involve only incidental ingestion of water. Those plaintiffs' claims thus are not typical of the claims of absent class members who continued regularly drinking Flint water during and after VNA's engagement in Flint.

Similarly, for claims for property damage, one of the proposed representatives is Carthan, but her pipes were all replaced at no cost to her in March 2016. Ex. 71, Carthan Dep. 91:2-7. Her claims thus are not typical of the claims of property owners who have not had their pipes replaced.

And for claims for lost business profits, Plaintiffs' proposed representatives are not typical of all businesses. Two of the three named plaintiffs (635 S. Saginaw LLC and Neil Helmkay) owned restaurants that used Flint water to prepare their

food; they allege that they lost business because diners were wary of eating food prepared with Flint water. Ex. 61, Murphy Dep. 75:5-14; Ex. 74, Helmkay Dep. 71:11-14. The third proposed representative (Frances Gilcreast) owned a business that owns and manages rental properties; she alleges that her business lost money because the problems with Flint water caused her renters to leave Flint. Ex. 75, Gilcreast Dep. 124:5-13. But other businesses that Dr. Simons asserts lost profits include hardware stores, insurance agents, funeral homes, and clothing retailers, Simons Report 17, PageID.36152—very different businesses that would not have been affected the same way as a restaurant or a rental-property manager.

Courts routinely find typicality lacking when each plaintiff's claim depends on "individualized issues," particularly issues regarding "causation." *In re OnStar Contract Litig.*, 278 F.R.D. 352, 375 (E.D. Mich. 2011); *see, e.g.*, *Stout v. J.D. Byrider*, 228 F.3d 709, 717 (6th Cir. 2000) (because there were significant "discrepancies between Plaintiffs and the ostensible class members," typicality was not established). For example, in *Mays v. TVA*, a mass-contamination case involving the release of coal ash onto neighboring properties, the court held that no class member's claims were typical of any other class member's claims because "the analysis . . . will turn primarily on individualized inquiries into how the coal ash affected" each class member. 274 F.R.D. at 625. That is true here for every theory of harm Plaintiffs assert.

Adequacy of representation. The lack of typicality also means that the proposed class representatives are not adequate representatives of the absent class members. "The adequate representation requirement overlaps with the typicality requirement because in the absence of typical claims, the class representative has no incentives to pursue the claims of the other class members." *In re Am. Med. Sys.*, 75 F.3d at 1083 (citing Fed. R. Civ. P. 23(a)(4)). Where, as here, the proposed representatives' claims are not typical of the absent class members' claims, the proposed representatives would not be adequate class representatives. *See, e.g.*, *Noonan*, 217 F.R.D. at 398.

Plaintiffs ignore the highly individualized nature of each class member's claims. They argue only that the named plaintiffs will "vigorously prosecute" the case and that the named plaintiffs' interests are not "antagonistic" to the interests of the absent class members. Mot. 43-45, PageID.34480-34482. The problem is that, in prosecuting their own claims, the named plaintiffs will not vindicate the claims of absent class members because the named plaintiffs just do not have certain facts in their cases. *See, e.g.*, *Modern Holdings, LLC v. Corning, Inc.*, Civil Action No. 13-cv-405, 2018 WL 1546355, at *10 (E.D. Ky. Mar. 29, 2018) ("The named Plaintiffs cannot be adequate representatives of the class when they do not suffer from the injuries complained of.").

2. The Proposed Classes Do Not Meet The Predominance Requirement Of Rule 23(b)(3)

Even if there were one or two common questions, those questions would not predominate over the extensive individualized inquiries needed to adjudicate each Plaintiff's professional negligence claim against VNA.

The thrust of Plaintiffs' argument is that their proposed class action satisfies the predominance requirement because their claims arise from a common course of conduct by VNA that allegedly caused community-wide problems. *See* Mot. 59-63, PageID.34496-34500. But the "community" as a whole does not allege claims against VNA; individual residents and businesses do. It is not enough to allege abstract, community-wide problems; Plaintiffs must prove liability at the individual level, for each individual resident's or business's specific injuries. And VNA must be permitted to present its defenses at that individual level, just as it would in a case involving a single plaintiff.

Usually, common issues predominate only when resolving those issues would entirely resolve liability class-wide. *See In re Whirlpool*, 722 F.3d at 860 ("[L]iability issues relating to injury must be susceptible of proof on a classwide basis to meet the predominance standard."); *Randleman v. Fid. Nat'l Title Ins.*, 646 F.3d 347, 353-54 (6th Cir. 2011) (because "liability . . . [could] only be determined on an individual basis," common issues did not predominate). Here, Plaintiffs

cannot come close to establishing liability on a class-wide basis. The claims of their proposed classes are too broad and too disparate for that.

The *Parkhurst* case is particularly instructive, because the claims were similar to those here. Residents of the District of Columbia alleged that the District's change in its corrosion controls caused lead to leach out of pipes and fittings and into the residents' drinking water. *Parkhurst*, 2013 D.C. Super. Lexis 4, at *3-*4. The residents sought to certify a class of minors who consumed that water under the District's version of Rule 23(b)(3), *id.* at *12, which "parallels" federal Rule 23(b)(3), *Jones v. District of Columbia*, 996 A.2d 834, 846 (D.C. 2010).

The court denied class certification because individualized issues regarding injury, causation, and damages predominated over common issues. *Parkhurst*, 2013 D.C. Super. Lexis 4, at *38-*40 (citing *Amchem*, 525 U.S. at 624). The court explained that injury would vary for each class member, because "some class members suffer no physical injury, while others suffer from significant cognitive or behavior problems." *Id.* at *38. The court further explained that causation would be individualized, because "different class members were exposed to . . . different amounts of lead, for different amounts of time, in different ways, and over different periods." *Id.* The class members also would need to account for "different sources" of lead other than the water, as well as "factors other than lead" that can cause the same injuries as lead, which would vary by class member. *Id.* at *39. And the court

explained that "[d]amages issues are also individualized." *Id.* The court concluded that those individualized issues predominated over the few common questions related to the District's liability, precluding class certification under Rule 23(b)(3). *Id.* at *42.

This case is even more complex than *Parkhust*, and it presents even more individualized issues. The plaintiffs in *Parkhurst* were minors who sought to recover only for physical injury from lead exposure, from only one defendant. This case involves claims by adult plaintiffs, minors, and businesses, for physical injury, property damage, and economic losses, from multiple toxic agents, against multiple defendants who acted at different times. Class certification therefore is even less appropriate here than it was in *Parkhurst*.

Resolving the allegedly common questions would take up a very small part of a class trial. That trial instead would be overwhelmed by individualized issues on injury, causation, damages, and allocation of fault—each of which courts have found sufficient to deny class certification.

Injury. First, the jury would need to decide whether each class member suffered a cognizable injury. For claims for personal injuries, each class member would testify as to his or her alleged injuries and introduce medical records and diagnoses. VNA, for its part, would introduce rebuttal medical records and expert testimony. For claims for property damages, each class member would testify as to

the condition of the property and introduce documentary evidence and professional assessments. VNA would introduce its own documentary evidence and professional assessments. And for claims for lost business profits, each class member would testify as to the performance of the business and introduce expert evidence, and VNA would introduce its own documentary evidence and professional assessments. All of that precludes class certification; "[c]ommon questions of fact cannot predominate where there exists no reliable means of proving classwide injury in fact." *In re Rail Freight Fuel Surcharge Antitrust Litig.*, 725 F.3d at 252-53.

But-for causation for personal injury. Next, the jury would need to decide whether VNA caused each class member's injury. For claims for personal injury, each class member would need to testify as to his or her water use and introduce medical test results, results of property inspections, and expert testimony, to establish that VNA's alleged negligence caused additional exposure, and that the additional exposure could and did cause the class member's injuries. For lead claims, the class member would have to prove an incremental exposure above his or her preexisting lead exposure. VNA would introduce its own fact-witness testimony, medical test results, results of property inspections, and expert testimony to establish that its actions did not cause additional exposure or harm to the class member. Those issues also would be too individualized for class certification. *See, e.g.*, *Rowe*, 2008 WL 5412912, at *14-*15 (denying class certification in a toxic-tort

case because "the element of significant exposure is fraught with individualized issues"); *Fulford*, 2004 WL 1208513, at *3 (denying class certification in a toxic-tort case because determining the source of each class member's exposure "will be a highly individualized issue").

But-for causation for property damage. For claims for property damage, each class member would need to testify as to his or her water use and introduce documentary and expert evidence to establish that VNA's actions (and not some other cause) damaged his or her property. VNA would introduce its own documentary and expert evidence in its defense. Again, establishing causation for property damages would be too individualized for class certification. *See, e.g.*, *Crutchfield*, 829 F.3d at 377 (affirming denial of class certification because determining the cause of property damage required individualized analysis).

But-for causation for economic losses. For claims for economic losses such as lost business profits, each class member would need to testify as to the operations and performance of the business during the Flint water crisis and introduce documentary and expert evidence in an effort to establish that the business lost profits due to VNA's alleged negligence and not some other source. VNA would introduce its own documentary and expert evidence to establish that it did not cause lost profits. The need to establish causation for economic losses on an individual basis also precludes class certification. *See, e.g.*, *Andrews*, 777 F. App'x at 892

(reversing grant of class certification because determining economic injury required individualized inquiries).

Proximate causation. The jury then would need to determine whether VNA's actions proximately caused each class member's injuries. Each class member would have to introduce fact-witness testimony, documentary evidence, and expert testimony to establish that VNA's actions were a substantial factor contributing to the harm, that the harm was foreseeable, and that it is reasonable to hold VNA liable for that harm. VNA would introduce its own fact-witness testimony, documentary evidence, and expert testimony to establish that its actions were insubstantial compared to the actions of others; that others' actions were superseding causes that cut off VNA's liability; or both. Courts do not certify classes because of those types of individualized issues of proximate causation. *See, e.g.*, *Sterling*, 855 F.2d at 1197 (class certification is not appropriate when "no single proximate cause equally applies to each potential class member and each defendant").

Damages. The jury would then have to determine the extent of each class member's damages. The class member would need to introduce documentary evidence and expert testimony in an attempt to quantify the amount of harm. VNA would introduce its own documentary evidence and expert testimony to rebut the class member's damages estimate. "Predominance . . . may be destroyed solely by the complexity of determining damages." *Food Lion, LLC*, 312 F.R.D. at 496.

Allocation of fault. Finally, the jury would allocate fault across all defendants and non-parties. VNA would introduce fact-witness testimony, documentary evidence, and expert testimony establishing the contribution of others' actions to the class member's injuries. The individualized nature of comparative-fault analysis "poses an almost insurmountable obstacle to certification of any liability issue." *Rink*, 203 F.R.D. at 652.

Plaintiffs' response to all of those individualized issues is that they can use their experts to establish liability class-wide. But all of their experts' opinions are based on assumptions and hypotheticals, not actual plaintiff-specific evidence. Moreover, nearly all of their assumptions and hypotheticals are implausible or have already been disproven. The many flaws with Plaintiffs' proposed approach are catalogued above. *See* pp. 35-43, 45-52, 64-66, 68-69, 71-73, 78, 79-84, *supra*.

But even if the Court allowed the experts' testimony, Plaintiffs still could not avoid individualized adjudication. Their experts do not cover every type of injury that Plaintiffs allege—they cover only lead injuries in minors, property damages, and economic losses. And for the injuries they do cover, they do not attempt to link any injuries to VNA's actions specifically. So to complete their cases in chief against VNA, Plaintiffs would need to present individualized evidence for each class member.

At the end of the day, a class trial in this case would quickly degenerate into a series of individual trials. Nearly all of the key issues would be individualized, and nearly all of the time at trial would be spent on those issues. Plaintiffs do not identify a single case as complex as this one in which a court certified a damages class under Rule 23(b)(3). The Court should not certify the proposed classes here, because there is just no way that common issues would predominate over individual ones at the class trial.

II. A Class Action Is Not The Superior Method Of Adjudicating These Cases, Precluding Certification Under The Superiority Requirement Of Rule 23(b)(3)

Certification of damages classes is unwarranted for the independent reason that a class action is not the superior method for adjudicating these claims, especially in light of the ongoing bellwether process. *See* Fed. R. Civ. P. 23(b)(3).

A. A Class Action Is Not Superior To Individual Adjudication Using The Bellwether Process

A class action is not the superior method for adjudicating these cases because of the highly individualized nature of Plaintiffs' claims. When a class trial would necessarily devolve into a series of individualized adjudications, a class action is not superior to individual adjudication. *See, e.g.*, *Sandusky Wellness Ctr.*, 863 F.3d at 472; *Williams v. Mohawk Indus., Inc.*, 568 F.3d 1350, 1355 (11th Cir. 2009).

That is especially true here because the Court has established a bellwether process for adjudicating claims on an individual basis. That process already is far

ahead of the proceedings in this putative class action, so as a practical matter there is little to be gained by class adjudication. The bellwether process also will be fair to all the parties—both plaintiffs and defendants will be able to fully litigate their claims and defenses.

The bellwether process is a viable alternative to the proposed class action. In many cases in which plaintiffs seek to certify a class action, there would be no practical way for class members to litigate their claims without a class action. *See Beattie v. CenturyTel, Inc.*, 511 F.3d 554, 567 (6th Cir. 2007). Usually that is because an individual class member's potential recovery is too small for the class member to have the incentive to bring an individual lawsuit. *See id.* Courts in those cases thus may conclude that a class action is the superior method of adjudicating the claims because there is no practical alternative. *See* 2 *Newberg on Class Actions* § 4:87 (5th ed. 2020).

But in this case, tens of thousands of individual plaintiffs have filed suit, and the Court has established a robust bellwether process to manage and adjudicate those claims. In this case, therefore, there already is a viable method available for adjudicating individual claims.

The bellwether trials will be both fair and manageable. The parties in the bellwether trials will submit individualized evidence bearing on exposure, causation, injury, and damages, such as comprehensive medical examinations and home

inspections, as to each claimed toxic agent. The bellwether plaintiffs will not be restricted to the type of hypothetical evidence Plaintiffs propose for a class trial, or be limited to seeking only the types of damages Plaintiffs seek to recover in this class action. Then VNA will be able to raise all of its defenses to each individual's claims. *See Wal-Mart*, 564 U.S. at 367 (defendants must be able to litigate their "defenses to individual claims"). For example, VNA will present evidence that the particular plaintiff stopped drinking Flint water before VNA's arrival in Flint, and that there are alternative causes for the plaintiff's claimed injuries. In contrast, when VNA presents those individual defenses in the class trial, the process will morph into an unmanageable morass of individualized trials. For those reasons, "at least two Courts of Appeal[s] have found that a bellwether trial may be superior to other forms of adjudication without violating any party's substantive or procedural due process rights." *In re Methyl Tertiary Butyl Ether (MBTE) Prods.*, No. 1:00-1898, MDL 1358, 2007 WL 1791528, at *2 (S.D.N.Y. June 15, 2007) (citing *Hilao v. Estate of Marcos*, 103 F.3d 767, 771 (9th Cir. 1996), and *In re Chevron U.S.A., Inc.*, 109 F.3d 1016, 1017 (5th Cir. 1997)).

The bellwether process will be more efficient than a class action at resolving Plaintiffs' claims. The earliest the Court would be in a position to *start* any class trial would be some time in 2022. At that point, the Court may have completed some or all of the trials for the first bellwether group (minors with claims for injuries

caused by lead), and started the trials for the second bellwether group (adults with claims for personal injury and property damage). Those trials will provide the parties with important insights about the relative strengths and weaknesses of their positions, helping them decide which cases to continue to pursue individually, and which cases to narrow, settle, or abandon.

Further, each bellwether trial will fully resolve the bellwether plaintiffs' claims against all non-settling defendants, on all issues, including the allocation of fault. Plaintiffs' proposed class trial, in contrast, will not resolve any class member's claims. At best, it will answer a handful of common questions, leaving nearly all of the hard work (on exposure, causation, injury, damages, and allocation of fault) to extensive individualized phases.

Those individualized inquiries likely would stretch years into the future. In fact, Plaintiffs do not propose starting the damages phase for the minors subclass until after a class trial on liability and after all minors have undergone a medical evaluation and treatment program to determine their injuries. *See* Trial Plan 3, PageID.36065. Simply put, a class action in this case would not be superior to individual adjudication through the bellwether process.

B. The Rule 23(b)(3) Superiority Factors All Weigh Against Certification

Consideration of the four Rule 23(b)(3) superiority factors confirms that this case is not suited for class adjudication. The factors are "(A) the class members'

interests in individually controlling the prosecution or defense of separate actions; (B) the extent and nature of any litigation concerning the controversy already begun by or against class members; (C) the desirability or undesirability of concentrating the litigation of the claims in the particular forum; and (D) the likely difficulties in managing a class action." Fed. R. Civ. P. 23(b)(2). None favors certification.

Interest in individual control. Courts consider a variety of factors when determining whether individual plaintiffs are likely to want to control their own cases, including the number of individual suits that have already been filed, the nature of each individual's claims, and the size of those claims. *See* 2 *Newberg on Class Actions* § 4:69. All of them cut against class certification here.

First, tens of thousands of individual suits already have been filed. When a substantial number of potential class members have brought individual actions, "[i]t is proper to infer . . . that many potential class members prefer to maintain separate actions." *Abby v. City of Detroit*, 218 F.R.D. 544, 549 (E.D. Mich. 2003); *see* 1 *McLaughlin on Class Actions* § 5:65 ("The existence of separate individual actions is the most clear-cut evidence of the interest of class members in individually controlling separate actions."). The tens of thousands of individual suits here are many more than the numbers that courts have held is enough to show that "potential class members prefer to 'go it alone.'" *Taylor v. CSX Transp., Inc.*, 264 F.R.D. 281, 296 (N.D. Ohio 2007) (73 individual suits); *see Abby*, 218 F.R.D. at 549 (over 100

individual suits). That confirms that individual plaintiffs want to control their own cases, and also that any efficiency gains from a class action would be minimal. *See* 1 *McLaughlin on Class Actions* § 5:64 ("If significant opt-outs seem likely, class certification makes little sense, as the efficiencies achieved by class litigation vanish.").

Second, the nature of plaintiffs' claims indicates that class members have an interest in controlling the litigation individually. The interest in individual control is strongest in cases involving a high degree of emotional involvement, such as claims for personal injuries or claims for damage to real property (as opposed to claims involving purely economic damages), because those injuries "are more central to [plaintiffs'] lives." 2 *Newberg on Class Actions* § 4:69; *see, e.g.*, *Lehocky v. Tidel Techs., Inc.*, 220 F.R.D. 491, 510 (S.D. Tex. 2004). These cases involve claims for personal injuries (including personal injuries of minors) in addition to claims for property damage to plaintiffs' homes. The "emotional stake[s]" thus weigh against class certification. *Abby*, 218 F.R.D. at 549-50 (internal quotation marks omitted).

Third, the size of each class member's claim also indicates that class members would want to control their own cases. *See In re Whirlpool*, 722 F.3d at 861. Here, class members allege claims for personal injuries that they likely value in the millions of dollars (such as neurological damages to minors). *See, e.g.*, *Bravo v.*

United States, 532 F.3d 1154, 1162 (11th Cir. 2008). And Plaintiffs claim sizeable property damages and business losses as well. *See* Gamble Report 38-506, PageID.36228-36696; Ex. 76, Simons Suppl. Report 11.

Further, the incremental cost for any individual plaintiff to bring suit is lower than in a typical individual action. Under the coordinated case management order, all discovery is shared across all cases, so no individual plaintiff has to depose all witnesses. *See generally* Fifth Am. Case Management Order, ECF No. 1255, PageID.39264-39355. The Court also adopted a common set of pleadings for the individual cases, which simplifies individual complaints. *See generally* Am. Master Long Form Compl., *Walters v. Snyder*, 5:17-cv-10164 ECF No. 185-2, PageID.5042-5248.

Plaintiffs assert that the costs of prosecuting an individual action in these cases outweigh any potential recovery. *See* Mot. 81-82, PageID.34518. But tens of thousands of individual plaintiffs already have disproven that argument—they already have filed suit, and they have engaged in discovery under the efficient procedures adopted by the Court. Plaintiffs argue that the Court should disregard those actions because many of them involve a large number of plaintiffs, which Plaintiffs contend shows that some type of collective action is needed. *Id.* at 82 n.226. But the existence of the individual actions proves that it *is* feasible to bring individual cases without class certification.

Plaintiffs also assert that the "vast majority" of minors have not brought individual suits, which Plaintiffs contend is because of the cost. Suppl. Br. 2-3, PageID.41430-41431. That is just speculation. The minors who have not brought individual suits may not have viable claims. And those minors who do have viable claims may be waiting until they turn 18 so that they can litigate their claims themselves, as Michigan law allows. *See* Mich. Comp. Laws § 600.5851(1) (extending the statute of limitations for most civil cases involving a minor to one year after the minor's 18th birthday). The fact that thousands of minors already have filed individual suits shows that it is feasible to litigate their claims without a class action and that many thousands of minors want to proceed that way.

Anyway, even if some individuals' claims might not be large enough to justify an individual action, Plaintiffs' proposed class action would not help those individuals. Plaintiffs have proposed class-wide methods for adjudicating the claims for only the highest-value injuries—lead injury in minors aged 10 and under, property damage, and business loss. They have not explained how their class action would resolve anyone else's claims. So certifying the classes that Plaintiffs propose would not benefit individuals with small-value claims.

Extent and nature of pending litigation. Both the "extent" and the "nature" of the existing Flint water litigation weigh against class certification. Fed. R. Civ. P. 23(b)(2). Tens of thousands of individual suits are pending before this Court and

before Judge Joseph J. Farah in state court. The Sixth Circuit has held that when there are parallel proceedings that would continue regardless of class certification, class certification is not appropriate because there would be few efficiency gains from a class action. *See Vassalle v. Midland Funding LLC*, 708 F.3d 747, 758 (6th Cir. 2013) (reversing class certification in part because there were several parallel proceedings). That is true here.

Class certification also is not appropriate because the individual cases are "at more advanced stages of litigation." *In re Am. Med. Sys.*, 75 F.3d at 1088. "Adding a complex certified class . . . makes little sense" when, as here, the Court has set the briefing schedule for dispositive motions in the individual cases, "[b]ellwether plaintiffs have been selected," and "[t]rial dates are set in the coming months." *In re Digitek Prods. Liab. Litig.*, MDL No. 08-md-01968, 2010 WL 2102330, at *18 (S.D. W. Va. May 25, 2010); *see, e.g.*, *Erlandson v. ConocoPhillips Co.*, No. 09-99, 2010 WL 4292827, at *3 (S.D. Ill. Oct. 21, 2010). In fact, the first bellwether group is so far ahead that the trials for many members of that group could be completed before the class action could be ready to go to trial.

Plaintiffs note that their counsel have been litigating this case for years, but that does not weigh in their favor. *See* Mot. 82-83, PageID.34519-34520. Counsel for individual plaintiffs have been litigating their cases for just as long and have

participated in motion practice, interlocutory appeals, and discovery to the same extent as proposed class counsel.

Desirability of concentrating litigation. This factor assesses both whether there are viable alternatives to class adjudication and whether litigation should be concentrated in this Court. *See* 2 *Newberg on Class Actions* § 4:71. As to the first issue, the bellwether process presents a viable alternative to a class action for the reasons explained. As to the second issue, all of the professional negligence claims against VNA in federal court already are consolidated before this Court, and all new cases will be assigned to this Court. So while VNA agrees that "[t]here is no other federal forum better equipped to preside over the Flint Water Crisis," Mot. 83, PageID.34520, there is no need to certify any classes to keep the claims in this Court.

Manageability. A class action would be unmanageable, in large part because individualized issues would overwhelm common issues. *See, e.g.*, *In re LifeUSA Holding Inc.*, 242 F.3d 136, 148 (3d Cir. 2001) (when common issues do not predominate, "attempting to adjudicate plaintiffs' various claims through a class trial would not only be inordinately time consuming and difficult, but it would impermissibly transgress upon the required standards of fairness and efficiency"). But it also is unmanageable because of the immense complexity of this case, with multiple defendants and a wide variety of claims, theories of harm, and alleged injuries, and particularly difficult issues of damages and allocation of fault. All of

those variations would make a class action unmanageable even if common issues predominate over individualized issues, which they do not. *See, e.g.*, *In re Pac. Fertility Ctr. Litig.*, No. 18-cv-01586, 2020 WL 3432689, at *8 (N.D. Cal. June 23, 2020); *Haley v. Medtronic, Inc.*, 169 F.R.D. 643, 654 (C.D. Cal. 1996).[17]

Plaintiffs' proposed trial plan underscores that a class action would be unmanageable. Plaintiffs propose a three-phased approach, under which all issues for more than 100,000 Flint residents, 35,000 residential properties, and 700 businesses would be litigated in phase one, except for damages for physical injuries for the proposed minors subclass (to be litigated in phase two) and individualized damages for the proposed principal class (to be litigated in phase three). Trial Plan 2-4, PageID.36064-36066. That plan is unrealistic. It ignores the significant complexities of any class trial, including the myriad individualized issues, and VNA's individualized defenses.

For example, Plaintiffs allocate just three weeks for VNA and LAN to put on all of their individualized defenses for every class member on causation, injury, and all damages other than for personal injury. *See* Trial Plan 2, PageID.36064. And

[17] Plaintiffs argue that "the manageability inquiry is a comparative one" and that courts "have disfavored dismissing a class action on manageability grounds." Suppl. Br. 1-2 & 1 n.1 (internal quotation marks omitted). But a class action here would be less manageable than the alternative—individual adjudication using the bellwether process—so a comparative analysis does not help Plaintiffs. *See* pp. 109-12, *supra*. And the manageability problems with Plaintiffs' proposed class action are much more severe and intractable than in the average case.

Plaintiffs propose that phases two and three be decided by "a Special Master, a Court, or through a claims administration proceeding," *id.* at 3, PageID.36065—even though those phases would involve key elements of the professional negligence claims, as to which VNA has a Seventh Amendment right to a jury trial, *see City of Monterey v. Del Monte Dunes at Monterey, Ltd.*, 526 U.S. 687, 709 (1999).

Anyway, no amount of bifurcation would make this class action manageable. Courts regularly refuse to bifurcate claims when there are only a few common issues, since "the jury trial would become but a precursor to a capacious administrative morass where the majority of substantive issues of causality would be resolved on a piecemeal basis." *Presbyterian Church of Sudan v. Talisman Energy, Inc.*, 226 F.R.D. 456, 485 (S.D.N.Y. 2005); *see, e.g.*, *Ebert*, 823 F.3d at 479 (district court cannot "manufacture" predominance by limiting certification to common issues); *Fisher*, 238 F.R.D. at 315 (bifurcating only issues relating to the defendant's conduct "would be chaotic, inefficient and at odds with the principles animating bifurcation in the first place"). That is true here.

Not only would there be limited efficiency gains, there also would be a significant risk that a second jury would reexamine the findings of a first jury in violation of the Seventh Amendment. *See* U.S. Const. amend. VII ("[N]o fact tried by a jury[] shall be otherwise re-examined in any Court of the United States."); *see, e.g.*, *In re MBTE Prods. Liab. Litig.*, 209 F.R.D. 323, 352 (S.D.N.Y. 2002)

(bifurcating the litigation between "generic and specific liability" would violate the Seventh Amendment because of the significant likelihood of "juror confusion and uncertainty").

The risk of re-examination is particularly acute in this case, in which interrelated factual issues cut across several elements. No matter how the Court were to bifurcate the professional negligence claims against VNA, it is likely that much of the same evidence would be presented in more than one phase, "ultimately unravel[ling] and undo[ing] any efficiencies." *Ebert*, 823 F.3d at 479; *see, e.g.*, *In re Pac. Fertility Ctr. Litig*, 2020 WL 3432689, at *6. For example, the jury deciding the allocation of fault at the individualized damages phase likely would need to rehear the evidence about VNA's actions, to determine the comparative fault of all defendants and non-parties. And that jury "would invariably have to reexamine the common evidence of wrongdoing . . . to determine whether any of that wrongdoing aggrieved a particular plaintiff." *Fisher*, 238 F.R.D. at 316.

This case is a paradigmatic example of why courts do not certify damages classes in mass-tort cases. The class members' claims are too disparate and too dependent on individualized issues. And unlike in some other cases, here the bellwether process affords the Court a viable alternative. The Court therefore should not certify Plaintiffs' proposed classes as damages classes.

III. The Proposed Minors Subclass Should Not Be Certified

Plaintiffs' proposed minors subclass has all of the flaws of the principal class. But it also suffers from additional insurmountable manageability problems (including that the subclass is not ascertainable), and it does not adequately protect minors' rights to control their own claims. This Court recognized these problems in its order for supplemental briefing. *See* Order on Suppl. Briefing 6-7, PageID.39855-39856. Plaintiffs fail to adequately respond to the Court's concerns. Moreover, a class action for the minors subclass is unnecessary, given that the first bellwether group consists of minors claiming lead-related injuries.

A. The Proposed Minors Subclass Is Not Ascertainable, Precluding Certification Under Rule 23(b)(3)

In the Sixth Circuit, damages classes must be ascertainable, meaning that it must be "administratively feasible for the court to determine whether a particular individual is a member." *Young v. Nationwide Mut. Ins.*, 693 F.3d 532, 537-38 (6th Cir. 2012) (internal quotation marks omitted).

That is not possible with the proposed minors subclass. The subclass consists of all minors of a certain age who, among other things, "were exposed through ingestion to unfiltered Flint public water at [their] residence, school, or day care for at least 14 days within a 90 day period." Mot. xii, PageID.34436. Plaintiffs identify no databases or other records that reliably show whether any minor drank "unfiltered" Flint water (or ate foods prepared with that water) "for at least 14 days

within a 90 day period." So there is no reliable mechanism for this Court to identify which minors in Flint would be part of the proposed subclass.

Plaintiffs suggest that parents or guardians could submit affidavits certifying that their children meet the criteria for the proposed minors subclass, but that is not a viable solution. *See* Mot. 34 n.129, PageID.34471. As an initial matter, the courts of appeals have divided as to whether a district court can certify a class identified only through the putative class members' own affidavits.[18] The Sixth Circuit has not taken a position on this issue, but its decisions view affidavit-only classes with considerable skepticism. In a false-advertising case involving a medical product, the court affirmed the district court's decision allowing plaintiffs to use affidavits to "supplement" online sales records and doctors' records, but indicated that the outcome might have been different if the plaintiffs had proposed an affidavit-only approach. *Rikos v. Procter & Gamble Co.*, 799 F.3d 497, 525-27 & n.10 (6th Cir. 2015). Then in a case in which affidavits were the only proposed method for determining class membership, the Sixth Circuit affirmed the district court's

[18] *Compare Hayes v. Wal-Mart Stores, Inc.*, 725 F.3d 349, 356 (3d Cir. 2013) (a class is not ascertainable if "the only proof of class membership is the say-so of putative class members"), *with Mullins v. Direct Digital, LLC*, 795 F.3d 654, 672 (7th Cir. 2015) (affidavit-only classes are not categorically impermissible, but district courts should consider identification problems as part of the superiority inquiry).

decision finding the proposed class to be unascertainable. *See Sandusky Wellness Ctr.*, 863 F.3d at 472.

Here, Plaintiffs' only proposed method for determining membership in the proposed minors subclass is through affidavits. Even if that approach is permitted, it does not make sense here. Courts that have allowed affidavits to determine class membership often did so because the claims at issue were small and there was no practical alternative to class adjudication. *See, e.g.*, *In re Dial Complete Mktg. & Sales Practices Litig.*, 312 F.R.D. 36, 51-52 (D.N.H. 2015); *see also Mullins*, 795 F.3d at 667. That is not the case here: The potential recovery is large, which is why thousands of minors have brought their own lawsuits, which will be resolved through the bellwether process.

In any event, using affidavits to establish class membership is unworkable in this case. It is difficult to imagine that any parent could reliably recall whether his or her child ingested Flint water for 14 days within a 90-day period—much less tie that ingestion to VNA's conduct. *See Sandusky Wellness Ctr.*, 863 F.3d at 473 (affidavit-only approach is likely to be infeasible when the class member's recollection of events would be "dubious at best"). For example, Tiantha Williams, the mother of named plaintiff T.W., testified in her deposition that she does not recall whether she stopped drinking Flint water before or during her pregnancy or whether she ever used unfiltered tap water to prepare T.W.'s formula. Ex. 62, Williams Dep.

116:2-17. VNA would have ample grounds to challenge any affidavit filed by her and other class members, and the Court would have to conduct mini-trials just to determine class membership. Courts regularly decline to certify classes in those circumstances. *See, e.g.*, *In re Processed Egg Prods. Antitrust Litig.*, 312 F.R.D. 124, 140 (E.D. Pa. 2015); *Karhu v. Vital Pharms., Inc.*, No. 13-60768-CIV, 2014 WL 815253, at *3 (S.D. Fla. Mar. 3, 2014), *aff'd*, 621 F. App'x 945 (11th Cir. 2015). That is one key reason not to certify the proposed minors subclass.

B. The Proposed Minors Subclass Would Not Adequately Protect Minors' Rights To Control Their Claims

The Court should not certify the proposed minors subclass for another reason: The proposed class action would not adequately protect the minors' rights to pursue and control their own claims. *See* Order on Suppl. Briefing 6, PageID.39855 (citing *Woodman v. Kera*, 280 Mich. App. 125 (2008)). (To the extent that the principal class includes minors who are not members of the minors subclass, the principal class also would have that problem.)

1. Michigan Law Strongly Protects Minors' Rights To Control Their Claims

In Michigan, a minor's cause of action is the personal property of the minor, and Michigan law protects the minor's rights to personally "pursue and control" that cause of action. *Woodman ex rel. Woodman v. Kera LLC*, 486 Mich. 228, 253 (2010)

(opinion of Young, J.).[19] That is a "longstanding and undisturbed common law rule." *Id.* at 240-41 (citing *Power v. Harlow*, 57 Mich. 107, 111 (1885)). To "preserve" the minor's rights, the Michigan legislature has extended the statute of limitations for nearly all claims involving a minor until one year after the minor turns eighteen, so that the minor can litigate the claim himself or herself on reaching the age of majority. *Id.* at 253 (citing Mich. Comp. Laws § 600.5851(1)).

Michigan courts permit a minor's parents or guardians to "waive, release, or compromise claims" belonging to the minor only in narrow circumstances and only with a court's oversight. *McKinstry v. Valley Obstetrics-Gynecology Clinic, P.C.*, 428 Mich. 167, 192-93 (1987). The parent cannot bring a minor's claim on the minor's behalf without a court first appointing the parent as the minor's representative. *See Kilda v. Braman*, 278 Mich. App. 60, 71 (2008) (citing Mich. Ct. R. 2.201(E)(1)). And that parent cannot settle the minor's claim without the court determining that the settlement is fair and in the best interests of the minor. *See Woodman*, 486 Mich. at 253 (opinion of Young, J.) (citing Mich. Ct. R. 2.420); *see also O'Brien v. Loeb*, 229 Mich. 405, 408 (1924). Further, for a personal-injury claim, the minor must "appear in court personally to allow the judge an opportunity

[19] Although Justice Young wrote only for himself, Chief Justice Kelly and Justices Weaver and Hathaway concurred with Justice Young's opinion on all points relevant to this case, so Justice Young's opinion is the controlling opinion. *See Woodman*, 486 Mich. at 258-59 (Hathaway, J., concurring); *id.* at 260-61 (Kelly, C.J., concurring).

to observe the nature of the injury," and the judge "may require medical testimony . . . if not satisfied of the extent of the injury." Mich. Ct. R. 2.420(B)(1)(a)-(b).

Plaintiffs' primary response is that those rights do not matter in federal court. But the Michigan Supreme Court has made clear that those rights reflect the substantive public policy of the State to "preserve a minor's property interest in his tort claims," even though the protections are codified in Michigan Court Rules and not state statutes. *Woodman*, 486 Mich. at 254 (opinion of Young, J.); *see id.* at 259 (Hathaway, J., concurring). The Court further has specified that any changes to that policy should be made by the Legislature, and not by courts. *Id.* at 245-47 (opinion of Young, J.). So Plaintiffs are mistaken in asserting, Suppl. Br. 4, PageID.41432, that these are merely state procedures that do not apply in federal court.

2. A Class Action Could Not Feasibly Protect Minors' Rights

In light of Michigan's robust protections for minors' rights, it is infeasible to litigate minors' damages claims on a class-wide basis. First, the Court would need to appoint a representative for each member of the minors subclass, which is not feasible in the 75 days Plaintiffs propose for the class notice and opt-out period. Second, the Court cannot bind minors to the results of a class adjudication without having appointed individual representatives. And third, the Court cannot bind minors to any class settlement without having appointed individual representatives

and requiring each minor to appear before the Court. That all amounts to individualized adjudication.

Plaintiffs argue that the Court does not need to appoint a representative for each minor and can bind minors to the results of a class adjudication (or to a class settlement) without appointing individual representatives. Suppl. Br. 5, PageID.41433. But they cite no Michigan authority to support that position. And notably, in the settlement with the state defendants, the city defendants, Rowe, and McLaren Hospital, counsel for Plaintiffs do not propose to settle minors' claims using a class settlement, even though they propose to use a class settlement for adults' claims. *See* Proposed Settlement § 1.72, ECF No. 1319-1, PageID.40343.

Question #1: The Court first asked whether the Court could identify each member of the proposed minors subclass and appoint individual representatives in the 75 days Plaintiffs proposed as the opt-out period for their proposed classes. *See* Order on Suppl. Briefing 6, PageID.39855. The answer is no. The Court would first need to solicit affidavits from each minor child's parents or guardians attesting that the child ingested unfiltered Flint water for 14 days within a 90-day period after VNA's initial report, and then determine the accuracy of each affidavit. *See* pp. 114-16, *supra*. Then the Court would need to determine the most suitable representative for each minor child and formally appoint that person.

The Court could not feasibly complete those steps in 75 days or any other reasonable amount of time. It is not clear that the Court even could identify all of the members of the subclass in that time. Plaintiffs say that the minors subclass would number in the "tens of thousands." Suppl. Br. 2, PageID.41430. They suggest that there are records of the minors in Flint, but offer no evidence that the records are complete. *Id.* at 6, PageID.41434. More importantly, they offer no evidence that the records identify the parents or guardians of the minors, much less that the records identify which parent is authorized to make decisions for the child (in cases where the parents are unmarried, separated, or divorced). Even if the Court could use the records Plaintiffs cite to identify all of the minors, the Court would need to take additional steps to identify parents or guardians.

The Court also could not appoint representatives for each minor in the time Plaintiffs propose. Assuming that parents would need 30 days to read the notice certifying the subclass and prepare their affidavits, the Court would have only 45 days to determine class membership and appoint representatives for each minor. Assuming that there are 20,000 minors, *see* Mot. 35, PageID.34472, the Court would need to evaluate the claims of the minors at approximately a rate of one minor a minute, for eight hours each day, including weekends. That is unrealistic.

Plaintiffs appear to recognize that the Court could not feasibly appoint representatives for each minor in 75 days. They argue instead that the Court is

"unlikely" to need to appoint representatives for each minor, or could instead appoint a "Master Guardian ad Litem as well as panels of approved guardians." Suppl. Br. 5, PageID.41433. In particular, they argue that Federal Rule of Civil Procedure 17(c), which permits a minor's "general guardian" (in most cases, a parent) to sue on behalf of the minor without prior court appointment, displaces Michigan Court Rule 2.201(E), which requires prior appointment. *See* Suppl. Br. 5, PageID.41433.

Rule 17(c) does not displace this Court's need to appoint a representative for each minor. To determine whether a federal rule of procedure displaces a state rule, the Court applies the framework set out in Justice Stevens's concurrence in *Shady Grove Orthopedic Associates, P.A. v. Allstate Insurance Co.*, 559 U.S. 393 (2010). *See Whitlock v. FSL Mgmt., LLC*, 843 F.3d 1084, 1091 n.2 (6th Cir. 2016) (explaining that Justice Stevens's opinion controls because it is the narrowest opinion in *Shady Grove*).[20] Under that framework, a court should not follow a Federal Rule of Civil Procedure if doing so would "operate[] to modify the scope of [a] state substantive right" and thereby violate the Rules Enabling Act. *Id.* at 1092. Plaintiffs cite two cases in support of their argument that a federal court sitting in diversity does not need to appoint a representative for each minor, but neither case

[20] In *Gallivan v. United States*, 943 F.3d 291 (6th Cir. 2019), the Sixth Circuit appeared to treat Justice Scalia's plurality opinion in *Shady Grove* as controlling. *See id.* at 293. *Gallivan* is irreconcilable with *Whitlock* on this point, so *Whitlock*—as the earlier decided case—controls. *See United States v. Abboud*, 438 F.3d 554, 567 (6th Cir. 2006).

applies the analysis in *Shady Grove*. *See* Suppl. Br. 4 n.5, PageID.41432 (citing *Greer v. City of Highland Park*, No. 15-cv-12444, 2019 WL 578550, at *2 n.3 (E.D. Mich. Jan. 10, 2019) (R&R); *In re Brooks*, 584 B.R. 443, 444-45 (Bankr. W.D. Mich. 2018)).

Applying Rule 17(c) instead of the state rule would violate the minors' substantive rights. The state rights at issue are the property rights of minors in Michigan, under which a minor's cause of action is the minor's personal property, protected by the law to the same extent as the minor's "corporeal possession[s]." *Woodman*, 486 Mich. at 240-41 (opinion of Young, J.) (quoting *Power*, 57 Mich. at 111). Michigan substantive law defines the scope of those rights, including when a parent may exercise those rights: A parent acting as a "natural guardian" has "no control of any estate the [minor] may possess, and could not be given a control *except on judicial proceedings*." *Id.* at 240-41 (quoting *Power*, 57 Mich. at 111) (emphasis added). The fact that this right is "embodied" in a Michigan court rule does not make the right any less substantive. *Id.* at 259 (Hathaway, J., concurring). This Court therefore should not permit a parent to litigate a minor's claim without first appointing the parent as the minor's representative in accordance with Michigan Court Rule 2.201(E). *See Shady Grove*, 559 U.S. at 429 (Stevens, J., concurring) ("[I]f a federal rule displaces a state rule that is . . . sufficiently interwoven with the

scope of a substantive right or remedy, there would be an Enabling Act problem, and the federal rule would have to give way.").[21]

Plaintiffs' alternative argument—that this Court can appoint master representatives for multiple class members—is inconsistent with the minors' rights. Michigan Court Rule 2.201(E) states that a court "shall" appoint the representative proposed by the minor (if the minor is 14 or older) or the minor's next of kin (if the minor is under 14), unless the court finds the proposed representative "unsuitable." Mich. Ct. R. 2.201(E)(2)(a)-(b). In other words, the rule does not allow a court to select a different representative without first assessing the suitability of the minor's or next of kin's proposed representative.

In sum, the Court could not certify the proposed minors subclass without appointing individual representatives for each class member, and the Court could not feasibly do so in the 75 days Plaintiffs propose.

Question #2: The Court asked whether minors can be bound by the results of a class adjudication on liability. The answer is that absent members of the proposed subclass could not be bound by a class trial or decision on a dispositive motion unless

[21] Federal courts regularly apply Michigan court rules in federal litigation when those rules embody substantive rights. For example, courts in this district (including this Court in this case) require defendants to provide notice of potential non-parties at fault pursuant to Michigan Court Rule 2.112(K). *See, e.g., Sedgwick Ins. v. F.A.B.E. Custom Downstream Sys., Inc.*, 47 F. Supp. 3d 536, 545 (E.D. Mich. 2014).

this Court appointed representatives for each class member, and it is not feasible for the Court to do so.

Damages classes under Rule 23(b)(3) operate under the assumption that when putative class members receive notice of a court's decision to certify a class, the class members make "informed, intelligent decision[s] of whether to opt out or remain [] member[s] of the class." *Achtman v. Kirby, McInerney & Squire, LLP*, 464 F.3d 328, 338 (2d Cir. 2006) (internal quotation marks omitted); *see Smith v. SEECO, Inc.*, 865 F.3d 1021, 1026 (8th Cir. 2017). The Court should not assume that if a minor fails to opt out of a class, it is because the minor has an appropriate representative who made the informed decision for the minor to remain in the class. That assumption cannot be squared with Michigan law, because if a court simply could assume that a parent or next friend would be a suitable representative, there would be no point to requiring "judicial proceedings" before a parent or next friend can bring a suit on behalf of a minor. *Woodman*, 486 Mich. at 240 (opinion of Young, J.) (quoting *Power*, 57 Mich. at 111). Michigan law permits an adult to suffer the consequences of his or her failure to read and act on a class notice. It does not allow a minor to suffer the consequences of an adult's failure to do so, unless that adult has been pre-approved by a court to protect the minor's legal interests.

Plaintiffs assert that "courts may rule on the legal claims of minors, whether proceeding individually or as a class." Suppl. Br. 7-9, PageID.41435-41437. But

they do not cite a single Michigan case (or federal case applying Michigan law) in support of that broad assertion. Plaintiffs rely primarily on a Washington intermediate appellate court decision, but in Washington the rules are different; the court does not need to appoint a parent as a representative before the parent may bring suit on behalf of a minor. *See* Wash. Rev. Code § 4.08.050; *Taylor v. Enumclaw Sch. Dist. No. 216*, 133 P.3d 493, 495 (Wash. Ct. App. 2006). In any event, there is a world of difference between allowing a parent to bring an individual suit on behalf of a minor and treating a parent's inaction as a reason to bind the minor to the results of a class action.

Plaintiffs also do not cite a single case in which any court certified a class of minors for damages claims. They rely exclusively on cases in which the class sought injunctive relief. But class members cannot opt out of injunctive classes under Rule 23(b)(2), so there would be no need to appoint individual representatives for each minor, because all minors would be bound by the class judgment regardless. *See Coleman v. Gen. Motors Acceptance Corp.*, 296 F.3d 443, 447 (6th Cir. 2002). Here, Plaintiffs ultimately seek damages for the class members, and so cases involving injunctive classes provide them with no support.

Plaintiffs also suggest that they could petition the Michigan Supreme Court to allow the Genesee County Circuit Court to exercise the jurisdiction of the probate court. *See* Suppl. Br. 11, PageID.41439. It is not clear how that would help

matters.[22] The result would be to place authority over the minors' claims in the Genesee County Circuit Court. But Plaintiffs seek to bring their class action in this Court, not the Genesee County Circuit Court, and Plaintiffs do not identify any mechanism through which this Court could exercise the authority of the Genesee County Circuit Court. Further, the Genesee County Circuit Court would still be bound by the Michigan Court Rules requiring the appointment of a representative for each minor. All of this goes to show that there is no feasible method for adjudicating minors' damages claims in a class action.

The requirement that the Court appoint a representative for each minor before the representative can choose to remain part of a class is an insurmountable obstacle to class adjudication of the minors subclass. Yet without those appointments, each minor could argue that he or she is not bound by the results of any class trial, completely nullifying the purpose of a class action. *Cf. Phillips Petroleum Co. v. Shutts*, 472 U.S. 797, 805 (1985) ("Whether it wins or loses on the merits, [a

[22] Plaintiffs note that they intend to follow a similar approach for the proposed settlement with the State and City defendants, but that is irrelevant. Suppl. Br. 11, PageID.41439. Minors must affirmatively opt in to the proposed settlement; Plaintiffs do not propose to use an opt-in litigation class for minors' claims. Nor could they. *See Ackal v. Centennial Beauregard Cellular, L.L.C.*, 700 F.3d 212, 217 (5th Cir. 2012) (Rule 23 prohibits opt-in classes); *Kern v. Siemens Corp.*, 393 F.3d 120, 124 (2d Cir. 2004) (same); 3 *Newberg on Class Actions* § 9:48 ("Put simply, Rule 23 is an opt-out, not an opt-in mechanism").

defendant] has a distinct and personal interest in seeing the entire plaintiff class bound by res judicata just as [the defendant] is bound.").

Question #3: The Court asked whether minors can be bound to a class settlement. The answer is that minors' claims could not be settled on a class-wide basis.

The rule requiring that a court approve a settlement of a minor's claims is particularly stringent. In addition to appointing a representative for each minor, the Court would need to have each minor "appear in court personally" and would need to determine that each settlement is fair and in the best interests of each minor. Mich. Ct. R. 2.420(B). It would not be feasible for the Court to do that for each of the tens of thousands of minors in the proposed class within a reasonable time frame.

Plaintiffs' principal argument is (again) that those requirements are procedural rules that do not apply in federal courts. *See* Suppl. Br. 10, PageID.41438. But as Plaintiffs acknowledge, a number of federal district courts *have* followed the Michigan requirements when approving the settlement of a minor's claim. *See id.* at 10 n.15 (citing *Mitchell v. SoftPlay, LLC,* No. 13-14125, 2014 WL 12662246, at *1 (E.D. Mich. Dec. 23, 2014); *Richardson v. Time Mfg. Co.*, No. 04-CV-27, 2006 WL 8462401, at *2 (W.D. Mich. Nov. 21, 2006)). Those decisions are correct. *See Goesel v. Boley Int'l (H.K.) Ltd.*, 806 F.3d 414, 419 (7th Cir. 2015) ("We join our colleagues in other federal courts in characterizing judicial approval of settlements

involving minors as a matter of substantive law."). Notably, none of the cases that Plaintiffs cite in support of their position analyzed the issue under *Shady Grove*.[23]

Plaintiffs also cite cases that do not involve Michigan law, and again suggest that the Court use panel guardians or other short-cuts. *See* Suppl. Br. 11-12, PageID.41439-41440. But cases not involving Michigan law are irrelevant, and the Court should reject Plaintiffs' invitation to weaken the protections of Michigan law for minors' rights.

The Court's concerns about the minors subclass are completely justified, and the Court should not certify that subclass.

IV. The Proposed Principal Class And Minors Subclass Do Not Meet The Requirements For Certification As Injunctive Classes Under Rule 23(b)(2)

Plaintiffs also ask the Court to certify the proposed principal class and minors subclass as injunctive-relief classes under Rule 23(b)(2). Plaintiffs want an order requiring Defendants to fund a "coordinating body" to provide "programmatic

[23] Further, the courts in all three cases Plaintiffs cite independently assessed the fairness of the settlement as a matter of federal law. *See H.D. v. Omni La Costa Resort & Spa, LLC*, No. 17-cv-0516, 2020 WL 220088, at *3 (S.D. Cal. Jan. 15, 2020), *R&R adopted*, 2020 WL 563551 (S.D. Cal. Feb. 4, 2020); *Kiel ex rel. Kiel v. Barton*, No. 09-cv-15053, 2011 WL 13206189, at *1 (E.D. Mich. Jan. 31, 2011); *Knight-Stanner v. Pruitt*, No. 08-cv-949, 2010 WL 432424, at *1 (W.D. Mich. Jan. 26, 2010); *see also Green v. Nevers*, 111 F.3d 1295, 1301 (6th Cir. 1997) ("[T]he court would have been remiss if it had not made an independent determination that the settlement was in the minor's best interest."). So even if the Michigan rule did not apply, the Court still would need to make an individualized determination of a settlement's fairness as to each class member.

relief" to the classes (essentially, medical monitoring, treatment, and other health services). Mot. 86, PageID.34523. The Court should deny that request. In addition to failing to meet the Rule 23(a) requirements, *see* pp. 87-92, *supra,* the proposed principal class and proposed minors subclass do not meet the requirements of Rule 23(b)(2), both because they do not actually seek "final injunctive relief" (just a stepping stone to damages) and because the classes are not sufficiently cohesive.

A. Plaintiffs Seek Damages, Not "Final Injunctive Relief"

Plaintiffs do not actually seek "final injunctive relief," as required by the Rule. Many courts have held that a request for medical monitoring or treatment is not actually a request for injunctive relief, but is really a request for monetary damages to pay for the proposed treatment. *See Zinser v. Accufix Res. Inst.*, 253 F.3d 1180, 1196 (9th Cir. 2001); *Boughton v. Cotter Corp.*, 65 F.3d 823, 827 (10th Cir. 1995); *Arch v. Am. Tobacco Co.*, 175 F.R.D. 469, 484 (E.D. Pa. 1997), *aff'd sub nom. Barnes v. Am. Tobacco Co.*, 161 F.3d 127 (3d Cir. 1998). Here, Plaintiffs make that clear, because their proposed trial plan says that the reason they want the treatment services is to evaluate the injuries of the members of the minors subclass, so that they then can use those evaluations as the basis for damages claims in a later phase of the trial. Trial Plan 2-3, PageID.36064-36065.

Thus, Plaintiffs' proposed relief is in reality "designed to assess past . . . damage for purposes of determining liability for individual retrospective

compensatory monetary remedies." *Kartman v. State Farm Mut. Auto. Ins.*, 634 F.3d 883, 895 (7th Cir. 2011). That is not "final prospective equitable relief"; it is a disguised method of "recovering a retrospective damages remedy." *Id.* (emphasis omitted). In that situation, "Rule 23(b)(3), not (b)(2), governs certification." *Id.* And because Defendants would be paying for those evaluations, "the contemplated injunction would essentially have the effect of shifting the burden to [Defendants] to prove elements of the plaintiffs' claims." *Id.* at 893. That is not allowed under the Rule or as a matter of due process.

Plaintiffs argue that medical monitoring is a form of injunctive relief in the Sixth Circuit. Mot. 94, PageID.34531 (citing *Boler v. Earley*, 865 F.3d 391 (6th Cir. 2017)). But the case they cite was addressing whether a claim for medical monitoring could be a claim for "prospective injunctive relief" for purposes of the *Ex Parte Young* exception to Eleventh Amendment immunity. *Boler*, 865 F.3d at 413. The court was not determining that medical monitoring is injunctive relief in the class-certification context; in that context, the Sixth Circuit has said that medical monitoring is, "at best," "quasi-equitable in nature." *Olden*, 383 F.3d at 510. Nor was the court addressing whether a medical-monitoring claim is a claim for injunctive relief when the plaintiffs seek to use the results of the medical treatment to "lay an evidentiary foundation for subsequent determinations of liability." *Kartman*, 634 F.3d at 893.

Plaintiffs also rely on the Third Circuit's decision in *Baby Neal ex rel. Kanter v. Casey*, 43 F.3d 48 (3d Cir. 1994), but they misread that case. Plaintiffs cite *Baby Neal* for the proposition that "the (b)(2) requirement is 'almost automatically satisfied'" when the plaintiff seeks injunctive relief. Mot. 88, PageID.34525 (quoting *Baby Neal*, 43 F.3d at 58). But this does not mean that any relief labeled "injunctive" will do. Since *Baby Neal*, the Third Circuit has repeatedly affirmed district court decisions refusing to certify classes seeking medical monitoring under Rule 23(b)(2). *See, e.g.*, *Gates*, 655 F.3d at 269; *Barnes v. Am. Tobacco Co.*, 161 F.3d 127, 143 (3d Cir. 1998).

Baby Neal also addressed a very different factual situation. Plaintiffs there sought prototypical injunctive relief—an order requiring the defendant to stop or change its behavior to comply with its constitutional or statutory obligations. *See Baby Neal*, 43 F.3d at 64. The medical treatment sought in *Baby Neal* was incidental to the institutional reform sought to correct deficiencies in Philadelphia's child-welfare system. *See id.* at 53-54. Here, Plaintiffs want an order requiring VNA to pay for medical evaluations so that they can then bring damages claims, not an order requiring VNA to stop or change its current behavior. That is not a permissible use of an injunctive class.

B. Not Every Class Member Is Entitled To Injunctive Relief, And Those Who Are Will Each Want Different Relief

Even if the relief Plaintiffs seek is considered injunctive relief, the proposed classes lack the "defining characteristic" of an injunctive class under Rule 23(b)(2)—"the homogeneity of the interests of the members of the class." *Reeb v. Ohio Dep't of Rehab. & Corr.*, 435 F.3d 639, 649 (6th Cir. 2006). That cohesion requirement exists because, unlike a damages class, an injunctive class is mandatory—once certified, class members may not opt out. *Id.*; *see Coleman*, 296 F.3d at 447. To protect the due process rights of absent class members, "the cohesiveness requirement of Rule 23(b)(2) is more stringent than the predominance and superiority requirements . . . under Rule 23(b)(3)." *Ebert*, 823 F.3d at 480.

Here, the proposed principal class and minors subclass are not cohesive, because not all class members even would be eligible for the relief Plaintiffs seek. Plaintiffs essentially want Defendants to pay for medical monitoring or other treatment. But the Michigan Supreme Court has held that a plaintiff in a toxic-tort case is eligible for medical monitoring and other medical services only if the plaintiff can demonstrate a "present physical injury" caused by the defendant's conduct. *Henry*, 473 Mich. at 73. That is because medical monitoring is not an independent cause of action but a remedy in a claim for negligence, and "Michigan law requires an actual injury to person or property as a precondition to recovery under a negligence theory." *Id.* at 73. The Court specified that a claim for injuries that the

plaintiff "may suffer in the future" is "precluded as a matter of law," because "Michigan law requires more than a merely speculative injury." *Id.* at 72.

The Court explained that Michigan's "requirement of a present physical injury" is well-recognized "in the toxic tort context." *Henry*, 473 Mich. at 72; *id.* at 75 ("[T]he injury requirement has always been present in our negligence analysis."). Thus, a plaintiff who seeks a "medical monitoring program" not to "redress actual or present injury" but "instead to screen for possible future injury" from exposure to an allegedly toxic agent cannot obtain that relief under Michigan law. *Id.* at 77-78.

The Michigan Supreme Court has explained the rationales behind that rule. The "requirement of a present physical injury to person or property serves a number of important ends for the legal system": "it defines more clearly who actually possesses a cause of action"; it "reduces the risks of fraud, by setting a clear minimum threshold—a present physical injury—before a plaintiff can proceed"; and it "avoids compromising the judicial power" that would result from courts making ad-hoc judgments about whether and when to allow compensation based on a risk of injury, a job better suited to the legislature. *Henry*, 473 Mich. at 76-77. Thus, this rule reflects a considered judgment by the State's highest court.

Plaintiffs cannot show that every member of their proposed classes has suffered a cognizable physical injury on a class-wide basis. They have not done so for the minors subclass, *see* pp. 34-42, *supra*, and they have not even tried to do so

for the principal class. In fact, one of Plaintiffs' experts supporting their request for medical treatment and other services admits that not all Flint residents will require those services. Ex. 53, Keating Dep. 369:19-371:19. Further, for the class members who have suffered injuries, Plaintiffs cannot show that those injuries were caused by VNA in particular. *See* pp. 42-43, *supra*. VNA cannot be liable for paying for services for individuals it did not harm. *See Powers v. Hamilton Cty. Pub. Defender Comm'n*, 501 F.3d 592, 618 (6th Cir. 2007) (a defendant "cannot be held liable for harm to persons that it did not cause"). A class is not cohesive if the Court would need to determine on an individual basis which members even are eligible for relief. *See, e.g.*, *Gates*, 655 F.3d at 265; *Penn. Chiropractic Ass'n v. Blue Cross Blue Shield Ass'n*, 286 F.R.D. 355, 377 (N.D. Ill. 2012); *Roe v. Bridgestone Corp.*, 257 F.R.D. 159, 170 (S.D. Ind. 2009).

Further, even for class members who might be eligible for medical monitoring or other treatment paid for by VNA, the nature and degree of treatment needed would vary dramatically by class member based on "singular circumstances and individual medical histories." *Parkhurst*, 2013 D.C. Super. Lexis 4, at *39. As explained above, the physiological effects of lead can vary widely from person to person, even at the same level of lead exposure. Ex. 51, Weed Report 82-83; *see* Ex. 47, Georgopoulos Dep. 148:7-14. And not all class members allege injuries from lead; Plaintiffs claim injuries from at least three other toxic agents (although their experts

never address those agents). *See* Mot. 64, PageID.34501. Further, many plaintiffs have extensive medical histories. *See* pp. 62-63, *supra*.

The monitoring and treatment needs thus would vary widely from class member to class member, and each class member would have an obvious interest in controlling the treatment that he or she receives. *See, e.g.*, *Wal-Mart*, 564 U.S. at 360 ("Rule 23(b)(2) . . . does not authorize class certification when each individual class member would be entitled to a *different* injunction . . . against the defendant."); *M.D. ex rel. Stukenberg v. Perry*, 675 F.3d 832, 846-47 (5th Cir. 2012) (explaining that a proposed class that seeks "individualized injunctive relief" does not satisfy Rule 23(b)(2) and reversing order certifying a class seeking an injunction to create a special expert panel to assess individual class members and implement "appropriate remedial steps").

But because there is no opting out of an injunctive class under Rule 23(b)(2), if the Court were to certify the proposed injunctive classes, *all* class members would be forced to accept the "programmatic relief" selected by Plaintiffs' counsel, and could not seek different relief more suited to their needs. Those types of "cohesion difficulties" have led "numerous courts across the country" to deny certification of classes that seek medical monitoring and treatment, particularly in toxic-tort cases. *In re St. Jude Med., Inc.*, 425 F.3d 1116, 1122 (8th Cir. 2005); *see, e.g.*, *Ball v. Union Carbide Corp.*, 385 F.3d 713, 728 (6th Cir. 2004) (medical monitoring is an

"individualized issue" that can preclude certification under Rule 23(b)(2)).[24] This case should be no different.

Plaintiffs' argument that an injunction need not "benefit each class member in precisely the same way," Mot. 92, PageID.34529 (quoting *Braggs v. Dunn*, 317 F.R.D. 634, 668 (M.D. Ala. 2016)), misses the mark. The question is not whether each class member gets the same benefit; the question is whether the class members' interests are sufficiently cohesive that each class member would want the same injunction. Here, they are not. The Court therefore should decline to certify the proposed injunctive-relief classes.

V. Issue Classes Under Rule 23(c)(4) Are Not Appropriate In This Case

As an alternative to certifying damages classes under Rule 23(b)(3), Plaintiffs ask the Court to certify an issue class under Rule 23(c)(4). *See* Mot. 97-100, PageID.34534-34537. Plaintiffs argue that the "factual and legal questions pertaining to the [VNA] Defendants' duty to the Class" are appropriate for issue-

[24] Plaintiffs note that 20 years ago—before the development of the case law discussed above—a magistrate judge in another circuit recommended certification of an injunctive class of minors with elevated blood lead levels for medical monitoring. Mot. 91, PageID.34528 (citing *Elliott v. Chicago Housing Auth.*, No. 98 C 6307, 2000 WL 263730, at *14 (N.D. Ill. Feb. 25, 2000), *R&R adopted* (N.D. Ill. Oct. 6, 2000)). The *Elliott* court did not address cohesion issues, perhaps because the class in that case was expressly defined to include only minors with blood lead levels over a specific amount. *See id.* at *4. The proposed classes in this case are not limited to minors or to lead injuries, and there is no minimum blood lead level specified, so the proposed classes in this case are much more diverse than in *Elliott*.

class certification, as is the issue "relating to [VNA's] role in contaminating Flint's drinking water." *Id.* at 98-99, PageID.34535-34536. Plaintiffs are wrong.

Under Sixth Circuit precedent, this Court may certify an issue class under Rule 23(c)(4) even when the class as a whole does not meet the predominance and superiority requirements of Rule 23(b)(3). *See Martin*, 896 F.3d at 411.[25] That view of Rule 23(c)(4) is mistaken, as it provides an end-run around the rigorous requirements of Rule 23(b)(3). *See, e.g.*, *Castano v. Am. Tobacco Co.*, 84 F.3d 734, 745 n.21 (5th Cir. 1996). But *Martin* is currently Sixth Circuit law that is binding on this Court.

However, the issues Plaintiffs identify do not meet the requirements for issue-class certification under the standard set out in *Martin*. Issue-class certification would not materially advance the litigation and would risk running afoul of the Seventh Amendment. *See Martin*, 896 F.3d at 413-18; *see also In re Nat'l Prescription Opiate Litig.*, 976 F.3d 664, 671 (6th Cir. 2020). Given that the Court will need to resolve individual plaintiffs' claims through the bellwether process regardless of any class certification, there is no point in certifying an issue class.

[25] Other circuits apply different standards. The Fifth Circuit requires plaintiffs to show that the action as a whole satisfies Rule 23(b)(3)'s predominance requirement. *Castano v. Am. Tobacco Co.*, 84 F.3d 734, 745 n.21 (5th Cir. 1996). The Third and Eighth Circuits require plaintiffs to show that certifying issue classes would be superior to alternative methods of resolving the litigations. *See Gates*, 655 F.3d at 273; *In re St. Jude Med., Inc.*, 522 F.3d 836, 841 (8th Cir. 2008).

A. Certifying An Issue Class Would Not Materially Advance Plaintiffs' Claims Against VNA

Little would be gained from certifying an issue class, because there are so few common issues and so much overlap between any common issues and the many individualized issues. The allegedly common questions go to duty, breach, and but-for causation. Even if they were common, resolving those questions would not significantly advance the litigation as to any class member's professional negligence claim against VNA. Each class member would still need to prove the remaining facets of causation, the fact of injury, and the amount of damages, and each of those issues is highly individualized. *See* pp. 31-87, *supra.* That is especially true for causation: Although VNA engaged only in one course of conduct, how that conduct affected a class member will vary depending on when the class member used Flint water and other individualized factors. *See Steering Comm.*, 461 F.3d at 603 (in toxic-tort cases, even when the "alleged cause of the injuries [] is a single accident," "the causal mechanism for plaintiff's injuries . . . will depend on any number of [] factors" unique to "each individual plaintiff"). For example, Plaintiffs argue that the City would have used a corrosion inhibitor sooner if VNA had more forcefully recommended it. If they are right, whether a class member was harmed as a result would depend on when the class member drank Flint water relative to when the City would have started using the corrosion inhibitor.

Further, any efficiency gains from issue-class certification likely would be lost because of the evidentiary overlap between the common and individual issues. Plaintiffs likely would present the same evidence twice for every act or omission of VNA's they allege to be negligent, once in a class trial and once in each individual trial. Take Plaintiffs' argument that VNA was negligent by not more forcefully recommending a corrosion inhibitor. In a class trial, to prove breach, Plaintiffs' experts likely would testify that VNA should have given that more forceful advice because VNA should have recognized that not doing so likely would result in increased damage to the Flint water system. Then, in an individual trial, to prove causation and for allocation of fault, Plaintiffs likely would present essentially the same evidence to argue that VNA's failure to give more forceful advice in fact resulted in increased damage to the Flint water system.

Accordingly, there would be little, if any, efficiency gains from certifying an issue class in this case. *See Castano*, 84 F.3d at 751 (because allocation of fault requires a comparison of the conduct of all defendants and non-parties, "[a]t a bare minimum," the fact-finder for allocation of fault "will rehear evidence of [each defendant's] conduct"). The need to present the same evidence multiple times would more than offset any benefit from resolving the common issues Plaintiffs identify on a class-wide basis. *See Ebert*, 823 F.3d at 479. Instead, an issue class would be duplicative and would waste the Court's and the parties' resources.

B. Plaintiffs' Proposed Issue Class Likely Will Confuse The Juries And Risks Violating The Seventh Amendment

There is another reason why an issue class is not appropriate here: The issue class Plaintiffs propose would be confusing to the juries and likely run afoul of the Reexamination Clause of the Seventh Amendment. That Clause prohibits a court or jury from revisiting an issue of fact that one jury already decided. *See Gasoline Prods. Co. v. Champlin Refining Co.*, 283 U.S. 494, 499-501 (1931). In *Martin*, the Sixth Circuit acknowledged that issue classes present Seventh Amendment concerns, but suggested that the district court in that case might be able to craft a trial plan that would address those concerns. *See* 896 F.3d at 417.

That would not be possible here because breach, causation, and allocation of fault will present overlapping issues. Generally, a court can avoid juror confusion and prevent Seventh Amendment problems when there is little or no overlap in the evidence between the common and individualized issues (such as between liability and damages). *See, e.g.*, *Olden*, 383 F.3d at 509 n.6. But in this case, the same evidence likely will be reheard at multiple phases of the same cause of action before different juries, presenting a significant danger of confusion, reexamination, or both.

For example, suppose the jury in an issue class trial concludes that VNA breached the applicable standard of care by not more forcefully recommending that the City start corrosion-control treatment, because VNA should have recognized that failing to give that advice would lead to a significant likelihood of harm. The Court

would then instruct a second jury in a subsequent individual trial to assume that VNA breached the standard of care. In determining but-for causation, the second jury could be confused as to what it is allowed to find. The second jury could conclude that because the first jury found there would be a significant likelihood of harm, it must find that there actually was harm.

There also is a serious risk that the second jury would reexamine the findings of the first jury. In finding breach, the first jury may have concluded that a reasonable engineer would have foreseen that the failure to recommend more forcefully that the City use corrosion controls would result in harm. The second jury then may revisit the issue in assessing whether VNA's failure proximately caused the particular plaintiff's harm, because proximate causation also depends on foreseeability of the harm. *See Poe*, 179 Mich. App. at 576-77. The second jury could conclude that VNA did not proximately cause the plaintiff's harm because the harm was not foreseeable—effectively overruling the first jury's conclusion that the harm was foreseeable, in violation of the Seventh Amendment. *See In re Rhone-Poulenc Rorer, Inc.*, 51 F.3d 1293, 1303 (7th Cir. 1995) (Seventh Amendment concerns are particularly acute when breach and proximate causation are decided by separate juries). The jury also might revisit the issue in determining the allocation of fault, by assigning VNA 0% fault on the ground that the harm was too speculative for any fault to be assigned to VNA. That also would effectively overrule the

conclusion of the first jury, to the detriment of other defendants. *See Castano*, 84 F.3d at 750-51 (Seventh Amendment concerns are particularly acute when different juries adjudicate liability and comparative fault); *In re Rhone-Poulenc Rorer, Inc.*, 51 F.3d at 1302-03 (same).

In light of the heightened risks of confusing the jury and of violating the Seventh Amendment in this case, and the lack of any practical advantage of issue-class certification, the Court should decline to certify an issue class.

VI. The Proposed Classes And Subclasses Cannot Be Certified As Currently Defined

Even if Plaintiffs' professional negligence claims could be amenable to some type of class adjudication, the proposed classes cannot be certified as defined. All of the proposed classes are overbroad as to VNA, because the proposed class period starts before VNA's involvement in Flint. And the proposed subclasses all are broader than the principal class of which they supposedly are a part. Perhaps those problems can be fixed, but doing so would make a class action even more unwieldy.

A. The Proposed Principal Class And Subclasses Start Before VNA's Engagement In Flint

All of the proposed classes are overbroad as to VNA because they include people who have no claims against VNA. But fixing this problem by narrowing the class definitions likely would require separate, VNA-specific subclasses, which would increase the complexity of a class action.

The proposed classes all start in April or May 2014, on or near the date on which the City of Flint switched to Flint River water. Mot. xii, PageID.34436. But VNA had no involvement in Flint until nearly a year later; VNA's engagement with the City started on February 10, 2015, and it issued its first report on February 18, 2015. Ex. 19, VWNAOS018930 at 10; Ex. 23, VWNAOS020165 at 2. As this Court has recognized, VNA "can't be held responsible for things that happened before" it "showed up" in Flint. Nov. 6, 2019, Tr. 22-23, PageID.26085-26086.

Because the classes start before the start of VNA's engagement in Flint, the proposed classes contain many people who have no claims against VNA. The proposed classes include Flint residents who left Flint before February 2015. They include residents who sold their residential property or closed their businesses before February 2015. And they include residents who stopped using Flint water before February 2015. VNA could not have caused those residents any injury and thus cannot be liable to those residents. *See Powers*, 501 F.3d at 618.

The overbreadth of the class definitions could lead to VNA being "held responsible for things that happened before" it "showed up" in Flint. None of Plaintiffs' experts distinguish between injury and damages suffered before February 2015 and those incurred after that date. *See* Mot. 64, 77-79, PageID.34501, 34514-34516. Neither does Plaintiffs' request for medical monitoring. *See id.* at 85-88, PageID.34522-34525. VNA thus could end up paying for damages it could not

possibly have caused and for programmatic relief for minors it could not possibly have harmed. A class "defined so broadly as to include a great number of members who for some reason could not have been harmed by the defendant's allegedly unlawful conduct" is "defined too broadly to permit certification." *Messner v. Northshore Univ. HealthSystem*, 669 F.3d 802, 824 (7th Cir. 2012).

The usual solution for temporal overbreadth is to narrow the class definition to start on the appropriate date. *See, e.g.*, *Fosbre v. Las Vegas Sands Corp.*, No. 10-CV-00765, 2012 WL 2848057, at *19 (D. Nev. July 11, 2012) (shortening class period to "begin[] on the first date of actionable alleged misconduct"). That would not work here, because there is no single date that marks the start of the claims across both LAN and VNA. So if Plaintiffs want to bring class claims against VNA, Plaintiffs likely would need to seek to certify classes or subclasses specific to VNA. Assuming that those VNA-specific classes would otherwise meet the Rule 23 requirements, the Court would need to engage in separate notice and opt-out processes for those classes and may need to try those classes separately, making the class process even more unmanageable.

Plaintiffs have long been aware of that timing problem, yet they persist in proposing overbroad class definitions. VNA filed two motions to strike the class allegations in this case, and in both motions VNA identified the timing problem. *See* VNA Mot. to Strike 7-9, ECF No. 275, PageID.9979-9981; VNA Mot. to Strike 12-

13, ECF No. 914, PageID.24149-24150. Although the Court denied both motions as premature, it agreed that having class definitions that start before VNA's involvement in Flint is a problem "that will have to get resolved," and that VNA could renew its arguments in its opposition to the motion for class certification. Nov. 6, 2019, Tr. 21, 28 PageID.26084, 26091. If the Court finds that any class meets the requirements for certification, the Court should hold that the class is overbroad as to VNA and needs to be redefined.

B. The Proposed Subclasses Are Broader Than The Proposed Principal Class

The other problem with the proposed subclasses is that all three are broader than the proposed principal class. If Plaintiffs do not fix the mismatches, the subclasses would require separate notice and opt-out processes and separate trials. But fixing the mismatches would require either excluding some of the named plaintiffs or massively expanding the proposed principal class.

The subclasses are broader than the proposed principal class because the subclasses are not limited to Flint residents. The proposed principal class is limited to "current and former residents of the City of Flint." Mot. xii, PageID.34436. The proposed subclasses do not contain that restriction: They would include "all" minors who ingested water at an identified residence, school, or day-care center for 14 days in a 90-day period, *id.*; "all persons and entities" who owned residential property in

Flint, *id.*; or "all persons and entities" who owned and operated a business in Flint, *id.*—including those who were not Flint residents.

The proposed minors and residential-property subclasses have additional problems: The subclass periods are longer than the principal class period. The proposed minors subclass ends on January 5, 2016, after the end of the proposed principal class on October 15, 2015. Mot. xii, PageID.34436. That means that the proposed minors subclass includes minors who were conceived after October 15, 2015, who would not be members of the proposed principal class. The proposed minors subclass also includes minors who were born after October 15, 2015, but already *in utero* on that date. As defined, it is not clear that those minors would be members of the proposed principal class, because (as this Court has recognized) while *in utero* they arguably were not "resident[s]" of Flint and did not "receive[] drinking water supplied by the City of Flint." *Id.*; *see* Order on Suppl. Briefing 2 n.1, PageID.39851.

The residential-property subclass also ends after the principal class ends on October 15, 2015. The subclass period runs from "April 25, 2014, to the present." Mot. xii, PageID.34436. So the proposed residential property subclass would include, for example, a person who moved to Flint and bought property there for the first time in June 2020. That person would not be a member of the proposed principal class.

If Plaintiffs do not fix the mismatches between the proposed principal class and the proposed subclasses, there would be no benefit to having subclasses. Subclasses allow the court "to more efficiently resolve common issues during the proceeding and at trial," because the court can use the same notice process for the principal class as for the subclasses, and rulings that apply to the principal class necessarily apply to the subclass. *Aldapa v. Fowler Packing Co.*, 323 F.R.D. 316, 326 (E.D. Cal. 2018). But as defined, the supposed subclasses would actually be separate principal classes, requiring separate notices and opt-out processes. *See* Fed. R. Civ. P. 23(c)(2). And rulings and findings that applied to the proposed principal class would not necessarily apply to the proposed subclasses; instead, the subclasses likely would require separate trials. That would increase the complexity of the already unmanageable proposed class-action process.

If Plaintiffs try to fix the mismatches by either narrowing the definitions of the proposed subclasses or broadening the definition of the principal class, that will lead to additional problems. Narrowing the definitions of the proposed subclasses to fit within the proposed principal class would exclude several of the proposed subclass representatives. Plaintiffs propose Frances Gilcreast and Neil Helmkay as two of the representatives for the proposed business subclass. Mot. 30, PageID.34467. Neither were Flint residents, so they would not be members of the proposed principal class. *See* Ex. 74, Helmkay Dep. 13:15-23; Ex. 75, Gilcreast

Dep. 21:9-22:2. And Plaintiffs propose Tiantha Williams's minor son T.W. as one of the representatives for the proposed minors subclass. Mot 39, PageID.34476. But T.W. was born in December 2015, so he arguably would not be a member of the proposed principal class. *See id.*

On the other hand, broadening the definition of the principal class would vastly expand the scope of that class. To account for all of the members of the proposed subclasses as currently defined, the principal class would need to be defined as "all persons and entities who received drinking water from the City of Flint, owned and operated a business in the City of Flint, or owned residential property in the City of Flint, at any point between April 25, 2014, and the present." That class could not be certified; its definition "is so broad that it sweeps within it persons who could not have been injured by the defendant's conduct." *Kohen v. Pac. Inv. Mgmt. Co.*, 571 F.3d 672, 677 (7th Cir. 2009).

The burden is on Plaintiffs to propose class definitions that reflect their theories of liability, fit the named plaintiffs, and would result in a manageable class trial. The current class definitions do not do that. So if the Court concludes that some form of class adjudication is permissible, the Court should first require Plaintiffs to amend their proposed class definitions.

CONCLUSION

The Court should deny Plaintiffs' Motion for Class Certification.

Respectfully submitted,

CAMPBELL, CONROY & O'NEIL P.C.

By: /s/ *James M. Campbell*
James M. Campbell
Alaina N. Devine
One Constitution Wharf, Suite 310
Boston, MA 02129
(617) 241-3000
jmcampbell@campbell-trial-lawyers.com
adevine@campbell-trial-lawyers.com

BUSH SEYFERTH PLLC

By: /s/ *Cheryl A. Bush*
Cheryl A. Bush (P37031)
Michael R. Williams (P79827)
100 W. Big Beaver Road, Suite 400
Troy, MI 48084
(248) 822-7800
bush@bsplaw.com
williams@bsplaw.com

Attorneys for Veolia North America, LLC, Veolia North America, Inc., and Veolia Water North America Operating Services, LLC

Dated: January 7, 2021

CERTIFICATE OF SERVICE

I hereby certify that on January 7, 2021, I electronically filed the foregoing document with the Clerk of the Court using the ECF System, which will send notification to the ECF counsel of record.

By: /s/ *James M. Campbell*
James M. Campbell
jmcampbell@campbell-trial-lawyers.com

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

ELNORA CARTHAN, et al., Plaintiffs, v. RICK SNYDER, et al., Defendants.	Case No. 5:16-cv-10444-JEK-MKM Hon. Judith E. Levy Magistrate Judge Mona K. Majzoub

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INDEX OF EXHIBITS

Exhibit	Description
1	Declaration of James M. Campbell in support of VNA's opposition to Plaintiffs' motion for class certification
2	Copy of the document produced as COF_FED_0043822
3	Copy of the document produced as COF_FED_0032174
4	Copy of the document produced as Oct-7-2019 EGLE0058088
5	Copy of the document produced as LAN_FLINT_00063890
6	Copy of the document produced as 6-6-2016 SOM-MASON 00063591
7	Copy of the document produced as Mar-30-2020 TREAS037224
8	Excerpts of the deposition of Warren Green
9	Copy of the document produced as COF_FED_0540536
10	Copy of the document produced as 04-15-2016 SOM0024921
11	Excerpts of the deposition of Michael Glasgow
12	Excerpts of the deposition of Daugherty Johnson
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14	Copy of the document produced as COF_FED_0042553
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16	Copy of the document produced as COF_FED_0010485
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19	Copy of the document produced as VWNAOS018930
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22	Excerpts of the deposition of Marvin Gnagy
23	Copy of the document produced as VWNAOS020165
24	Copy of the document produced as CROFT-0000000125
25	Copy of the document produced as VWNAOS134132
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27	Copy of the document produced as VWNAOS060386
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32	Copy of the document produced as Aug-14-2019 EGLE0260445
33	Copy of the document produced as 04-15-2016 SOM0008786
34	Expert report of Dr. David Duquette
35	Excerpts of the deposition of Dr. Marc Edwards
36	Copy of the document designated as Marc Edwards Deposition Exhibit 33
37	Excerpts of the deposition of Dr. Larry Russell
38	Excerpts of the deposition of Dr. Daryn Reicherter
39	Excerpts of the deposition of Dr. David Keiser
40	Excerpts of the deposition of Dr. Robert A. Simons
41	*Parkhurst v. D.C. Water & Sewer Auth.*, No. 2009 CA 000971 B, 2013 D.C. Super. Lexi 4 (D.C. Sup. Ct. Apr. 8, 2013)
42	Expert report of Dr. John Gaitanis
43	Expert report of Dr. Robert J. McCaffrey
44	Excerpts of the deposition of Darrell Davis
45	Excerpts of the deposition of Dr. Pierre Goovaerts
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52	Expert report of Dr. Stacey M. Benson

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66	Excerpts of the deposition of Barbara Davis
67	Copy of the document designated as Kelso Deposition Exhibit 4 and produced as RHONDA-KELSO_0000079
68	Expert report of Dr. Anthony Scialli
69	Excerpts of the deposition of Darnella Gaines
70	Expert declaration of Andrew D. Richmond
71	Excerpts of the deposition of Elnora Carthan
72	Excerpts of the deposition of Miguel A. Del Toral
73	Excerpts of the deposition of David Munoz
74	Excerpts of the deposition of Neil Helmkay
75	Excerpts of the deposition of Frances L. Gilcreast
76	Supplemental expert report of Dr. Robert A. Simons

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

ELNORA CARTHAN, et al., Plaintiffs,	
v.	Case No. 5:16-cv-10444-JEK-MKM
RICK SNYDER, et al., Defendants.	Hon. Judith E. Levy Magistrate Judge Mona K. Majzoub

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DECLARATION OF JAMES M. CAMPBELL IN SUPPORT OF THE OPPOSITION OF DEFENDANTS VEOLIA NORTH AMERICA, LLC, VEOLIA NORTH AMERICA, INC., AND VEOLIA WATER NORTH AMERICA OPERATING SERVICES, LLC'S TO PLAINTIFFS' MOTION FOR CLASS CERTIFICATION

I, James M. Campbell, declare as follows:

1. I am a partner of the law firm of Campbell Conroy & O'Neil, P.C., and I represent Defendants Veolia North America, LLC, Veolia North America, Inc., and Veolia Water North America Operating Services, LLC (collectively, VNA) in the above-captioned matter. I have personal knowledge of the matters stated in this Declaration.

2. Attached as Exhibit 2 is a true and correct copy of a document produced as COF_FED_0043822.

3. Attached as Exhibit 3 is a true and correct copy of a document produced as COF_FED_0032174.

4. Attached as Exhibit 4 is a true and correct copy of a document produced as Oct-7-2019 EGLE0058088.

5. Attached as Exhibit 5 is a true and correct copy of a document produced as LAN_FLINT_00063890.

6. Attached as Exhibit 6 is a true and correct copy of a document produced as 6-6-2016 SOM-MASON 00063591.

7. Attached as Exhibit 7 is a true and correct copy of a document produced as Mar-30-2020 TREAS037224.

8. Attached as Exhibit 8 is a true and correct excerpt of the deposition of Warren Green.

9. Attached as Exhibit 9 is a true and correct excerpt of a document produced as COF_FED_0540536. Blank pages were deleted from the document.

10. Attached as Exhibit 10 is a true and correct copy of a document produced as 04-15-2016 SOM0024921.

11. Attached as Exhibit 11 is a true and correct excerpt of the deposition of Michael Glasgow.

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22. Attached as Exhibit 22 is a true and correct excerpt of the deposition of Marvin Gnagy.

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25. Attached as Exhibit 25 is a true and correct copy of a document produced as VWNAOS134132.

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34. Attached as Exhibit 34 is a true and correct copy of the expert report of David Duquette, Ph.D., in support of VNA's Opposition to Plaintiffs' Motion for Class Certification.

35. Attached as Exhibit 35 is a true and correct excerpt of the deposition of Marc Edwards.

36. Attached as Exhibit 36 is a true and correct copy of a document previously marked as Marc Edwards Deposition Exhibit 33 and entitled "Lead Release to Potable Water During the Flint, Michigan Water Crisis as Revealed by Routine Biosolids Monitoring Data."

37. Attached as Exhibit 37 is a true and correct excerpt of the deposition of Dr. Larry Russell.

38. Attached as Exhibit 38 is a true and correct excerpt of the deposition of Dr. Daryn Reicherter.

39. Attached as Exhibit 39 is a true and correct excerpt of the deposition of Dr. David Keiser.

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51. Attached as Exhibit 51 is a true and correct copy of the expert report of Douglas L. Weed, M.D., M.P.H., Ph.D., in support of VNA's Opposition to Plaintiffs' Motion for Class Certification.

52. Attached as Exhibit 52 is a true and correct copy of the expert report of Stacey M. Benson, Ph.D., in support of VNA's Opposition to Plaintiffs' Motion for Class Certification.

53. Attached as Exhibit 53 is a true and correct excerpt of the deposition of Dr. Daniel P. Keating.

54. Attached as Exhibit 54 is a true and correct excerpt of the deposition of Rhonda Kelso.

55. Attached as Exhibit 55 is a true and correct copy of the expert declaration of William E. Butler in support of VNA's Opposition to Plaintiffs' Motion for Class Certification.

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57. Attached as Exhibit 57 is a true and correct excerpt of the deposition of David A. Pogorilich.

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70. Attached as Exhibit 70 is a true and correct copy of the expert declaration of Andrew D. Richmond in support of VNA's Opposition to Plaintiffs' Motion for Class Certification.

71. Attached as Exhibit 71 is a true and correct excerpt of the deposition of Elnora Carthan.

72. Attached as Exhibit 72 is a true and correct excerpt of the deposition of Miguel A. Del Toral.

73. Attached as Exhibit 73 is a true and correct excerpt of the deposition of David Munoz.

74. Attached as Exhibit 74 is a true and correct excerpt of the deposition of Neil Helmkay.

75. Attached as Exhibit 75 is a true and correct excerpt of the deposition of Frances L. Gilcreast.

76. Attached as Exhibit 76 is a true and correct copy of the supplemental expert repot of Dr. Robert A. Simons in support of Plaintiffs' motion for class certification.

I declare, under penalty of perjury, that the foregoing is true and correct.

Executed on January 7, 2021
Boston, Massachusetts

/s/ James M. Campbell
James M. Campbell

EXHIBIT 2

From: Maxine Murray <mmurray@cityofflint.com>
Sent: Monday, February 24, 2014 9:59 AM
To: Jerry Ambrose
Subject: Fwd: Briefing on Karegnondi Project/City of Flint
Attachments: 2013EM041.PDF; EM1082013 (3).pdf; Application for State Treasurer's Approval to Issue Long Term Securities (KWA).pdf; Tucker Young Rpt.PDF

Jerry,

I am not finding anything in writing that indicates the State approved the attached resolutions. I did find however that we scheduled this meeting (see below) and did a briefing on KWA at Treasury (see below). I am also attaching the 1990 Tucker Young Report which apparently was a major part of the briefing.

Maxine

---------- Forwarded message ----------
From: **Fraser, Roger (Treasury)** <FraserR1@michigan.gov>
Date: Mon, Oct 29, 2012 at 3:23 PM
Subject: Briefing on Karegnondi Project/City of Flint
To: "Dillon, Andy (Treasury)" <DillonA2@michigan.gov>, "Stibitz, Brom (Treasury)" <StibitzB@michigan.gov>, "Koryzno, Edward (Treasury)" <KoryznoE@michigan.gov>, "Mike Brown (mbrown@reinvestflint.org)" <mbrown@reinvestflint.org>
Cc: "Hichez, Amy (Treasury)" <HichezA@michigan.gov>, "Cousineau, Sara (Treasury)" <CousineauS@michigan.gov>, "mmurray@cityofflint.com" <mmurray@cityofflint.com>, "mking@dwsd.org" <mking@dwsd.org>, "Fausone, Jim" <JFausone@fb-firm.com>

Please note – location change AND additional attendees:

Discussion: Brief Treasury on pros and cons of Karegnondi project. There are concerns about cost and engineering constraints. Report for Flint in late 90's….suggested this project was not financially feasible.

Attendees:

State of Michigan
Andy Dillon - Treasurer
Brom Stibitz – Policy Advisor
Roger Fraser – Deputy Treasurer
Ed Koryzno – Office of Fiscal Responsibility

City of Flint – (confirmed attendance with Maxine Murray)
Mike Brown – City Administrator
Jerry Ambrose, Finance Director
Howard Croft, Director of Infrastructure & Development
Bob Emerson – CEO Lawrence Moon Funeral Home
Bob Emerson – Former State Senator

John Matonich, EDO Rowe Professional Svcs.

Genesee County – (confirmed attendance with Maxine Murray)
Jeff Wright, Genesee County Drain Commissioner
John OBrian, Chief Deputy Drain Commissioner
Dave Jansen, Assistant Director, Genesee County Drain Commission
Rick Freeman, Rowe Professional Service

Tucker, Young, Jackson & Tull – (confirmed attendance with David Guastella)
George Karmo, President
David Guastella
Awni Qaqish

Detroit – (confirmed with Marian King-Bell)
James Fauson – DWSB Chair
Sue McCormick – DWS Director
Matt Schenk – DWS COO

--
Maxine Murray
Executive Assistant to
Mayor Dayne Walling
Darnell Earley, Emergency Manager
1101 S. Saginaw Street
Flint, MI 48502
810.237.2035 Telephone
810.766.7218 Fax

EM SUBMISSION NO.: 2013EM041

PRESENTED: 3-28-13

ADOPTED: 3-29-13

BY THE EMERGENCY MANAGER:

RESOLUTION TO PURCHASE CAPACITY FROM KAREGNONDI WATER AUTHORITY

The Karegnondi Water Authority (KWA) is a governmental consortium of cities and counties in southeastern Michigan that was created to build a water pipeline that will provide water from Lake Huron to interested communities in Sanilac, Lapeer, and Genesee counties. The incorporating bodies that created the KWA are Sanilac County, Lapeer County, Genesee County, the City of Flint, and the City of Lapeer.

The City of Flint is currently in a year to year contract with the City of Detroit for the purchase of water. A study was conducted that projected that staying with Detroit will cost the region $2.1 billion over the next 25 years. In contrast, if the region builds its own pipeline, the projected costs are $1.9 billion over the same period. After the initial 25 year period, the projected costs would be less then 25% of the projected water costs from Detroit.

In order to build the pipeline, the KWA needs commitment from its members regarding the capacity that each member will purchase in the pipeline. The KWA is allowed to withdraw 85 million gallons of water per day. Capacity is available to members in increments of 1 million gallons per day known as units. For each unit of capacity that a member purchases, the buyer shall pay to the KWA a one time fee of $32,300.00. Additionally, the buyer shall pay to the KWA not less then $32,300.00 per unit per year until such time as water is made available to the buyer. After water is made available, the buyer shall pay to the KWA an estimated amount not to exceed $355.300.00 per unit per year until such time that the bonds are paid in full. If it is determined that the costs per unit will exceed $355,300.00 the buyer has a right to cancel the contract.

The purchase of capacity along with the payment of other costs necessary to operate the pipeline gives the member a right to water for sale to its customers. The buyer has a right to resell capacity and water rights. Each party entering into a capacity contract shall also be entitled to appoint additional board members equal to the party's percentage share of the total capacity under contract.

It is in the long term best interests of the City of Flint to enter into a contract with the KWA to purchase up to eighteen (18) units of capacity.

IT IS RESOLVED that City officials are authorized to enter into a contract with KWA to purchase up to eighteen (18) units of capacity.

IT IS FURTHER RESOLVED that the City Administrator is authorized to provide KWA information needed to administer the contract and, with approval of the Chief Legal Officer, to make minor (non-material) modifications to the contract.

APPROVED AS TO FORM:

Peter M. Bade, City Attorney

APPROVED AS TO FINANCE:

For **Gerald Ambrose, Finance Director**

EM DISPOSITION:

ENACT V **FAIL** _____ **DATED** 3-29-13

Edward L. Kurtz, Emergency Manager

S:\P. Bade\EM2013\Resolutions\KWA.03.28.13.doc

13-5342

EM SUBMISSION NO.: EM 10820 13

PRESENTED: 9-11-13

ADOPTED: 9-11-13

RESOLUTION APPROVING CONTRACT BETWEEN THE CITY OF FLINT, GENESEE COUNTY AND THE KAREGNONDI WATER AUTHORITY AND AUTHORIZING PUBLICATION OF NOTICE

BY THE EMERGENCY MANAGER:

It is necessary to acquire and construct a new water supply system consisting of the acquisition, construction and installation of various water main and related facilities, together with all necessary appurtenances and attachments thereto as described in the Contract (the "System"), to serve the City and the County of Genesee (the "County"); and

A Contract has been prepared between the City, County and the Karegnondi Water Authority (the "Authority") whereby the Authority will issue its bonds, in one or more series (the "Bonds") on behalf of the City and the County to provide for the financing of the cost of the acquisition, construction and installation of the System; and

The City has carefully reviewed the Contract and finds that it provides the best means for accomplishing the acquisition, construction and installation of the System and for providing the needed services.

IT IS RESOLVED, THAT:

1. Approval of Contract; Effectiveness. The Contract is hereby approved and the Emergency Manager and the City Clerk are hereby authorized and directed to execute and deliver the Contract for and on behalf of the City; provided, however, that Contract shall not become effective until the expiration of forty-five (45) days after the date of the publication of the notice attached hereto as Exhibit A as a display advertisement of at least one-quarter (1/4) page size in one or more newspapers of general circulation within the territory encompassed by the Authority, which manner of publication is deemed by the City to be the most effective manner of informing the taxpayers and electors of the City of the details of the proposed Contract and the rights of referendum thereunder.

2. Publication of Notice. The City Clerk is hereby directed to publish the attached notice as soon as possible after the adoption hereof in substantially the form attached, with such changes as shall be approved by the City Clerk, upon the advice of bond counsel, so as to permit the Bonds to be issued as contemplated herein. The City Clerk may agree to publish the attached notice pursuant to this Section jointly with the Clerk of the County *provided* that the attached notice shall appear in a newspaper having a general circulation in the City.

3. Application to Michigan Department of Treasury. The Emergency Manager, City Clerk and Treasurer are each authorized and directed to take such further steps and actions as are necessary or desirable to enable the Authority to issue the Bonds for and on behalf of the City and the County as contemplated herein and in the Contract, including making an application to the Michigan Department of Treasury for prior approval with respect to the issuance of the Bonds by the Authority, if such prior approval is required, and the payment of any fees required by the Michigan Department of Treasury in connection with such application. The Emergency Manager, City Clerk and Treasurer are each further authorized to apply for any waivers or other orders from the Michigan Department of Treasury as may be necessary or advisable to issue, sell and deliver the Bonds as contemplated herein and to pay any filing fees related thereto.

4. Bond Counsel. The City has been advised that the Authority has retained Miller, Canfield, Paddock and Stone, P.L.C. ("Miller Canfield") as its bond counsel in connection with the Bonds and the City hereby consents to the representation of the Authority by Miller Canfield.

5. Rescission. All resolutions and parts of resolutions in conflict with this resolution be, and the same hereby are repealed.

APPROVED AS TO FORM:

Peter M. Bade, City Attorney

APPROVED AS TO FINANCE:

Gerald Ambrose, Finance Director

EM DISPOSITION:

ENACT ✓ **REFER TO COUNCIL** _____ **FAIL** _____

Michael K. Brown

DATED: 09.11.13

Michael K. Brown, Emergency Manager

S:\P. Bade\EM2013\Resolutions\KWA-Reso Approving Contract and Authorizing Notice.9-04-13.DOC

NOTICE OF INTENT TO EXECUTE
TAX-SUPPORTED CONTRACT AND OF RIGHT TO
PETITION FOR REFERENDUM THEREON

TO THE TAXPAYERS AND ELECTORS OF THE CITY OF FLINT AND THE COUNTY OF GENESEE.

PLEASE TAKE NOTICE, the City of Flint and the County of Genesee each in the County of Genesee (collectively, the "Local Units" and each a "Local Unit") have each approved the execution of a contract (the "Contract") with the Karegnondi Water Authority (the "Authority") pursuant to Act No. 233, Public Acts of Michigan, 1955, as amended, which Contract provides, among other things, that the Authority will acquire, construct and equip a water system to provide raw untreated water to the Local Units, together with all necessary appurtenances and attachments thereto (the "Project") and will issue its bonds in one or more series in the principal amount not to exceed $300,000,000 to finance the cost of the acquisition, construction and installation of such system for the Local Units AND THE LOCAL UNIT WILL PAY TO THE AUTHORITY PURSUANT TO THE CONTRACT THE SUMS NECESSARY TO RETIRE THE PRINCIPAL OF AND INTEREST ON SAID BONDS. Each Local Unit's share of such payments shall be determined by capacity initially acquired by each Local Unit in the Project. If the City of Flint fails to fulfill its payment obligations under the Contract, the County of Genesee has covenanted and agreed to make any such missed payments. Based on an aggregate $300,000,000 in bond issues, the amounts below show the maximum each Local Unit would be responsible for repaying for the Project.

Local Unit	Bond Issue
County of Genesee	$300,000,000
City of Flint	$102,600,000

LOCAL UNIT'S CONTRACT OBLIGATIONS

It is presently contemplated that said bonds in one or more series will be issued by the Authority in the aggregate principal amount of not to exceed $300,000,000, and will be payable in not to exceed thirty (30) years, and will bear interest at the rate or rates to be determined at the time of sale of any series of bonds but in no event to exceed ten percent (10.0%) per annum on the balance of such bonds from time to time remaining unpaid. The Contract includes each Local Unit's pledge of its limited tax full faith and credit for the prompt and timely payment of each Local Unit's obligations as expressed in the Contract. PURSUANT TO SUCH PLEDGE, EACH LOCAL UNIT WILL BE REQUIRED TO LEVY AD VALOREM TAXES WITHIN APPLICABLE CONSTITUTIONAL, CHARTER AND STATUTORY TAX LIMITATIONS ON ALL TAXABLE PROPERTY WITHIN THE LOCAL UNIT TO THE EXTENT NECESSARY TO MAKE THE PAYMENTS REQUIRED TO PAY PRINCIPAL OF AND INTEREST ON THE BONDS IF OTHER FUNDS FOR THAT PURPOSE ARE NOT AVAILABLE. It is the present intention of each Local Unit to use the revenues derived from the operation of its respective water treatment system to make all of the payments required to pay its obligations under the Contract.

RIGHT OF REFERENDUM

FOR EACH LOCAL UNIT, THE CONTRACT WILL BECOME EFFECTIVE without vote of the electors as permitted by law unless a petition requesting an election on the question of the Local Unit entering into the Contract, signed by not less than 10% of the registered electors of the Local Unit, is filed with the Clerk of the Local Unit within forty-five (45) days after publication of this notice. If such petition is filed, the Contract cannot become effective with respect to such Local Unit without an approving vote of a majority of electors of the Local Unit qualified to vote and voting on the question.

This notice is given pursuant to the requirements of Section 8 of Act No. 233, Public Acts of Michigan, 1955, as amended. Further information concerning the details of the Contract and the matters set out in this notice may be secured from the Local Unit's Clerk's office.

John J. Gleason
County Clerk
County of Genesee

Inez M. Brown
City Clerk
City of Flint

Stauder, BARCH & ASSOCIATES, Inc.

PUBLIC FINANCIAL CONSULTANTS

Since 1968

Richard W. Barch
President

Paul R. Stauder
First Vice President

January 13, 2014

Mr. Gerald W. Ambrose Finance Director
City of Flint
1101 South Saginaw Street
Flint, MI 48502

RE: Not to exceed $300,000,000 Karedgnondi Water Supply System Bonds (Karegnondi Water Pipeline), Series 2014 A and B

Dear Jerry:

We are enclosing an original (with an additional copy for your records) of the "Application for State Treasurer's Approval to Issue Long-Term Securities" form. Please have Darnell Earley sign both signature pages of the application. In order to obtain prior written approval from the Department of Treasury to issue a municipal security you must file all of the following documents with the Department:

- A completed application for the state treasurer's approval. (enclosed)
- A copy of your current budget.

All of these documents shall be submitted to Bond Counsel. Bond Counsel will submit the required documents to the Department of Treasury.

Please send the applicable documents to:

David P. Massaron
Miller, Canfield, Paddock and Stone, P.L.C.
150 West Jefferson, Suite 2500
Detroit, MI 48226

If you have should have any questions, please give me a call.

Sincerely,

Paul R. Stauder
First Vice President

PRS/mv
Enclosures
cc: John O'Brien, GCDC
Keith Francis, County Controller
David Massaron, Miller, Canfield, Paddock and Stone, P.L.C.
Sylvia Dimov, Miller, Canfield, Paddock and Stone, P.L.C.

3989 Research Park Drive Ann Arbor, Michigan 48108
Telephone: (734)668-6688 / Facsimile: (734)668-6723
e-mail: paul@stauderbarch.com

Michigan Department of Treasury
1428 (Rev. 2-02)

This form is issued under the authority of P.A. 34 of 2001. If your municipality does not have qualified status, you must file this form to apply for approval of the State Treasurer before Long term Municipal Securities can be issued.

Application for State Treasurer's Approval to Issue Long-Term Securities

INSTRUCTIONS: Complete all parts of this application. The Department of Treasury may request additional information.
FILE WITH: Local Audit & Finance Division, Michigan Department of Treasury, P.O. Box 30728, Lansing, MI 48909-8228.
Direct questions to (517) 373-0660 or email to TREAS_LAFD@michigan.gov

The municipality identified below applies for permission to issue securities under authority of the statutes(s) and resolution as follows:

[X] P.A. 34 of 2001, as amended
[X] P.A. 233 of 1955, as amended

Date Resolution Was Adopted: 11/20/13

Legal Name of Municipality	Legal Classification	County (ies)
City of Flint	Home Rule City	Genesee

Title of Security
Water Supply System Bonds (Karegnondi Water Pipeline), Series 2014 A

Amount of Security	Date of Security
Not to Exceed $220,500,000	To Be Determined

Chief Administrative Officer - Person Darnell Earley Emergency Manager	Address and Telephone No. 1101 South Saginaw Street Flint, MI 48502 phone: 810-237-2057 fax: 810-766-8675
Bond Counsel - Person and Firm David P. Massaron Miller, Canfield, Paddock and Stone, P.L.C.	Address and Telephone No. 150 West Jefferson, Suite 2500 Detroit, MI 48226-4415 phone: 313-496-7523 fax: 313-496-8450
Local Attorney - Person and Firm	Address and Telephone No. phone: fax:
Financial Consultant - Person and Firm Paul R. Stauder Stauder, Barch & Associates, Inc.	Address and Telephone No. 3989 Research Park Drive Ann Arbor, MI 48108 phone: 734-668-6688 fax: 734-668-6723
Underwriter - Person and Firm Thomas J. Whitehouse JP Morgan	Address and Telephone No. 1450 Brickell Ave, 33rd Fl Miami, FL 33131 phone: 305-579-9482 fax: 312-337-0347
Engineer or Architect - Person and Firm Mark M. Coleman, P.E. Wade Trim	Address and Telephone No. 500 Griswold Suite 2500 Detroit, MI 48226 phone: 313-961-3650 fax:

CERTIFICATION: I the undersigned, certify that this application and the attachments were authorized by the governing body of this municipality and that they are complete and accurate in all respects. I further certify that the funds on hand (if any) listed on page 4 of this application are on hand and available for use on this project.

Chief Administrative Officer Name and Title (Typed or Printed)	Chief Administrative Officer's Signature	Date
Darnell Earley, Emergency Manager	Darnell Earley	1-15-14

Michigan Department of Treasury
1428 (Rev. 2-02)

This form is issued under the authority of P.A. 34 of 2001. If your municipality does not have qualified status, you must file this form to apply for approval of the State Treasurer before Long-term Municipal Securities can be issued.

Application for State Treasurer's Approval to Issue Long-Term Securities

INSTRUCTIONS: Complete all parts of this application. The Department of Treasury may request additional information.
FILE WITH: Local Audit & Finance Division, Michigan Department of Treasury, P.O. Box 30728, Lansing, MI 48909-8228.
Direct questions to (517) 373-0660 or email to TREAS_LAFD@michigan.gov

The municipality identified below applies for permission to issue securities under authority of the statutes(s) and resolution as follows:

[X] P.A. 34 of 2001, as amended
[X] P.A. 233 of 1955, as amended

Date Resolution Was Adopted: 11/20/13

Legal Name of Municipality	Legal Classification	County (ies)
City of Flint	Home Rule City	Genesee

Title of Security
Water Supply System Bonds (Karegnondi Water Pipeline), Series 2014 B

Amount of Security	Date of Security
Not to Exceed $79,500,000	To Be Determined

Chief Administrative Officer - Person Darnell Earley Emergency Manager	Address and Telephone No. 1101 South Saginaw Street Flint, MI 48502 phone: 810-237-2057 fax: 810-766-8675
Bond Counsel - Person and Firm David P. Massaron Miller, Canfield, Paddock and Stone, P.L.C.	Address and Telephone No. 150 West Jefferson, Suite 2500 Detroit, MI 48226-4415 phone: 313-496-7523 fax: 313-496-8450
Local Attorney - Person and Firm	Address and Telephone No. phone: fax:
Financial Consultant - Person and Firm Paul R. Stauder Stauder, Barch & Associates, Inc.	Address and Telephone No. 3989 Research Park Drive Ann Arbor, MI 48108 phone: 734-668-6688 fax: 734-668-6723
Underwriter - Person and Firm Thomas J. Whitehouse JP Morgan	Address and Telephone No. 1450 Brickell Ave, 33rd Fl Miami, FL 33131 phone: 305-579-9482 fax: 312-337-0347
Engineer or Architect - Person and Firm Mark M. Coleman, P.E. Wade Trim	Address and Telephone No. 500 Griswold Suite 2500 Detroit, MI 48226 phone: 313-961-3650 fax:

CERTIFICATION: I the undersigned, certify that this application and the attachments were authorized by the governing body of this municipality and that they are complete and accurate in all respects. I further certify that the funds on hand (if any) listed on page 4 of this application are on hand and available for use on this project.

Chief Administrative Officer Name and Title (Typed or Printed)	Chief Administrative Officer's Signature	Date
Darnell Earley, Emergency Manager	Darnell Earley	1-15-14

Purpose

For the purpose of acquiring, construct and equip a water system to provide raw untreated water to the Local Units, together with all and necessary appurtenances and attachments thereto.

Maturity Schedule

See Attached

Interest	First Interest Payment	Interest Payments
Not to exceed 10% Maximum	To Be Determined	May 1 and November 1

Optional Securitie (To be determined)

Securities maturing 20___ / _____ are non callable.

Securities maturing 20___ / _____ are callable on any interest payment date on or after _____

at par and accrued interest, plus a premium ranging from _____ % to _____ % in _____ order.

SECURITY

Full Faith and Credit Pledge

- [ ] Unlimited Tax Full Faith and Credit Pledge
- [X] Limited Tax Full Faith and Credit Pledge
- [ ] No Full Faith and Credit Pledge

Authorized by a Vote?

		Votes For:	Votes Against:	Spoiled Ballots:
[X]	NO			
[ ]	YES - Date of Election:			

Sources of Revenues

- [X] Rates and Charges
- [ ] Taxes
- [ ] Special Assessments
- [ ] Michigan Transportation Fund Revenues
- [ ] Other (Specify)

Additional Security

City of Flint

TAX INFORMATION

Fiscal Year	Date Taxes are Due	Date Taxes Delinquent
July 1 - June 30	July 1 - Oct 1 - Feb 1	1-Mar

Maximum authorized statutory, constitutional or charter tax levy	10.00	mills
Maximum estimated annual millage requirement for this issue	- 0 -	mills
Date of first levy for this issue (if tax supported)	N/A	

Tax Collection History for Last Four Completed Fiscal Years

Fiscal Year Ending	Tax Levy	Collections to Date Delinquent	Percentage
2013	28,192,664	24,134,164	85.60%
2012	18,022,915	15,866,017	88.03%
2011	21,029,361	19,431,043	92.40%
2010	22,864,857	21,950,721	96.00%

MUNICIPAL MILLAGE RATES	Operating	Debt	Other
for 2012	7.5000	0.0000	8.5000

This municipality is in compliance with the provisions of Article IX, Section 6, of the Michigan Constitution of 1963 ..... [X] Yes [ ] No

TV INFORMATION

Breakdown of Current Year's State Taxable Valuation 2013					
			STATE EQUALIZED VALUATION	CURRENT YEAR 2013	$795,172,400
Industrial	$77,833,577	10.02%		PRIOR YEAR 2012	$969,129,800
Commercial	$181,351,218	23.35%		PRIOR YEAR 2011	$1,191,515,300
Utility	$0	0.00%	TAXABLE VALUE	CURRENT YEAR 2013	$776,654,903
Agricultural	$0	0.00%		PRIOR YEAR 2012	$917,513,440
Residential	$362,867,708	46.72%		PRIOR YEAR 2011	$1,112,393,943
Other (Personal)	$154,602,400	19.91%	POPULATION	CENSUS Current	97,932
TOTAL	$776,654,903	100.00%		CENSUS 2000	124,943
				CENSUS 1900	140,761
			SEV PER CAPITA	Current Year	$8,119.64

DEBT INFORMATION

You must attach the following lists unless the Department of Treasury waives the requirement for this detail:

1. All outstanding securities or debt with no full faith and credit pledge. Include title and date of issue and the amount outstanding.
2. All outstanding securities or debt with either a limited or unlimited full faith and credit pledge. Include title, date and type of issue, and the amount supported by taxes.
3. All outstanding securities or debt with either a limited or unlimited full faith and credit pledge that has been issued by an overlapping municipality. Include the name of the issuing municipality, the amount outstanding, the share applicable to your municipality, the net tax supported amount outstanding and the share applicable to your municipality.
4. All projects currently being planned for future indebtedness. Include an estimate of the amount of indebtedness to be incurred.

REPAYMENT SCHEDULE

Attach a schedule of revenues available for repayment of the proposed and outstanding securities and indicate coverage. Include operation and maintenance expenses and reserve requirements (when applicable) in addition to principal and interest requirements. Begin with one year of actual revenues and expenses. Revenue supported securities need only project for a 7 to 10 year period. In lieu of this schedule, voted general obligation securities may submit a principal and interest schedule.

1428, Page 4 **City of Flint**

10 LARGEST PROPERTY TAXPAYERS

	Name		2013 Taxable Value	IFT VALUE	TOTAL
1.	Consumers Energy	utility	$51,454,247	$0	$51,454,247
2.	General Motors LLC	automotive	47,820,558	9,386,600	57,207,158
3.	Delphi Authomofve	automotive	12,067,500	0	12,067,500
4.	Barrette	retail	10,102,700	0	10,102,700
5.	4405 Continental	distribution warehouse	6,418,860	0	6,418,860
6.	IINN	health care	5,251,400	0	5,251,400
7.	Comcast Cablevision	cable service	5,106,000	0	5,106,000
8.	Saginaw & Court	real-estate	4,160,735	0	4,160,735
9.	Citizens Bank (First Merritt)	banking	3,363,904	0	3,363,904
10.	Diplomat	manufacturing	3,201,900	0	3,201,900

10 LARGEST EMPLOYERS AND EMPLOYMENT DATA

	Name		Number of Employees
1.	General Motors LLC	automotive	13,975
2.	McClaren Health Care Group	health care	3,014
3.	Hurley Medical Center	hospital & other heath care	2,811
4.	University of Michigan	education	2,624
5.	Flint School District	education	2,559
6.	Genesee County	government	2,361
7.	CS Mott Community College	education	2,022
8.	Employment Plus	employment agent	1,214
9.	State of Michigan	government	1,183
10.	Kettering University	education	1,010

Local unemployment rate for the most recently available month	16.90%
Seasonally adjusted unemployment rate for the preceding month	

ESTIMATED COSTS	
Project Category	Estimated Costs
Construction cost (materials and labor)	See Attached
Equipment	
Site Acquisition and development	
Architect or engineering (including survey, design, inspection, etc..)	
Issuance Costs	
Capitalized Interest (_____ months at _____%)	
Other Costs	
Contingencies	
Total Project Costs	
Less:	
Grants.....	
Funds on Hand	
BALANCE: Amount of the security	

Municipal Advisory Council of Michigan

Buhl Building - 535 Griswold, Suite 1850 - Detroit, Michigan 18226-3699
313-963-0120 800-337-0696 Fax 313-963-0943 www.ms-macsitc.com

Debt Summary Report

Debt as of 11/18/2013

Municipal City of
FLINT

Dated / Cusip	Debt Type	Sub# Description - Purpose / Note	Shared	Gross Original Amt	Gross Outstanding	Municipality's Portion Outstanding	- Escrowed =	Net Amt
04/13/2011 NA	GO LT XSEC XF XEN XTD XUSA XR	1- MFA - Series 2011 - Financial Stabilization	N	8,000 M	Report 7,620 M	$7,620 M	- 0 M =	7,620,000
			GO Subtotal		7,620 M	$7,620 M	- 0 M =	7,620,000
03/25/2010 339510	GOAU XT SS XF XEN XTD XUSA XR	1- Series 2010 (Hurley Medical Center) - Health	N	35,215 M	Report 33,215 M	$33,215 M	- 0 M =	33,215,000
04/02/2013 339510	GOAU XT SS XF XEN XTD XUSA XR	1- Hurley Medical Center Series 2013A - Health	N	21,940 M	Report 21,940 M	$21,940 M	- 0 M =	21,940,000
04/02/2013 339511	GOAU XT SS XF XEN XTD XUSA RF	1- Hurley Medical Center Ref.. Series 2013B -	N	36,590 M	Report 36,035 M	$36,035 M	- 0 M =	36,035,000
			GOAU Subtotal		91,190 M	$91,190 M	- 0 M =	91,190,000
09/30/1999 NA	REV XT REV XF XEN XTD XUSA XR	1- SERIES 1999 - Utilities Water Call: legaldw	N	7,220 M	Report 2,930 M	$2,930 M	- 0 M =	2,930,000
09/28/2000 NA	REV XT REV XF XEN XTD XUSA XR	1- SERIES 2000 - Utilities Water	N	8,035 M	Report 3,700 M	$3,700 M	- 0 M =	3,700,000
09/28/2001 NA	REV XT REV XF XEN XTD XUSA XR	1- SERIES 2001 - Utilities Water	N	9,480 M	Report 4,850 M	$4,850 M	- 0 M =	4,850,000
09/25/2003 NA	REV XT REV XF XEN XTD XUSA XR	1- SERIES 2002 - Utilities Water	N	19,180 M	Report 11,700 M	$11,700 M	- 0 M =	11,700,000
			REV Subtotal		23,180 M	$23,180 M	- 0 M =	23,180,000

Municipal City of
FLINT

Dated / Cusip	Debt Type	Sub# Description - Purpose / Note	Shared	Gross Original Amt	Gross Outstanding	Municipality's Portion Outstanding	- Escrowed	= Net Amt
06/11/2003 339511	REVAU XT SS XF XEN XTD XUSA RF	1- hurley medical center - Health Care Facilities series 1995b bonds.	N	35,000 M	Report 5,150 M	$5,150 M	0 M	5,150,000
12/28/2007 NA	REVAU XT REV XF XEN XTD XUSA XR	1- Cap Impvt., Parking - Public Garage/Parking	N	10,000 M	Report 8,955 M	$8,955 M	0 M	8,955,000
09/30/2011 NA	REVAU XT SS XF XEN XTD XUSA XR	1- Equipment - Health Care Facilities	N	5,074 M	Report 3,829 M	$3,829 M	0 M	3,829,661
			REVAU Subtotal		17,934 M	$17,934 M	0 M	17,934,661
			Grand Total		139,924 M	$139,924 M	0 M	139,924,661

Municipal Advisory Council of Michigan

Buhl Building - 535 Griswold, Suite 1850 - Detroit, Michigan 48226-3699
313-963-0420 800-337-0696 Fax 313-963-0943 www.mi-macsite.com

CITY - FLINT (GENESEE)

Taxable Value		Year	Population
2013	754,083,994	2011	102,434
2012	920,073,024	2010	102,434
2011	1,113,523,735	2008	125,000
2010	1,274,340,776	2007	125,000
2009	1,446,086,098		
2008	1,587,996,219		

Overlapping Debt as of 11/18/2013

%	Municipality	Net Tax Supported Debt	Share
School District			
7.68	CARMAN-AINSWORTH (GENESEE)	40,208,000	3,087,974
100.00	FLINT (GENESEE)	13,890,000	13,890,000
0.03	KEARSLEY (GENESEE)	0	0
1.33	SWARTZ CREEK (GENESEE)	12,615,000	167,780
4.25	WESTWOOD HEIGHTS (GENESEE)	0	0
		School District Total:	**17,145,754**
County			
8.81	GENESEE	74,124,040	6,530,328
		County Total:	**6,530,328**
Intermediate School District			
8.32	GENESEE I/S/D	0	0
		Intermediate School District Total:	**0**
Community College			
8.32	MOTT COMMUNITY COLLEGE	46,050,000	3,831,360
		Community College Total:	**3,831,360**
Library			
100.00	FLINT PUBLIC LIBRARY	0	0
		Library Total:	**0**
Authority			
8.81	BISHOP AIRPORT AUTH	10,605,000	934,301
		Authority Total:	**934,301**
			28,441,742

WadeTrim AECOM

Project Cost Estimate - Weekly Update

KWA Water Supply System

Genesee County Drain Commissioner Division of Water & Waste

Week of December 23, 2013

Contract S.4000 - Intake, Shorewell and Tunnel	KWA		
Contract S.4001 - Lake Huron Pump Station	KWA	$	15,925,942
Contract S.4004 - Intermediate P.S. and Storage Reservoir/Balancing Tanks	KWA	$	19,435,641
Contract S.4002 - Raw Water Transmission Main from LHPS to Bricker Rd	KWA	$	32,592,388
Contract S.4003 - Raw Water Transmission Main from Bricker Rd to Int. PS	KWA	$	33,690,912
Contract S.4005 - Raw Water Transm Main from Int. PS to Jefferson Rd	KWA	$	32,733,511
Contract S.4006 - Raw Water Transm Main from Jefferson Rd to GCDC WTP at Marathon Rd	KWA	$	38,255,181
Contract S.4007 - Raw Water Transm Main from GCDC WTP at Marathon Rd to Flint WTP	KWA	$	24,019,644
Contract S.5004 - 2 Mile 36" Raw Water Transmission Main from GCDC WTP to Stanley & German Rd	KWA	$	1,377,736
System Control and Monitoring	KWA	$	552,800
Design Contingency	3%	$	5,957,513
Construction Contingency (5%)	10%	$	9,929,188
Design Engineering		$	5,700,000
Construction Administration		$	7,216,127
Legacy Costs			
Bond, Legal & Project Administration	3%	$	5,957,513
Power Service to Lake Huron Pump Station	KWA	$	85,000
Substation at Lake Huron Pump Station	KWA	$	2,239,308
Power Service to Intermediate Pump Station	KWA	$	2,300,000
Substation at Intermediate Pump Station	KWA	$	1,654,496
Power Service (Valves & Meters)	KWA		
Land (Lake Huron Pump Station)	KWA		
Land (Intermediate Pump Station)	KWA		
Land and Acquisition Costs (Easements & Attorney Fees)	KWA	$	60,000
Land (Lapeer Co. Transmission)	KWA		

WADETRIM AECOM

Project Cost Estimate - Weekly Update

KWA Water Supply System

Genesee County Drain Commissioner Division of Water & Waste

Week of December 23, 2013

Contract S.4000 - Intake, Shorewell and Tunnel	KWA	$	-
Contract S.4001 - Lake Huron Pump Station	KWA	$	15,925,942
Contract S.4004 - Intermediate P.S. and Storage Reservoir/Balancing Tanks	KWA	$	19,435,641
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Contract S.4005 - Raw Water Transm Main from Int. PS to Jefferson Rd	KWA	$	32,733,511
Contract S.4006 - Raw Water Transm Main from Jefferson Rd to GCDC WTP at Marathon Rd	KWA	$	38,255,181
Contract S.4007 - Raw Water Transm Main from GCDC WTP at Marathon Rd to Flint WTP	KWA	$	24,019,644
Contract S.5004 - 1 Mile 36" Raw Water Transmission Main from GCDC WTP to Stanley & German Rd	KWA	$	1,377,736
System Control and Monitoring	KWA	$	552,800
Design Contingency	3%	$	5,957,513
Construction Contingency	10%	$	9,929,188
Design Engineering		$	5,700,000
Construction Administration		$	7,216,127
Legacy Costs		$	-
Bond, Legal & Project Administration	3%	$	5,957,513
Power Service to Lake Huron Pump Station	KWA	$	85,000
Substation at Lake Huron Pump Station	KWA	$	2,239,308
Power Service to Intermediate Pump Station	KWA	$	2,300,000
Substation at Intermediate Pump Station	KWA	$	1,654,496
Power Service (Valves & Meters)	KWA	$	-
Land (Lake Huron Pump Station)	KWA	$	-
Land (Intermediate Pump Station)	KWA	$	-
Land and Acquisition Costs (Easements & Attorney Fees)	KWA	$	60,000
Land (Lapeer Co. Transmission)	KWA	$	-

$300,000,000
KAREGNONDI WATER AUTHORITY
STATE OF MICHIGAN
WATER SUPPLY SYSTEM BONDS, SERIES 2014 A
(LIMITED TAX GENERAL OBLIGATION)

Estimated Sources & Uses of Funds

		Series 2014 A	Series 2014 B	Total
Sources of Funds				
Par Amount of Bonds		$220,500,000.00	$79,500,000.00	$300,000,000.00
Production		(477,809.45)	0.00	(477,809.45)
Accrued Interest		0.00	0.00	0.00
Other		0.00	0.00	0.00
Contribution from Debt Fund		0.00	0.00	0.00
Total Sources		$220,022,190.55	$79,500,000.00	$299,522,190.55
Uses of Funds				
Deposit to Construction Account		$170,086,078.63	$64,597,528.38	$234,683,607.01
Deposit to Debt Fund-Bond Reserve		17,714,737.50	$5,139,575.00	22,854,312.50
Deposit to Debt Fund-Cap Int		29,524,233.33	8,745,000.00	38,269,233.33
Underwriter's Discount @	0.430%	948,150.00	341,850.00	1,290,000.00
Bond Insurance	0.250%	1,115,112.83	441,174.88	1,556,287.71
Costs of Issuance		633,878.25	234,871.75	868,750.00
Miscellaneous		0.00	0.00	0.00
Total Uses		$220,022,190.55	$79,500,000.00	$299,522,190.55

Stauder, Barch & Associates, Inc.
Municipal Bond Financial and Marketing Consultants
3989 Research Park Drive
Ann Arbor, Michigan 48108
Phone: (734) 668-6688 Fax (734) 668-6723

$220,600,000
KAREGNONDI WATER AUTHORITY
STATE OF MICHIGAN
WATER SUPPLY SYSTEM BONDS, SERIES 2014 A
(LIMITED TAX GENERAL OBLIGATION)

Dated: 01-Mar-14
Delivery Date: 01-Mar-14
Bond Term: 29 yrs, 8 mos
Average Life: 20.00

$79,500,000
KAREGNONDI WATER AUTHORITY
STATE OF MICHIGAN
WATER SUPPLY SYSTEM BONDS, SERIES 2014 B
(LIMITED TAX GENERAL OBLIGATION)

Dated 01-Nov-14
Delivery Date 01-Nov-14

SCHEDULE OF ESTIMATED NET REVENUE COVERAGE OVER DEBT

F/Y End 12-31.	[1] Gross Revenues Available	[2] Annual Operating Costs	Revenues Available for Debt Service	Existing Water Bond INTAKE Payments	$220,500,000 SERIES 2014A Interest Due May 1	Interest Due Nov 1	Estimated Interest Rate	Principal Due Nov 1	Total P&I	$79,500,000 SERIES 2014B Interest Due May 1	Interest Due Nov 1	Estimated Interest Rate	Principal Due Nov 1	Total P&I	Total KWA Water Bonds	Total KWA & Intake Bonds Debt	Series 2014 A Capitalized Interest	Series 2014 B Capitalized Interest	Net Existing & Proposed Debt	Coverage
2014	$2,529,423	$0	$2,529,423	$2,529,423		7,381,058 [3]		$0	$7,381,058					$0	$7,381,058	$9,910,481	($7,381,058)	$0	$2,529,423	1.00
2015	2,526,838	0	2,526,838	2,526,838	5,535,794	5,535,794	0.000%	0	11,071,588	$2,186,250	$2,186,250	5.500%	$0	4,372,500	15,444,088	17,970,925	(11,071,588)	(4,372,500)	2,526,838	1.00
2016	2,527,388	0	2,527,388	2,527,388	5,535,794	5,535,794	4.000%	0	11,071,588	2,186,250	2,186,250	5.500%	0	4,372,500	15,444,088	17,971,475	(11,071,588)	(4,372,500)	2,527,388	1.00
2017	25,454,557	2,454,557	23,000,000	2,527,188	5,535,794	5,535,794	4.000%	4,885,000	15,956,588	2,186,250	2,186,250	5.500%	0	4,372,500	20,329,088	22,856,275			22,856,275	1.01
2018	25,454,557	2,454,557	23,000,000	2,527,588	5,438,094	5,438,094	5.000%	4,045,000	14,921,188	2,186,250	2,186,250	5.500%	1,035,000	5,407,500	20,328,688	22,856,275			22,856,275	1.01
2019	25,454,557	2,454,557	23,000,000	2,526,588	5,336,969	5,336,969	5.000%	4,240,000	14,913,938	2,157,788	2,157,788	5.500%	1,100,000	5,415,575	20,329,513	22,856,100			22,856,100	1.01
2020	25,454,557	2,454,557	23,000,000	2,528,188	5,230,969	5,230,969	5.000%	4,445,000	14,905,938	2,127,538	2,127,538	5.500%	1,165,000	5,420,075	20,327,013	22,856,200			22,856,200	1.01
2021	25,454,557	2,454,557	23,000,000	2,525,438	5,119,844	5,119,844	5.000%	4,670,000	14,909,688	2,095,500	2,095,500	5.500%	1,230,000	5,421,000	20,330,688	22,856,125			22,856,125	1.01
2022	25,454,557	2,454,557	23,000,000	2,528,438	5,003,094	5,003,094	5.000%	4,885,000	14,891,188	2,061,675	2,061,675	5.500%	1,310,000	5,433,350	20,324,538	22,853,975			22,853,975	1.01
2023	25,454,557	2,454,557	23,000,000	2,526,688	4,880,969	4,880,969	5.000%	5,125,000	14,886,938	2,025,650	2,025,650	5.500%	1,390,000	5,441,300	20,328,238	22,853,925			22,853,925	1.01
2024	25,454,557	2,454,557	23,000,000	2,529,438	4,752,844	4,752,844	4.000%	5,375,000	14,880,688	1,987,425	1,987,425	5.500%	1,470,000	5,444,850	20,325,538	22,854,975			22,854,975	1.01
2025	25,454,557	2,454,557	23,000,000	2,525,188	4,645,344	4,645,344	4.250%	5,585,000	14,875,688	1,947,000	1,947,000	5.500%	1,550,000	5,454,000	20,329,688	22,854,875			22,854,875	1.01
2026	25,454,557	2,454,557	23,000,000	2,528,188	4,526,663	4,526,663	4.375%	5,810,000	14,863,325	1,904,100	1,904,100	5.500%	1,655,000	5,463,200	20,326,525	22,854,713			22,854,713	1.01
2027	25,454,557	2,454,557	23,000,000	2,529,675	4,399,569	4,399,569	4.500%	6,060,000	14,859,138	1,858,588	1,858,588	5.500%	1,750,000	5,467,175	20,326,313	22,855,988			22,855,988	1.01
2028	25,454,557	2,454,557	23,000,000	2,527,488	4,263,219	4,263,219	4.625%	6,325,000	14,851,438	1,810,463	1,810,463	5.500%	1,855,000	5,475,925	20,327,363	22,854,850			22,854,850	1.01
2029	25,454,557	2,454,557	23,000,000	2,526,625	4,116,953	4,116,953	4.750%	6,620,000	14,853,906	1,759,450	1,759,450	5.500%	1,955,000	5,473,900	20,327,806	22,854,431			22,854,431	1.01
2030	25,454,557	2,454,557	23,000,000	2,525,625	3,959,728	3,959,728	4.875%	6,925,000	14,844,456	1,705,688	1,705,688	5.500%	2,075,000	5,486,375	20,330,831	22,856,456			22,856,456	1.01
2031	25,454,557	2,454,557	23,000,000	2,525,875	3,790,931	3,790,931	5.000%	7,265,000	14,846,863	1,648,625	1,648,625	5.500%	2,185,000	5,482,250	20,329,113	22,854,988			22,854,988	1.01
2032	25,454,557	2,454,557	23,000,000	2,527,125	3,609,306	3,609,306	5.000%	7,610,000	14,828,513	1,588,538	1,588,538	5.500%	2,320,000	5,497,075	20,325,588	22,852,813			22,852,813	1.01
2033	25,454,557	2,454,557	23,000,000	2,526,925	3,419,056	3,419,056	5.000%	7,985,000	14,823,113	1,524,738	1,524,738	5.500%	2,455,000	5,504,475	20,327,588	22,854,513			22,854,513	1.01
2034	25,454,557	2,454,557	23,000,000	2,527,113	3,219,431	3,219,431	5.250%	8,370,000	14,808,863	1,457,225	1,457,225	5.500%	2,605,000	5,519,450	20,328,313	22,855,425			22,855,425	1.01
2035	25,454,557	2,454,557	23,000,000	2,527,569	2,999,719	2,999,719	5.250%	8,805,000	14,804,438	1,385,588	1,385,588	5.500%	2,750,000	5,521,175	20,325,613	22,853,181			22,853,181	1.01
2036	25,454,557	2,454,557	23,000,000	2,527,381	2,768,688	2,768,688	5.250%	9,275,000	14,812,175	1,309,963	1,309,963	5.500%	2,895,000	5,514,925	20,327,100	22,854,481			22,854,481	1.01
2037	25,454,557	2,454,557	23,000,000	2,526,281	2,525,119	2,525,119	5.250%	9,770,000	14,820,238	1,230,350	1,230,350	5.500%	3,045,000	5,505,700	20,325,938	22,852,219			22,852,219	1.01
2038	25,454,557	2,454,557	23,000,000	2,529,000	2,268,656	2,268,656	5.250%	10,285,000	14,822,313	1,146,613	1,146,613	5.500%	3,210,000	5,503,225	20,325,538	22,854,538			22,854,538	1.01
2039	25,454,557	2,454,557	23,000,000	0	1,998,675	1,998,675	5.250%	13,710,000	17,707,350	1,058,338	1,058,338	5.500%	3,030,000	5,146,675	22,854,025	22,854,025			22,854,025	1.01
2040	25,454,557	2,454,557	23,000,000	0	1,638,788	1,638,788	5.250%	14,435,000	17,712,575	975,013	975,013	5.500%	3,190,000	5,140,025	22,852,600	22,852,600			22,852,600	1.01
2041	25,454,557	2,454,557	23,000,000	0	1,259,869	1,259,869	5.250%	15,195,000	17,714,738	887,288	887,288	5.500%	3,365,000	5,139,575	22,854,313	22,854,313			22,854,313	1.01
2042	25,454,557	2,454,557	23,000,000	0	861,000	861,000	5.250%	15,990,000	17,712,000	794,750	794,750	5.500%	3,540,000	5,129,500	22,841,500	22,841,500			22,841,500	1.01
2043	25,454,557	2,454,557	23,000,000	0	441,263	441,263	5.250%	16,810,000	17,692,525	697,400	697,400	5.500%	3,725,000	5,129,800	22,822,325	22,822,325			22,822,325	1.01
2044	25,454,557	2,454,557	23,000,000	0	0	0	0.000%	0	0	594,688	594,688	5.500%	21,625,000	22,814,375	22,814,375	22,814,375			22,814,375	1.01
2045	25,454,557	2,454,557	23,000,000	0	0	0	0.000%	0	0	0	0	5.500%	0	0	0	0			0	
				$53,184,254	$109,082,038	$116,463,096		$220,500,000	$446,045,133	$48,484,975	$48,484,975		$79,500,000	$176,469,950	$622,515,083	$685,699,337	($29,524,233)	($8,745,000)	$647,430,104	

[1] Revenue estimates provided by the KWA based on fixed charges for system capacity from Genesee County and City of Flint.
[2] Projected annual operating costs provided by the KWA.
[3] Interest from date of issue to first interest payment date.

prs/kcg

STATE OF MICHIGAN CONTRACT NO. 271N3200089

CITY OF FLINT WATER SUPPLY ASSESSMENT

February 2013

For Submittal to:

State of Michigan, Department of Treasury

Submitted by:

TUCKER, YOUNG,
JACKSON, TULL INC.
CONSULTING ENGINEERS-PLANNERS
615 Griswold Suite 600
Detroit, Michigan 48226
(313)963-0612 FAX (313)963-2156

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Appendices

1. INTRODUCTION

Tucker, Young, Jackson, Tull, Inc. (TYJT), at the request of the State Treasurer performed an analysis of the water supply options being considered by the City of Flint. The City of Flint is presently supplied potable water from the Detroit Water and Sewerage Department (DWSD). This supply is from a single 72-inch water main that terminates at a master meter located at Potter and Baxter. Additionally, downstream of the DWSD master meter, Flint supplies its customer Genesee County. The City of Flint also operates a water treatment plant that uses the Flint River as its source of supply to provide back up and redundancy to the DWSD supply as required by MDEQ

The Karegnondi Water Authority (KWA) is planning on constructing a raw water supply system that could provide Lake Huron water to the Flint Water Treatment Plant. Flint's existing plant would be upgraded to treat the new raw water source.

The State Treasurer has appointed an emergency financial manager for the City of Flint. As such the Treasurer has requested TYJT to provide an analysis of the water supply options to assist the Treasurer in determining any potential risk and the best course going forward for supplying potable water to the City of Flint.

Report Organization

The following sections of this report are described below:

Section 2 – The basis of the analysis is described in this section. The options include the KWA option and several options offered by DWSD.

Section 3 – A significant amount of information and data was collected including memorandums, reports, drawings, financial reports, and other documents. This section summarizes the information used in the analysis.

Section 4 – This section describes the evaluation of the cost of supply for the Flint options. The costs are comprised of the initial cost of operations plus the annual rate of escalation/inflation.

Section 5 – The evaluation process used to analyze the construction costs associated with the KWA supply system is described in this section. Additionally, the cost of financing the capital requirements is described.

Section 6 – This section presents the financial review of the options considered to supply potable water to Flint. A summary of these options is also provided.

Section 7 – In addition to the financial analysis other considerations were identified that should be considered in understanding the risks and determining the best option to supply Flint. They include items related to cost, redundancy and reliability, and Flint's ability to control their future cost of water supply.

2. FLINT WATER SUPPLY OPTIONS

Two water purveyor options were evaluated; the KWA water supply system and continued supply from DWSD. Both suppliers would provide water from Lake Huron as the source. The KWA system is a raw water supply, which means that the water would have to be treated by Flint before distributing the potable water to its customers. The DWSD supply is potable or "finished" water and would not need additional treatment.

Additionally, an option for the Flint WTP to supply the City of Flint without being supplied from either DWSD or KWA was initially considered. The preliminary investigation evaluated the cost associated with the required improvements to the plant and to the Flint River dam system. Although it appeared that this was a viable option, Flint in a meeting on December 20, 2012 with the Treasury, stated that the City did not want to pursue the option and it is no longer being considered.

Karegnondi Water Authority (KWA) Lake Huron Water Supply

The KWA water supply system schematic is shown in Figure 2-1. The system is comprised of an intake in Lake Huron that supplies water to the Lake Huron Pump Station (LHPS). The LHPS lifts the water and pumps it through an approximately 22 mile long 60-inch pipeline. The pipeline terminates at a 5 MG reservoir and is then pumped from the Intermediate Pump Station (IPS) through approximately 26 miles of 60-inch and 18 miles of 30-inch pipeline to the existing Flint WTP. Downstream of the IPS, approximately half way to the Flint WTP, the 60-inch line would also supply a new Genesee County WTP.

The raw water transmission system has a 60 MGD capacity and is sized to deliver a maximum of 18 MGD to the Flint WTP with an average day supply of 12 MGD. Improvements at the Flint WTP would also be required to treat the lake water as the plant is currently designed to treat the Flint River water.

The term of the KWA contract for Flint is 40 years.

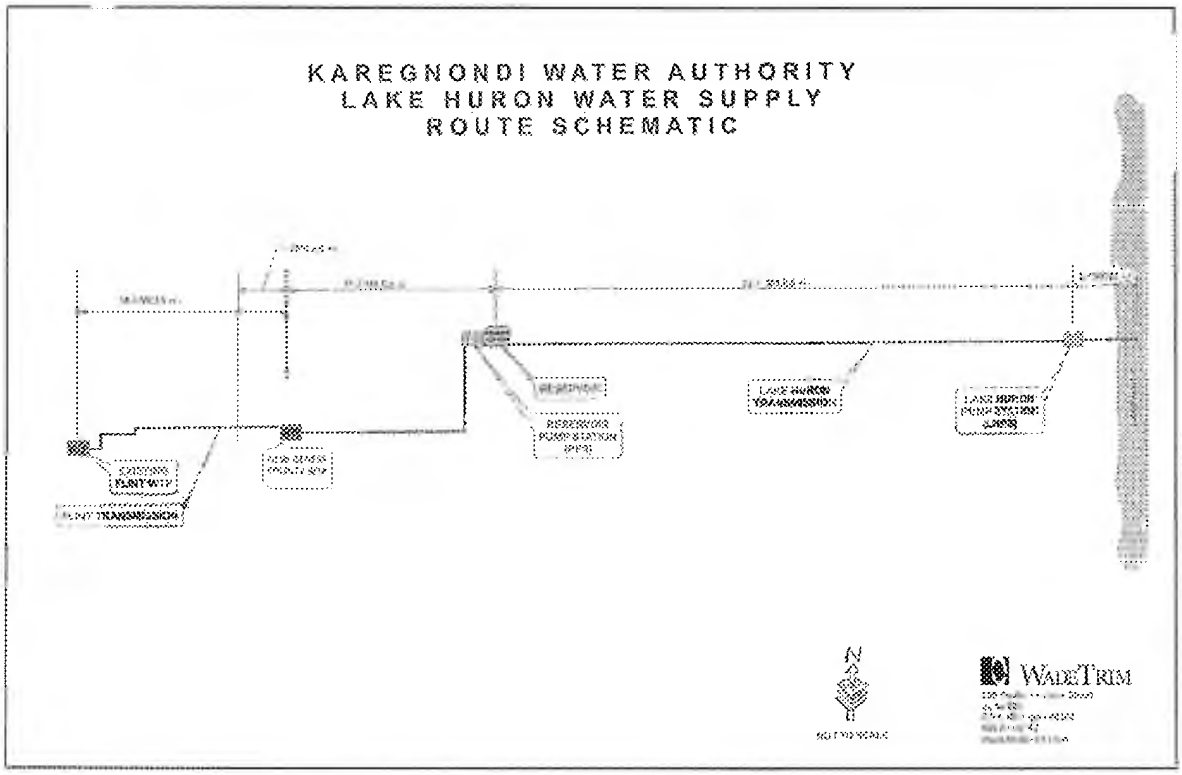

Figure 2-1: KWA Raw Water System

DWSD Water System

The DWSD system schematic is shown in Figure 2-2. Flint is currently supplied by DWSD at Master Meter FL-1, located at Potter and Baxter. Flint typically gets its water from the Lake Huron WTP, located in Fort Gratiot, Michigan; near the Lake Huron shoreline. Water is treated and pumped at the Lake Huron WTP and supplied through a 120-inch pipeline to an intermediate pump station called the Imlay Pump Station. The Imlay Pump Station has 20 MG of reservoir capacity. Depending on the time of year and the DWSD system demand, water is either bypassed directly to Flint or it is re-pumped at Imlay. It should be noted that the DWSD supply to Flint is part of a very large water system and during emergencies or outages water can be supplied from the south up to Flint in lieu of the Lake Huron facility.

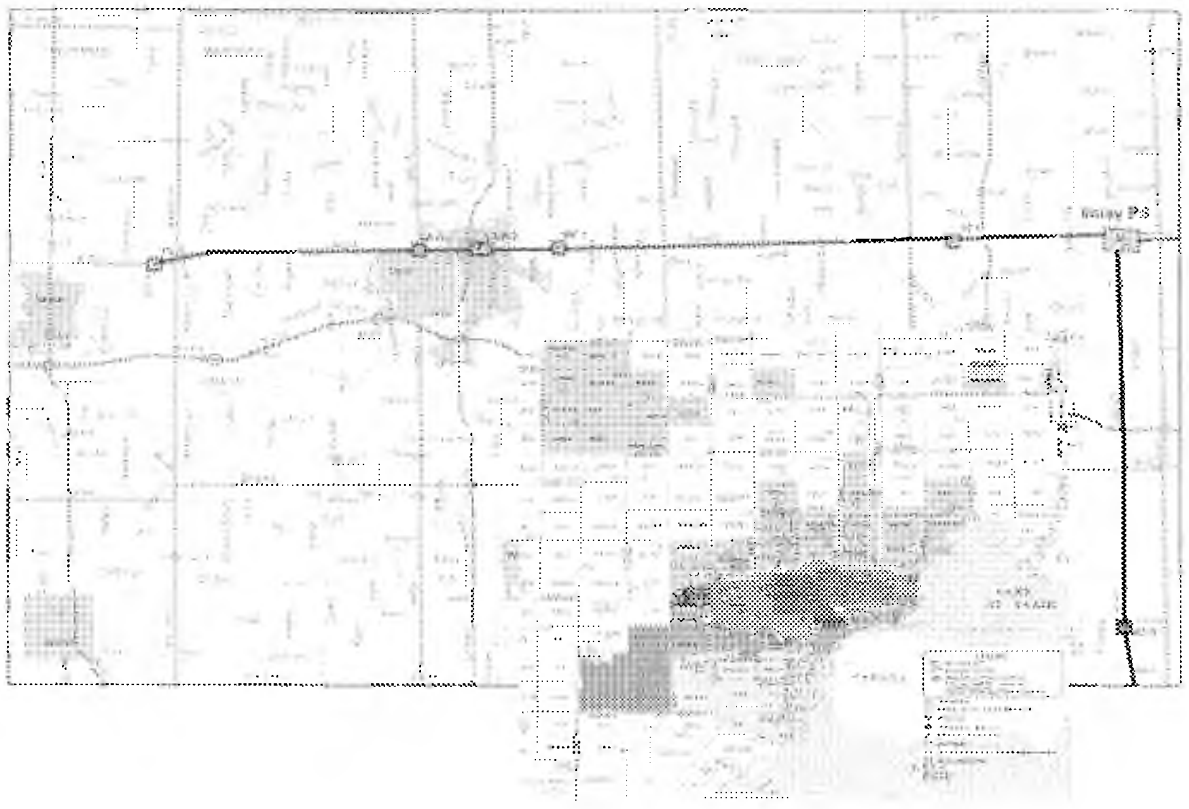

Figure 2-2: DWSD Water System

The pipeline from Imlay to FL-1 is a 72-inch pipeline. It has been estimated that the 72-inch line serving Flint has a capacity in excess of 90 MGD.

DWSD has presented several contractual options to Flint and all of them are based on Flint signing a new 30 year contract. The options shown in Table 2-1 are based on two different supply points; one at the current master meter location FL-1 at Potter and Baxter (P&B) and the other at the location of the Imlay Pump Station. The reason for the varying options is to provide a lower water rate at the Imlay Station, since the DWSD rate formula is based on distance and elevation factors related to the supply location.

The rates are also dependent on the maximum amount of water DWSD supplies. As example, if DWSD supplies a maximum day demand of 18 MGD that would equal the entire amount of water required by Flint.

For the options less than the maximum of 18 MGD means that the Flint WTP would supplement the difference by supplying water treated from the Flint River. These options are known as "blending" and would allow for Flint to blend two sources of water to supply its customers; the Flint River using the Flint WTP and Lake Huron from DWSD system.

[illegible]	[illegible]
18 MGD Maximum Day Customer – FL-1	12 MGD
12 MGD Maximum Day Customer – FL-1	8 MGD
8 MGD Maximum Day Customer – FL-1	8 MGD
12 MGD Maximum Day Customer - Imlay	12 MGD
8 MGD Maximum Day Customer - Imlay	12 MGD

Table 2-1: DWSD Supply Options

3. DATA COLLECTION

During the course of the investigation several documents were used to perform the analysis. The names of the documents are listed below for reference.

KWA and Flint

- Preliminary Engineering Report, Lake Huron Water Supply Karegnondi Water Authority, September 2009;
- Analysis of the Flint River as a Permanent Water Supply for the City of Flint, July 2011;
- Cost Comparison, KWA vs. DWSD, Letter to Mr. Kurtz, October 31, 2012;
- Lake Huron Supply Study, KWA, Appendix 20, October 2012 Preliminary Report Update, Final Report (DRAFT), October 4, 2012;
- Articles of Incorporation of Karegnondi Water Authority, endorsed in 2010;
- Karegnondi Water Authority Bylaws, October 26, 2010;
- KWA Raw Water Supply Contract;
- Flint WTP Statement of Revenues and Expenditures 09' – 12';
- GCDC Division of Water and Waste Services Financial Statements 03' – 11'; and
- Assorted emails with further clarification of questions and documentation.

DWSD

- Historical Rates and Charges to Flint 04' – 13';
- Historical Rates and Charges to Flint with Hypothetical Model Contract 10' – 13';
- 2013 Rates and Charges for the following options:
  - 18 MGD Maximum Day Customer at FL-1;
  - 12 MGD Maximum Day Customer at FL-1 (Flint blending*);
  - 8 MGD Maximum Day Customer at FL-1 (Flint blending*);
  - 12 MGD Maximum Day Customer at Imlay (Flint blending*);
  - 8 MGD Maximum Day Customer at Imlay (Flint blending*); and
- Assorted emails with further clarification of questions and documentation.

* Flint blending based on DWSD supplying two-thirds and Flint one-third of 12 MGD average day demand.

Two meetings were also held; one with DWSD and one with Flint and Genesee County representing KWA. The meetings were held on November 19, 2012 and November 20, 2012, respectively. Minutes from these meetings are included in Appendix A.

4. COST OF SERVICE

Information provided by DWSD, Flint, and representatives of the KWA were used in the cost of service evaluation. To evaluate the annual escalation/inflation rate over the planning period, the rate adjustment for DWSD was estimated based on the recent rate adjustment history. For the KWA system both the estimated cost of operations when the system begins supplying water and the annual rate adjustment or inflation was evaluated. The existing cost of operations and escalation for the Flint WTP was based on actual costs provided and then adjusted depending on the scenario considered. This section describes the evaluation process and the rates used in the analysis.

DWSD Water Supply

The City of Flint has been a customer of DWSD since 1967. The Flint WTP has been maintained as a backup to the DWSD system. As indicated previously, several options were provided by DWSD depending on the type of service Flint was to select. The unit cost of water for each of these options is shown in Table 4-1. These rates are based on DWSD's FY13, which are current until July 2013.

18 MGD Maximum Day Customer – FL-1	12	16.37
12 MGD Maximum Day Customer – FL-1	8	16.31
8 MGD Maximum Day Customer – FL-1	8	12.68
12 MGD Maximum Day Customer - Imlay	12	14.38
8 MGD Maximum Day Customer - Imlay	12	11.11

Table 4-1: Cost of DWSD Supply Options

To determine annual escalation rate, DWSD's last 10 years of history was used along with other large urban water systems in Michigan. The water systems used for benchmarking comparison were: Lansing, Grand Rapids, and Saginaw.

Table 4-2 identifies the annual and average rate of increase to Flint based on supplying water either to the current FL-1 at Potter and Baxter or Imlay. Note the last three years of the rates (FY 2011 through FY 2013) assumes that Flint's cost would be based on the new 30 year contract; FY 2011 being the first year that the new contract was available.

2004	11.06	
2005	10.24	-7.4
2006	10.56	3.1
2007	11.09	5.0
2008	11.35	2.3
2009	13.07	15.2
2010	11.73	-10.3
2011	13.89	18.4
2012	15.08	8.6
2013	16.24	7.7

From FL-1

2004	11.06	
2005	10.24	-7.4
2006	10.56	3.1
2007	11.09	5.0
2008	11.35	2.3
2009	13.07	15.2
2010	11.16	-14.6
2011	12.23	9.6
2012	13.28	8.6
2013	14.32	7.8

From Imlay

Table 4-2: Recent DWSD Water Rates

Audited financial reports were used to determine the rate of inflation associated with other three large municipal systems. The results are shown in Table 4-3.

Lansing	05'-12'	4.6
Grand Rapids	04'-11'	1.6
Saginaw	04'-11'	7.0

Table 4-3: O&M Inflation Rates of Other Large Water Systems

Based on the information analyzed from DWSD and the other communities, it was determined that a fair annual rate of inflation for operations and maintenance cost for the analysis should be 4.4%. The 4.4% has historical significance from Flint's current water supplier and falls within the range of the other communities.

KWA Water Supply

The initial projected O&M cost for the KWA supply would be comprised of KWA's O&M costs as well as Flint's O&M costs. Because there was limited information provided, the initial estimated rate of $1.50/MCF was used. This rate is based on information from the cost comparison analysis attached to the letter to Mr. Kurtz, dated October 31, 2012.

The KWA cost evaluation used an annual O&M inflation rate of 5%. To validate this rate a similar analysis to DWSD's operations and maintenance annual rate of inflation was used. First, in discussions with Flint and the Genesee County Drain Commission (GCDC), they believed that the annual rate of inflation for the new KWA system would be similar to the GCDC Water & Waste Services (WWS). Additionally, two large transmission systems were used to benchmark the inflation rates: the Southeastern Oakland County Water Authority (SOCWA) and the Ypsilanti Utility Community Authority (YUCA). Although both of these systems transmit finished water opposed to raw water, they were considered similar enough for comparison as they are comprised of only large water mains, pumping facilities and storage.

Once again audited financial statements were used to calculate the inflation rates. A summary of the findings are shown in Table 4-4. Based on the fact that the information analyzed showed a large difference between the two systems, it was determined that the KWA assumption of 5% was a good rate of inflation to use in the financial analysis. This rate is almost equally between the GCDC rate and the other two transmission systems.

Systems	Years Evaluated	Average Rate
GCDC WWS	03' – 11'	10.5
SOCWA	04'-12'	--
YUCA	04'-12'	0.7

Table 4-4: O&M Inflation Rates of Other Comparable Systems to KWA

Flint WTP

The Flint WTP currently serves as a backup supply to the DWSD service to Flint. To maintain backup operations, the City of Flint operates the plant approximately 20 days each year. Flint indicated that the average production rate when they operate is 11 MGD.

For the blending options and the KWA supply considered, Flint would be required to operate its plant all year around. Therefore, their operating and maintenance costs were evaluated and adjusted to determine an annual cost associated with year-round operations.

The Flint WTP provided three years of operating costs for the assessment. Additionally, reports listed in Section 3 were also used as reference to determine both operating costs for the plant processing Flint River water (blending options) and Lake Huron raw water (KWA option).

Major cost centers were analyzed to estimate annual operation and maintenance. They included: labor, utilities, chemicals and residual management. In general, as recommended by the Flint plant staff, labor and overhead were increased from the current costs by two-thirds. Additionally, variable costs for power, chemicals and residual cost were increased to estimate full time treatment at the Flint WTP. Data from the KWA Preliminary Report and annual operating data for the Flint WTP (provided separately) were analyzed to make these forecasts.

The annual operating and maintenance costs developed for Flint WTP used are shown in Table 4-5.

Source of Supply	Average Daily Production (MGD)	Estimated Annual O&M Cost
Flint River (Blending with DWSD)	4	$5,895,097
Lake Huron (Supplied by KWA)	12	$7,913,118

Table 4-5: FY 13 O&M Costs for Year-round Operations

It was determined that a fair annual rate of inflation for operations and maintenance cost for the Flint WTP plant should be 4.51%. The 4.51% is an average of Lansing, Grand Rapids and Saginaw facilities.

5. CAPITAL REQUIREMENTS

Large capital investments would be required by Flint and GCDC to construct the KWA supply system. Furthermore, some of the options presented by DWSD (supply point from Imlay) would require the purchase by Flint of DWSD's 72-inch water main. Performing the financial analysis; therefore, required an analysis of the KWA construction cost estimate for the transmission system and Flint WTP improvements.

Revenue bonds were also identified as the source of financing the new supply system and associated improvements. This section describes the assumptions made and the interest used for financing the improvements.

KWA Supply System

The most current cost estimate of the KWA system was presented in the document titled; Lake Huron Supply Study, KWA, Appendix 20, October 2012 Preliminary Report Update, Final Report (DRAFT), October 4, 2012. The cost of construction is estimated at $272,421,558. Flint's portion would be 30% or $81,726,467.

Due to the significance of this expenditure, a detailed review of the cost was performed and is presented in this section. The analysis was performed based on the main elements of the supply system: the lake intake, the two pumping stations, and the transmission pipeline. Additionally, an analysis was performed related to construction contingencies and other costs such as engineering, legal, and administration.

Lake Intake

KWA representatives indicated in a meeting in November that the design documents for the intake were at 90% and that it was planned for advertisement in January 2013. A summary of the estimate is shown in Table 5-1.

Description	Estimate
Intake and Crib	$22,076,850
ELAC at 25%	5,519,213
Property	2,300,000
Total	**$29,896,063**

Table 5-1: KWA Intake Cost Estimate

Based on the evaluation, it appeared that the cost estimate was reasonable. Given that the design was nearly complete, the engineering, legal, administration, and construction contingencies (ELAC) at 25% were also found to be appropriate.

Pumping Stations

KWA representatives indicated that the pump stations were estimated at a level of design less than 15%. Therefore, in addition to an evaluation of their cost estimate, other water pumping station costs were used for comparison. Additionally, contractors were also contacted for costs. Table 5-2 summarizes the KWA cost estimate compared to our cost estimate performed for the Treasury.

Description	KWA Estimate		TVT Estimate
Pumping Stations	$24,618,080		$54,573,314
Land for Intermediate Pump Station and Reservoir	--		75,000
Subtotal	**$24,618,080**		**$54,648,314**
ELAC for Construction	**25%**	**6,154,520**	**30%**	**16,394,494**
Total	**$30,772,600**		**$71,042,808**

Table 5-2: Pumping Stations Cost Estimate

Two things to note regarding the difference in the cost estimates; firstly, there is a large difference in the cost estimates of the pumping stations. The estimate developed for the Treasury used several other pumping stations construction costs from Southeastern Michigan and discussions with contractors. These costs were then computed on a $/MG's for comparison.

Secondly, our estimate for the Treasury is based on an ELAC of 30% instead of KWA's 25%. Although 25% was acceptable for the intake, it is believed to be too low for the pumping station estimate given that the engineering effort is less than 15%.

Transmission Main

Although the specific route for the transmission main was not provided, an estimate was calculated based on the general information provided. Once again, the KWA estimate was based on a level of design less than 15%. The estimate performed for the Treasury used the line items provided by KWA for the pipeline and also consulted with contractors to evaluate the cost of construction. The comparison is shown in Table 5-3.

Although the cost of construction of the pipeline is similar, a value of 30% was used for ELAC due to the level of design. Additionally, KWA did not believe there would be any additional costs for easements; however, this did not seem practical. Therefore an estimate for acquiring the easements was added to the Treasury estimate and is based on the 277 easements identified by KWA. The cost shown includes surveying, legal, engineering, administration, etc.

Transmission Mains		$166,202,316		$167,419,530
ELAC for Construction	25%	41,550,579	30%	50,225,859
Subtotal		$207,752,895		$217,645,389
Easements		--		1,166,170
Total		**$207,752,895**		**$218,811,559**

Table 5-3: Transmission Pipeline Cost Estimate

Other KWA Costs

In prior estimates of the construction cost, KWA used an ELAC of 37%. In this case it could be considered that the engineering effort associated with the design would have been included. However, it is believed that KWA's reduced ELAC of 25%, does not include the design effort. Additionally, it would be prudent to assume that the owner would want a construction manager during construction of this large project. A summary of these costs are shown in Table 5-4.

Design Engineering for Pumping Stations and the Transmission Pipeline	$16,939,581
Construction Management at 5%of Project Cost Estimate of $217,645,389	14,434,609
Administration	349,440
Legal, Easements, Contract Documents	831,000
Total	**$32,554,630**

Table 5-4: Other Costs

Summary Comparison

A summary of the two cost estimates are shown in Table 5-5. Based on the comparison, the estimate performed by TYJT shows a higher cost to Flint by approximately $25,000,000.

Note that there are two other costs shown in the summary that were not previously addressed; power and backup power. Regarding the cost of providing power to the pumping facilities, the cost of $4,000,000 appears reasonable.

The KWA has repeatedly indicated that backup power is not needed. Backup power is a standard practice in the water industry. Furthermore, a loss of power at either pumping facility will prevent the supply of water to both Flint and Genesee County. For these reasons, the cost of providing backup power was included in our estimate for the Treasury.

Description	KWA Estimate	OEM Estimate
Intake/Crib	$ 27,596,063	$ 27,596,063
Pump Stations	30,772,600	71,042,808
Transmission Mains	207,752,895	217,645,389
Power	4,000,000	4,000,000
Redundant Power for PS		1,273,200
Land for Lake Huron Pumping Station	2,300,000	2,300,000
Design Engineering/PS and Transmission		16,939,581
Construction Management		14,434,410
Administration		349,440
Legal/Easement/Contract Documents		831,000
Easements		1,166,170
Total	**$ 272,421,558**	**$ 357,578,060**
Flint Share at 30%	**$81,726,467**	**$107,273,418**

Table 5-5: Total Cost Comparison

Flint WTP Improvements

The KWA analysis identified capital costs required to convert the existing WTP from river water treatment to treating lake water. The cost estimate was identified as $7,100,000 in the 2009 report. This number was used in the our analysis, since additional information was not provided. For the purpose of the financial analysis; however, the $7,100,000 was increased by 3% each year for three years to account for inflation.

DWSD Imlay Station Supply Options

The options identified by DWSD to supply service to Flint at the Imlay Pump Station would require Flint to purchase the 72-inch water main from Imlay to Master Meter, FL-1. The pipeline is approximately 25 miles long. The estimated cost provided by DWSD for estimating purposes is $4,700,000.

Financing

The cost of financing the revenue bonds for the capital work was investigated. Based on conversations with local financial advisors knowledgeable in bond financing, an interest rate of 5% for the 25 year

period was considered acceptable. This is based on a Standard and Poor's bond rating of A without insurance.

Additional costs associated with the bond include the reserve and bond issuance fee. The bond holders will require a reserve of approximately 10% of the loan to be held for the 25 year payment period. The cost associated with the bond issuance has been estimated at 2.25% of the principal borrowed for the KWA project and 3% for the smaller loan associated with the Flint WTP improvements or the purchase of the 72-inch main.

Furthermore, since no revenue will be generated to pay on the bonds for the first three years that the system is being constructed, the cost associated with capitalizing the interest was also included.

Finally, interest on the reserve will be provided back to KWA and Flint. Although the interest is currently less than 1%, it was determined that a 3% rate would be more prudent long-term.

6. FINDINGS

Using the information described in the previous sections, a cost evaluation was conducted for the KWA supply and the DWSD options. Individual worksheets for each option are provided in Appendix B. For the purpose of comparison a 30 year period was used. This period includes the 3 year construction period, the 25 loan period and an additional two years to get a sense of the cost of operation after the loans have been paid.

There were three separate cost sheets prepared for the KWA option. The first cost sheet (KWA) is based on the cost estimate provided by KWA. The costs provided assumed no overruns or delay in construction. With KWA's own assumptions of an overrun in construction of 15% and a one year delay in operations, the KWA estimated cost becomes $686,375,920 through Year 2042.

Since this cost estimate did not appear to include the financing of revenue bonds, another cost sheet (KWA-1) was developed that included KWA's cost estimate without overruns with the additional finance costs associated with the revenue bonds. A final cost sheet (KWA-2) includes the cost associated with the revenue bonds based on the estimate provided by TYJT for the Treasury.

A summary of the cost sheets provided in Appendix B are shown in Table 6-1. Figure 6-1 shows the cumulative annual costs associated with each option.

Option	Costs through 2042 ($)	Ranking by Cost
DWSD 8 MGD Maximum Day at Imlay Station	634,795,488	1
KWA *(10/31/12 No Overruns, As Provided)**	649,775,166	2
DWSD 8 MGD Maximum Day at FL-1	672,671,705	3
KWA-1 *(10/31/12 No Overruns with Cost of Financing)*	707,279,715	4
DWSD 12 MGD Maximum Day at Imlay Station	725,576,803	5
DWSD 12 MGD Maximum Day at FL-1	762,110,308	6
KWA-2 *(Treasury Estimate)*	766,784,313	7
DWSD 18 MGD Maximum Day at FL-1	821,226,268	8

* $686,375,920 with 15% overrun in construction and a one year delay in operations

Table 6-1: Total Cost of Options through 2042

Based on the analysis, it is prudent to assume the KWA water supply option costs would be somewhere between the KWA-1 and KWA-2 options. Therefore, the analysis indicates that the two DWSD options of supplying 8 MGD on a maximum day and up to 8 MGD on average are the least cost options for Flint. These options allow Flint to maximize the use of existing assets; the City of Flint's (the Flint WTP) and DWSD's (the existing 72-inch main).

Additionally, in recent conversations with the Treasury another option was discussed that could potentially be the most cost-effective solution. Currently the Flint WTP serves as a backup if service is

lost through either the DWSD or KWA pipeline. If the a twin pipe paralleling the DWSD 72-inch water main were constructed with interconnects with the 72-inch line, then the new water main could serve as the backup to Flint and the Flint WTP could be abandoned or potentially sold to Genesee County for their use.

The construction of the parallel pipeline would be considered in the DWSD capital expenditure as a Common to All (CTA) cost. This means that the capital cost of the pipeline would be shared by all DWSD customers and not just by Flint. Preliminary analysis of this option appears to be the most cost-effective of all the options discussed. However, a more thorough cost analysis is warranted and this approach would require an agreement between Flint and DWSD.

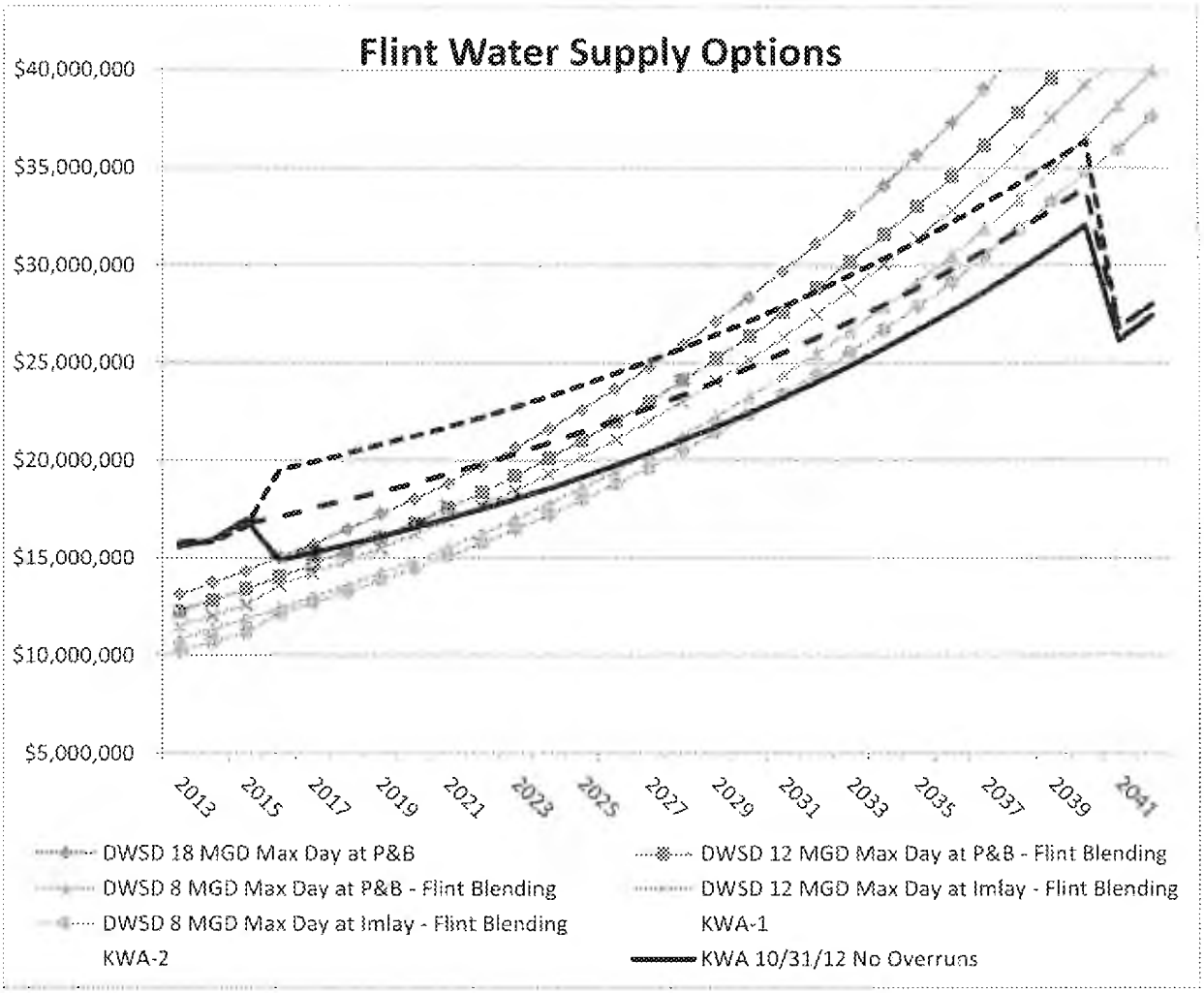

Figure 6-1: Flint Water Supply Options through 2042

7. OTHER CONSIDERATIONS

As part of the investigation other issues were identified that may result in risks to Flint that should be considered by the Treasury in determining how Flint's potable water should be supplied. These issues are related to redundancy and reliability, other items affecting cost, and Flint's desire to control its own destiny related to its water supply. These are described further below.

Redundancy/Reliability

In one of the first meetings related to this task assessment, which was held on November 1, 2012, the Genesee County Drain Commissioner, Mr. Jeff Wright, stated that one of the main reasons for pursuing the KWA supply option related to the lack of reliability of the DWSD system. He pointed to the Northeast blackout of 2003; a widespread power outage that occurred throughout parts of the Northeastern and Midwestern United States and Ontario, Canada, on Thursday, August 14, 2003. He stated that Flint and Genesee County were out of water for several days.

It is worth noting that this was a power outage of historic proportions that affected millions of Americans. However, DWSD did begin supplying water again relatively quickly in comparison to other major cities impacted by the same power outage.

Furthermore, the KWA supply system offers less redundancy to Flint than the current DWSD system. Under both options, Flint is supplied by a single pipeline; however, DWSD has backup power at all of its major facilities supplying Flint. The KWA system will not have a redundant power at its pumping facilities. This would be a major risk.

Currently, backup to the DWSD system for Flint is Flint's WTP using the Flint River as the source of supply. KWA has stated that the Flint River source would also be used as backup to Flint if the KWA supply through its pipeline was lost. However, since the Flint WTP would be upgraded to treat Lake Huron water under the KWA option, using the Flint River as a backup source would require the Flint WTP to maintain two process treatment streams.

In addition to Flint and Genesee County, the DWSD's 72-inch main supplies Imlay City, Mayfield and the Greater Lapeer County Utilities Authority (GLCUA). The volume of water contained within the 72-inch main is approximately 30 MG. Only supplying these three remaining communities would cause the water age to increase dramatically; somewhere in excess of three weeks old, before reaching the customers' master meters. Since the half-life of chlorine in the DWSD system is approximately 5 days, the chlorine would most probably be near zero requiring re-chlorination of the finished water upstream of the master meters.

Re-chlorinating is a costly and risky process due to the instability of chlorine gas. It is unknown whether DWSD would pursue this improvement or possibly abandoned the 72-inch pipeline.

If Flint is supplied by the KWA system, then DWSD supplying their other customers along the 72-inch water main may be reconsidered. Since the KWA system is a raw water supply, the communities would

either have to build a treatment facility to treat the water from KWA or find another water source for their communities.

Additional Cost and Risk Considerations

The design of the KWA supply and the construction of the system have not been completed; therefore, final costs and time to complete are unknown. Cost overruns and delays in completion will both negatively impact Flint's final cost. As example, if the project is not completed within the three year period, payment on the bonds will be due, but the revenue source needed from the sale of water could not be provided.

Furthermore, there is always a risk with large water system construction; especially those including an intake in the Great Lakes, pumping stations and rehabilitation of older water treatment plants. These risks include the potential of explosive gases in tunneling below Lake Huron, changing site conditions associated with the large number of miles of pipe installation and rehabilitating an older WTP, and the startup and debugging of the entire pumping system.

Flint has indicated that they have a high water loss. Not addressing this issue prior to sizing the Flint supply pipeline from KWA could cause the water main to be oversized along with its incremental cost in construction.

Also, the KWA supply option appears to run counter to the Treasury's Competitive Grant Assistance Program (Formerly EVIP Grant). This program has been put in place to allow for communities to consolidate their services and save money. Two existing customers of DWSD (Flint and Genesee County) along with the potential of others customers (GLCUA, Mayfield, Imlay City) separating to from another water system is in contradiction to the program.

Finally, there is a concern over the ability of smaller systems (KWA) over larger systems (DWSD) to pay for future unfunded mandates and regulations. Obviously, identifying regulation requirements over 30 years is hard to determine However, it is widely accepted that a large system has greater ability to respond to unfunded mandates because the cost can be distributed over a large customer base.

Flint's Autonomy

Flint has indicated that a major point of consideration is that they have no control over the rate increases issued to Flint by DWSD. All other counties supplied by DWSD have representatives on the Board of Water Commissioners (BOWC). The BOWC is one of the governing bodies that approve the water rates. Since Flint and Genesee County do not have a representative on the BOWC, Flint believes they are held "hostage" to DWSD's rates and cost of service.

This issue was stated in Flint's handout at the November 1, 2012 meeting. The handout is titled, "Flint Water Supply Future." However, it is worth noting in the same handout, Flint also identifies similar concerns with the governing board of the KWA system. Notably, that although Flint and Genesee County will be the only customers and Flint will be responsible for 30 percent of the construction cost,

they will have a minority vote on the KWA board. Furthermore, there are other communities (Lapeer County, the City of Lapeer, and Sanilac County) that sit on the board and vote. However, they are not purchasing water nor contributing to the construction costs.

STATE OF MICHIGAN CONTRACT NO. 271N3200089

CITY OF FLINT WATER SUPPLY ASSESSMENT

State of Michigan, Department of Treasury

Appendix A: Meeting Minutes

TUCKER, YOUNG,
JACKSON, TULL INC.
CONSULTING ENGINEERS-PLANNERS
565 E. Larned Suite 300
Detroit, Michigan 48226
(313)963-0612 FAX (313)963-2156

MEETING MINUTES

IN ATTENDANCE:	Sue McCormick, DWSD Director Darryl Latimer, DWSD Deputy Director George Karmo, TYJT Awni Qaqish, TYJT Dave Guastella, TYJT
DATE:	November 24, 2012
PURPOSE OF MEETING:	Meeting with DWSD for the Indefinite-scope, Indefinite-delivery Contract Number 00383, 2012 Professional General Architectural/Engineering Services – City of Flint Water Supply Assessment
PREPARED BY:	Dave Guastella

A meeting was held at the DWSD Main Office Building on November 19, 2012 to discuss the water supply options being presented by DWSD to the City of Flint. The main items discussed generally followed the attached DWSD Discussion/Questions that were provided to the Department prior to the meeting. A summary of the key points discussed are provided below.

DISCUSSION ITEMS

1. Question/Discussion Item: Verify that the four options presented at the November 1, 2012 meeting are still available for consideration:

    a. Supplied from Potter & Baxter using the new model contract (assume a Maximum Day Customer),

    b. Supplied from Imlay Station,

    c. Finished un-pumped supply from Lake Huron WTP, and

    d. Raw un-pumped supply from Lake Huron WTP.

    DWSD prefers to focus on the first two supply point listed; from the current location at Potter & Baxter and at the Imlay Pump Station as these apply specifically to Flint.

    DWSD provided the attached summary regarding the current costs to Flint based on the various options that DWSD is offering. The savings associated with each option is provided as well. As example, if Flint were to purchase water from the supply point located at Imlay Station, the current cost to Flint would be $5,661,000 and it would be a savings of nearly 50%

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compared to Flint's current rate.

2. Question/Discussion Item: What additional capital improvements will be required for each option?

   If Imlay Pump Station is selected as the supply point then Flint would need to purchase the 72-inch water main and an agreement to supply Lapeer would need to be worked out. DWSD believes that this could be worked out through a "wheeling" charge over the 72-inch main or possibly moving the supply point downstream of the Lapeer connection.. DWSD estimates the value of the water main at $4.7M. Flint could bond for this amount or DWSD could include the cost into Flint's rate.

3. Question/Discussion Item: Are there other options being presented that should be considered (e.g., blending)?

   Only the two options indicated above are currently being considered and both would include blending; DWSD providing 2/3 of the supply and the Flint WTP providing the other 1/3.

4. Question/Discussion Item: To evaluate each option over the 25 year planning period, provide:

   a. Annual water rate for Flint for 2002 through 2012, and the

   b. Projected annual rate adjustment for each option. What are the proposed measures to keep the rate adjustments down in the future?

   DWSD provided the attached historical rates from 2002 through 2012 for the existing water contract with Flint. The attachment also includes what the rates would have been if Flint had signed the new model contract or had taken service from Imlay. These rates were provided back to 2010.

   DWSD believes that 5% would be a good estimation to assume for their annual escalation in rates over the 25 year planning period.

5. Question/Discussion Item: Flint stated a 10% increase in the capacity charge. What number did DWSD provide Flint?

   It was unclear to DWSD where the 10% increase in capacity charge stated by Flint came from. DWSD's information provided shows an average of 6.3%. DWSD offered a meeting with TYJT to discuss how the fixed and commodity charges are allocated.

6. Question/Discussion Item: Flint financial comparison is based on the initial Cost of $14,413,858, which includes $2,725,538 for Flint WTP operating cost; i.e, DWSD charge is $11,688,320. How good is this number?

   DWSD indicated that the charge of $11,638,320 is good through 6/30/13.based on their existing contract with DWSD.

7. Question/Discussion Item: KWA's initial charge to Flint is based on 12 MGD. Is DWSD charge

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based on 12 MGD?

Yes, 12 MGD from DWSD would be a maximum with Flint supplying 6 MGD for a total of 18 MGD (2/3 vs. 1/3).

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TUCKER, YOUNG,
JACKSON, TULL INC.
CONSULTING ENGINEERS-PLANNERS
565 E. Larned Suite 300
Detroit, Michigan 48226
(313)963-0612 FAX (313)963-2156

Indefinite-scope, Indefinite-delivery Contract Number 00383
2012 Professional General Architectural/Engineering Services

CITY OF FLINT WATER SUPPLY ASSESSMENT

DWSD Discussion/Questions for the November 19, 2012 Meeting

1. Verify that the four options presented at the November 1, 2012 meeting are still available for consideration:
    c. Supplied from Potter & Baxter using the new model contract (assume a Maximum Day Customer),
    d. Supplied from Imlay Station,
    e. Finished un-pumped supply from Lake Huron WTP, and
    f. Raw un-pumped supply from Lake Huron WTP.
2. What additional capital improvements will be required for each option?
3. Are there other options being presented that should be considered (e.g., blending)?
4. To evaluate each option over the 25 year planning period, provide:
    g. Annual water rate for Flint for 2002 through 2012, and the
    h. Projected annual rate adjustment for each option. What are the proposed measures to keep the rate adjustments down in the future?
5. Flint stated a 10% increase in the capacity charge. What number did DWSD provide Flint?
6. Flint financial comparison is based on the initial Cost of $14,413,858, which includes $2,725,538 for Flint WTP operating cost, i.e DWSD charge is $11,688,320. How good is this number?
7. KWA's initial charge to Flint is based on 12 MGD. Is DWSD charge based on 12 MGD?

Comments: Meeting minutes were recorded based on the understanding of the author. Please contact the author within three days if you have any different understanding of the meeting. These minutes will be considered approved unless comments are provided within three days.

Summary of DWSD Cost Allocations to Flint Under Various Scenarios

Flint Only

	Revenue Requirement	Rates and Charges		
		Fixed	Commodity	Avg Unit Cost
1 **Status Quo**	11,461,700	357,271	12.46	19.91
2 **Model Contract**	9,732,100	275,517	11.16	16.90
3 Change	(1,729,600)	(81,754)	(1.30)	(3.00)
4 % Change	*-15.1%*	*-22.9%*	*-10.4%*	*-15.1%*
5 **Max Day Only**	9,424,700	271,010	10.72	16.37
6 Change	(307,400)	(4,507)	(0.44)	(0.53)
7 % Change	*-3.3%*	*-1.7%*	*-4.1%*	*-3.3%*
8 **Allow Blending**	6,302,800	182,369	10.72	16.42
9 Change	(3,121,900)	(88,641)	0.00	0.05
10 % Change	*-49.5%*	*-48.6%*	*0.0%*	*0.3%*
11 **Imlay City Connections**	5,800,700	170,912	9.77	15.11
12 Change	(502,100)	(11,457)	(0.95)	(1.31)
13 % Change	*-8.7%*	*-6.7%*	*-9.7%*	*-8.7%*
14 Cumulative Change	(5,661,000)	(186,359)	(2.69)	(4.80)
15 Cumulative %Change	*-49.4%*	*-52.2%*	*-21.6%*	*-24.1%*

	Assumptions					
	Avg Day	Max Day	Peak Hour	Distance	Elevation	Sales
	mgd	*mgd*	*mgd*	*miles*	*feet*	*mgd*
1 **Status Quo**	11.8	21.6	22.6	52.0	866	**11.8**
2 **Model Contract**	11.8	**17.9**	**18.8**	52.0	866	11.8
3 **Max Day Only**	11.8	17.9	**17.9**	52.0	866	11.8
4 **Allow Blending**	7.9	**11.9**	**11.9**	52.0	866	7.9
5 **Imlay City Connections**	7.9	11.9	11.9	**45.2**	**866**	7.9

Recent DWSD Water Rates to Flint

	Rates and Charges			Annual Change			*Average*
FY	Fixed	Commodity	Avg Unit Cost	Fixed	Commodity	Avg Unit Cost	*Annual Change*
	$/mo	*$/Mcf*	*$/Mcf*	*$/mo*	*$/Mcf*	*$/Mcf*	
As Charged							
2004		11.06	11.06				
2005		10.24	10.24			-7.4%	
2006		10.56	10.56			3.1%	
2007		11.09	11.09			5.0%	
2008		11.35	11.35			2.3%	
2009		13.07	13.07			15.2%	
2010		14.32	14.32			9.6%	
2011	182,301	14.29	16.01		-0.2%	11.8%	
2012	443,096	13.36	17.53	143.1%	-6.5%	9.5%	
2013	707,000	12.46	19.12	59.6%	-6.7%	9.1%	**6.3%**
Hypothetical Model Contract							
2004		11.06	11.06				
2005		10.24	10.24			-7.4%	
2006		10.56	10.56			3.1%	
2007		11.09	11.09			5.0%	
2008		11.35	11.35			2.3%	
2009		13.07	13.07			15.2%	
2010		***13.96***	***13.96***			6.8%	
2011	***145,918***	***13.74***	***15.28***		-1.6%	9.5%	
2012	***378,968***	***12.58***	***16.57***	159.7%	-8.4%	8.4%	
2013	***597,323***	***11.63***	***17.93***	57.6%	-7.6%	8.2%	**5.5%**

Recent DWSD Water Rates to Flint

	Rates and Charges			Annual Change			*Average*
FY	Fixed	Commodity	Avg Unit Cost	Fixed	Commodity	Avg Unit Cost	*Annual Change*
	$/mo	*$/Mcf*	*$/Mcf*	*$/mo*	*$/Mcf*	*$/Mcf*	
As Charged							
2004		11.06	11.06				
2005		10.24	10.24			-7.4%	
2006		10.56	10.56			3.1%	
2007		11.09	11.09			5.0%	
2008		11.35	11.35			2.3%	
2009		13.07	13.07			15.2%	
2010		14.32	14.32			9.6%	
2011	182,301	14.29	16.01		-0.2%	11.8%	
2012	443,096	13.36	17.53	143.1%	-6.5%	9.5%	
2013	707,000	12.46	19.12	59.6%	-6.7%	9.1%	**6.3%**
*Hypothetical Model Contract - **Flint Only***							
2004		11.06	11.06				
2005		10.24	10.24			-7.4%	
2006		10.56	10.56			3.1%	
2007		11.09	11.09			5.0%	
2008		11.35	11.35			2.3%	
2009		13.07	13.07			15.2%	
2010		***11.73***	***11.73***			-10.3%	
2011	***70,060***	***12.45***	***13.89***		6.1%	18.4%	
2012	***175,882***	***11.47***	***15.08***	151.0%	-7.9%	8.6%	
2013	***272,923***	***10.65***	***16.24***	55.2%	-7.1%	7.7%	**4.4%**

Recent DWSD Water Rates to Flint

	Rates and Charges			Annual Change			Average
FY	Fixed	Commodity	Avg Unit Cost	Fixed	Commodity	Avg Unit Cost	Annual Change
	$/mo	$/Mcf	$/Mcf	$/mo	$/Mcf	$/Mcf	
As Charged							
2004		11.06	11.06				
2005		10.24	10.24			-7.4%	
2006		10.56	10.56			3.1%	
2007		11.09	11.09			5.0%	
2008		11.35	11.35			2.3%	
2009		13.07	13.07			15.2%	
2010		14.32	14.32			9.6%	
2011	182,301	14.29	16.01		-0.2%	11.8%	
2012	443,096	13.36	17.53	143.1%	-6.5%	9.5%	
2013	707,000	12.46	19.12	59.6%	-6.7%	9.1%	**6.3%**
*Hypothetical Model Contract - **Flint Only @ Imlay***							
2004		11.06	11.06				
2005		10.24	10.24			-7.4%	
2006		10.56	10.56			3.1%	
2007		11.09	11.09			5.0%	
2008		11.35	11.35			2.3%	
2009		13.07	13.07			15.2%	
2010		***11.16***	***11.16***			-14.6%	
2011	***65,919***	***10.88***	***12.23***		-2.5%	9.6%	
2012	***165,275***	***9.89***	***13.28***	150.7%	-9.1%	8.6%	
2013	***255,580***	***9.09***	***14.32***	54.6%	-8.1%	7.8%	**2.9%**

TUCKER, YOUNG,
JACKSON, TULL INC.
CONSULTING ENGINEERS-PLANNERS
565 E. Larned Suite 300
Detroit, Michigan 48226
(313)963-0612 FAX (313)963-2156

MEETING MINUTES

IN ATTENDANCE:	Ed Kurtz; Flint Emergency Financial Manager, City of Flint Dayne Walling; Mayor, City of Flint Mike Brown, City of Flint John O'Brien, Genesee County Howard Croft, City of Flint Dwayne "Duffy" Johnson, City of Flint Brent Wright, City of Flint Awni Qaqish, TYJT Dave Guastella, TYJT
DATE:	November 24, 2012
PURPOSE OF MEETING:	Meeting with the City of Flint for the Indefinite-scope, Indefinite-delivery Contract Number 00383, 2012 Professional General Architectural/Engineering Services – City of Flint Water Supply Assessment
PREPARED BY:	Dave Guastella

A meeting was held at the City of Flint Municipal Center on November 20, 2012 to discuss the water supply option being presented by the Karegnondi Water Authority (KWA) to the City of Flint. The main items discussed generally followed the attached KWA Discussion/Questions that were provided to City prior to the meeting. A summary of the key points discussed are provided below.

The questions submitted are repeated in the Discussion Items for easy reference. A summary of the action items generated from the meeting follow the Discussion Items.

DISCUSSION ITEMS

1. Question/Discussion Item: Is the maximum day demand of 18 MGD for Flint the maximum day demand (MDD) throughout the 25 year planning period? If not, what is the 25 year projected MDD?

   KWA would supply up to 18 MGD. 18 MGD has been assumed as the maximum day demand and 12 MGD is assumed as the average day demand throughout the 25 year planning period.

2. Question/Discussion Item: Copy of the intake contract documents and engineer's estimate.

   The intake contract documents are approximately 90% complete and are not available for distribution. However, the updated Appendix 20, dated October 4, 2012 includes the most recent cost estimate of the intake based on the current design in process.

Comments: Meeting minutes were recorded based on the understanding of the author. Please contact the author within three days if you have any different understanding of the meeting. These minutes will be considered approved unless comments are provided within three days.

3. Question/Discussion Item: Documentation of the Flint WTP improvements required and cost estimate.

   The costs are approximately $7M as presented in the September 2009 Preliminary Engineering Report. However, this estimate has been updated. Some processes have been eliminated. John O'Brien will provide the updated costs and the description of the planned improvements to the plant.

4. Question/Discussion Item: Confirm Flint's allocated percentage of the KWA capital improvements (30%?).

   Yes, the allocation is based on 18 MGD/60 MGD total capacity.

5. Question/Discussion Item: Copy of the proposed KWA operating agreement for Flint.

   John O'Brien will provide the operating agreement as well as the Capacity Contract and Articles of Incorporation.

6. Question/Discussion Item: What is the annual operating agreement adjustment projected for the 25 year planning period?

   This information is provided in Appendix 14, Table 14.2 of the September 2009 Preliminary Engineering Report. Operating cost based on Table 1. Used 12 MGD as average day demand (ADD). Assumed 5% as the annual increase in operating costs. John O'Brien indicated that these operating costs were based on Genesee County's operating costs. John O'Brien will provide the last 10 years of audited financial statements for the water fund.

   To assess operating and maintenance costs for the Flint WTP, Duffy will provide multiple years of financial statements for the water fund. Duffy did not believe they had 10 years, but they will provide what they have.

   Regarding operation and maintenance costs, Flint believes that these costs will increase by 2/3 of what they are now.

7. Question/Discussion Item: Need the route of the pipelines and the locations of the facilities proposed. Purpose is to identify constraints that impact costs (i.e., utilities, environmental (e.g. wetlands), easements, etc.).

   KWA will not release the route due to concerns regarding speculation of land and easements. John O'Brien did indicate that the Lake Huron pump station would be at Fisher and M-25. The intermediate pump station site is near a location of the Lapeer/Sanilac/St. Clair border; where all three meet.

8. Question/Discussion Item: KWA's initial charge to Flint is based on a 12 MGD average day demand. What is the basis of this number? Are there population projections and water use figures available that were used to determine the Flint demand for the 25 year planning period?

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This was answered in Question No. 1 above.

9. Question/Discussion Item: Is there a transition plan and cost during construction of the KWA system identified?

   Flint is looking for an agreement with DWSD for back-up supply from the 72-inch main at the Genesee border.

10. Question/Discussion Item: The October 4, 2012 Preliminary Engineering Report Update states: "no backup power is planned for the pumps" (LHPS) and "No backup power is planned for pumping" (IPS). In case of power loss, how would Flint supply its customers?

    Flint indicated that they have adequate storage to supply the system for 6 to 7 days. Flint has 55 MG of storage and Genesee County has 65 MG for 2.5 days.

11. Question/Discussion Item: The latest plan shows only a 5 million gallon ground reservoir is planned for balancing between LHPS and IPS. How is redundancy maintained?

    In cases of emergency, Flint indicated that the back-up for the KWA system will be the same as it is now with DWSD; they will use the Flint River as the source water. Flint currently operates their plant four times a year.

    When questioned as to whether the WTP will be able to treat both lake water from the KWA system and river water Flint indicated that once the improvements identified in the September 2009 Preliminary Engineering Report are completed they will be able to accomplish both treatment processes. Flint will provide a schematic of the treatment trains at the WTP and a copy of the Flint transmission system.

    Genesee County indicated that additional redundancy would also be provided from the new Genesee County WTP.

    Regarding hydraulic transients; Genesee County indicated that a model analysis has not been included, but capital costs for mitigating transients have been included.

12. Question/Discussion Item: Related to the construction cost:

    a. Does it include an additional traffic lane since the construction will occupy half the right of way? *Not required, all roads are county roads; however, there are a few State road crossings.*

    b. Does it include costs/fees for permit requirements such as inspection cost by the jurisdictional authorities? As a point of reference, the permit fee costs for the Flint Transmission System came out to be $5.8 million. *Not required; all of the counties have waived any fees.*

    c. Does the cost of the steel pipe segments include corrosion protection measures such as

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anode stations and related O&M? *Yes; however, the KWA has not settled on using steel pipe. PCCP pipe may be used. Steel shown in estimate because it is highest in cost and therefore the pricing is conservative.*

d. SCADA monitoring stations require power. Is the cost of bring power to the SCADA stations included? Again, as a point of reference for the Flint Transmission System we estimated $800,000 for power to SCADA and valve operators. *Yes, Genesee County did emphasize that the SCADA system will be simple and straightforward because a lot of controls are not required.*

e. Other items discussed at the meeting included:

- The 2009 plant improvement cost is still good; however, there will be some reduction, such as a sulfuric chloride feed system that was eliminated. Plant capacity now is 36MGD, but will be 18 MGD.
- The KWA Lake Huron Pumping Station (LHPS) is now only high lift pump station.
- Genesee County will provide the distance of the intake pipe from the crib to the LHPS.
- The intake project is almost ready to bid; waiting for the COE permit.
- Genesee County is estimating the construction for the pipe lines and pump stations will begin July 2013.
- The route has been flown for survey.
- Genesee County is estimating construction will be complete and the project will be placed in service by Jan 2016.
- Genesee County to provide a list of assumptions that the $272 million cost estimate is based on since the route is now known.

13. The Flint River is identified as a backup: At what capacity? MDD or emergency supply?

    The Flint River would serve as a back up supply.

14. Where did the 40 years come from (Flint hostage to Detroit)? DWSD's new contracts are 30 years with openers to revise terms of supply (volume and pressure) after the first two years, then three years, and then in five year increments thereafter.

    The 40 years was stated in error. The reference was to DWSD's requirement to sign a 30 year contract.

    After 40 years Flint will own 30% of the project and can sell their share of ownership if they want. Conversely, with DWSD, they continue to pay for the capital projects but have no ownership. Flint believes they will know what they will be charged for the next 25 years versus DWSD that can't commit to a fixed escalation.

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Action Items for Follow-up		
Items:	***Assigned To:***	***Date to Complete***
1. Updated Costs for the Flint WTP Improvements and a description of the improvements.	John O'Brien	11/21/12
2. KWA Operating Agreement, Capacity Contract and Articles of Incorporation.	John O'Brien	11/20/12
3. Provide the last 10 years of audited financial statements for the Genesee water fund.	John O'Brien	11/20/12
4. Provide multiple years of financial statements for the City of Flint water fund.	Duffy Johnson	11/26/12
5. Provide schematic of the Flint WTP and a map of the Flint transmission system.	Brent Wright	11/26/12
6. Provide the length of the intake pipe from the crib to the pump station.	John O'Brien	11/20/12
7. Provide a list of assumptions that the $272 million cost estimate is based on since the route is now known.	John O'Brien	11/26/12

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JACKSON, TULL INC.
CONSULTING ENGINEERS-PLANNERS
565 E. Larned Suite 300
Detroit, Michigan 48226
(313)963-0612 FAX (313)963-2156

Indefinite-scope, Indefinite-delivery Contract Number 00383
2012 Professional General Architectural/Engineering Services

CITY OF FLINT WATER SUPPLY ASSESSMENT

KWA Discussion/Questions for the November 20, 2012 Meeting

1. Is the maximum day demand of 18 MGD for Flint the maximum day demand (MDD) throughout the 25 year planning period? If not, what is the 25 year projected MDD?
2. Copy of the intake contract documents and engineer's estimate.
3. Documentation of the Flint WTP improvements required and cost estimate.
4. Confirm Flint's allocated percentage of the KWA capital improvements (30%?).
5. Copy of the proposed KWA operating agreement for Flint.
6. What is the annual operating agreement adjustment projected for the 25 year planning period?
7. Need the route of the pipelines and the locations of the facilities proposed. Purpose is to identify constraints that impact costs (i.e., utilities, environmental (e.g. wetlands), easements, etc.).
8. KWA's initial charge to Flint is based on a 12 MGD maximum day demand. What is the basis of this number? Are there population projections and water use figures available that were used to determine the Flint demand for the 25 year planning period?
9. Is there a transition plan and cost during construction of the KWA system identified?
10. The October 4, 2012 Preliminary Engineering Report Update states: "no backup power is planned for the pumps" (LHPS) and "No backup power is planned for pumping" (IPS). In case of power loss, how would Flint supply its customers?
11. The latest plan shows only a 5 million gallon ground reservoir is planned for balancing between LHPS and IPS. How is redundancy maintained?
12. Related to the construction cost:
    a. Does it include an additional traffic lane since the construction will occupy half the right of way?
    b. Does it include costs/fees for permit requirements such as inspection cost by the jurisdictional authorities? As a point of reference, the permit fee costs for the Flint Transmission System came out to be $5.8 million.

Comments: Meeting minutes were recorded based on the understanding of the author. Please contact the author within three days if you have any different understanding of the meeting. These minutes will be considered approved unless comments are provided within three days.

c. Does the cost of the steel pipe segments include corrosion protection measures such as anode stations and related O&M?
d. SCADA monitoring stations require power. Is the cost of bring power to the SCADA stations included? Again, as a point of reference the for the Flint Transmission System we estimated $800,000 for power to SCADA and valve operators.

13. The Flint River is identified as a backup: At what capacity? MDD or emergency supply?
14. Where did the 40 years come from (Flint hostage to Detroit)? DWSD's new contracts are 30 years with openers to revise terms of supply (volume and pressure) after the first two years, then three years, and then in five year increments thereafter.

Comments: Meeting minutes were recorded based on the understanding of the author. Please contact the author within three days if you have any different understanding of the meeting. These minutes will be considered approved unless comments are provided within three days.

STATE OF MICHIGAN CONTRACT NO. 271N3200089

CITY OF FLINT WATER SUPPLY ASSESSMENT

State of Michigan, Department of Treasury

Appendix B: Cost Worksheets

DWSD Worksheet : 18 MGD Maximum Day Customer with Model Contract at Potter & Baxter

Capacity

Flint ADD	0.96	MGD	81	MCF/Day
DWSD ADD	12	MGD	1,604	MCF/Day

Annual Volume

Flint	29,432	MCF
DWSD	585,561	MCF

2013 Cost of Supply

Flint WTP O&M:	126.30	/MCF	$ 3,838,214	/Yr
DWSD: $	16.37	/MCF	$ 9,585,642	/Yr

Escalation/Inflation Rate

Flint:	4.519% /Yr
DWSD:	4.7% /Yr

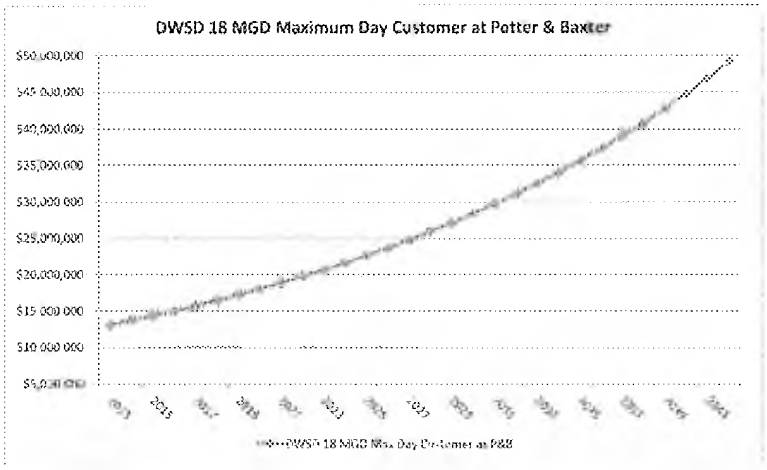
Capital Expenditure

Amount:	$			
Reserve:	$	0%	Reserve Rate:	6.00%
Amount plus Reserve:	$	-		
Revenue Bond Rate:		6%		
Number of Years:		25		
Annual Cost:	$0			

	Year	Flint WTP O&M	Water Purchase	Revenue Bond Payment	Interest on Reserve	TOTAL
1	2013	$ 3,838,214	$ 9,285,642			$ 13,123,856
2	2014	$ 3,697,788	$ 10,036,167			$ 13,733,955
3	2015	$ 3,864,558	$ 10,507,867			$ 14,372,425
4	2016	$ 4,038,850	$ 11,001,736			$ 15,040,586
5	2017	$ 4,221,002	$ 11,518,818			$ 15,739,820
6	2018	$ 4,411,368	$ 12,060,203			$ 16,471,571
7	2019	$ 4,610,322	$ 12,627,032			$ 17,237,354
8	2020	$ 4,818,247	$ 13,220,503			$ 18,038,750
9	2021	$ 5,035,550	$ 13,841,866			$ 18,877,416
10	2022	$ 5,262,653	$ 14,492,434			$ 19,755,087
11	2023	$ 5,499,999	$ 15,173,578			$ 20,673,577
12	2024	$ 5,748,049	$ 15,886,736			$ 21,634,785
13	2025	$ 6,007,286	$ 16,633,413			$ 22,640,699
14	2026	$ 6,278,216	$ 17,415,183			$ 23,693,398
15	2027	$ 6,561,362	$ 18,233,697			$ 24,795,059
16	2028	$ 6,857,279	$ 19,090,681			$ 25,947,960
17	2029	$ 7,166,543	$ 19,987,943			$ 27,154,486
18	2030	$ 7,489,754	$ 20,927,376			$ 28,417,130
19	2031	$ 7,827,542	$ 21,910,963			$ 29,738,505
20	2032	$ 8,180,568	$ 22,940,774			$ 31,121,342
21	2033	$ 8,549,507	$ 24,018,995			$ 32,568,502
22	2034	$ 8,935,090	$ 25,147,887			$ 34,082,977
23	2035	$ 9,338,063	$ 26,329,838			$ 35,667,901
24	2036	$ 9,759,209	$ 27,567,341			$ 37,326,550
25	2037	$ 10,199,350	$ 28,863,006			$ 39,062,355
26	2038	$ 10,659,340	$ 30,219,567			$ 40,878,907
27	2039	$ 11,140,078	$ 31,639,886			$ 42,779,963
28	2040	$ 11,642,494	$ 33,126,961			$ 44,769,455
29	2041	$ 12,167,570	$ 34,683,928			$ 46,851,498
30	2042	$ 12,716,328	$ 36,314,073			$ 49,030,401
		$ 216,222,171				

25 Yrs Cummulative	
$	596,916,044

30 Yrs Cummulative	
$	821,226,268



DWSD Worksheet : 12 MGD Maximum Day Customer with Model Contract at Potter & Baxter/Blending with Flint

Capacity

Flint ADD	4	MGD	535	MCF/Day
DWSD ADD	8	MGD	1,070	MCF/Day

Annual Volume

Flint	195,187	MCF	195,[illegible]658
DWSD	390,374	MCF	
			585,561,471

2013 Cost of Supply

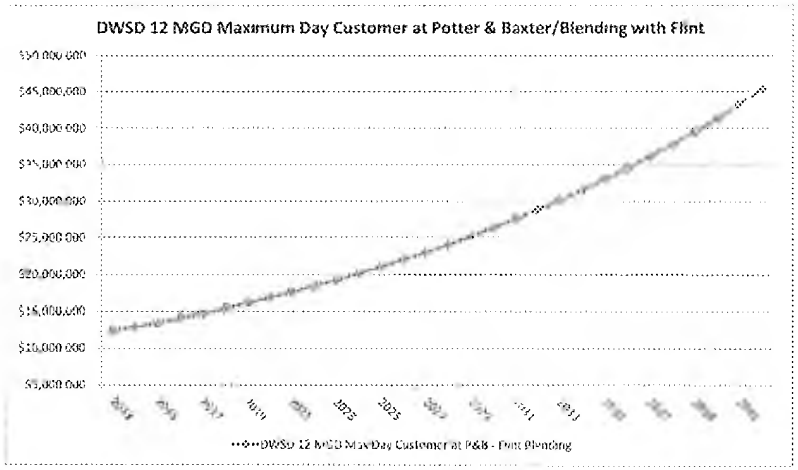
Flint WTP O&M	$ 29.20	/MCF	$ 5,895,097	/Yr
DWSD	$ 16.91	/MCF	$ 6,367,005	/Yr

Escalation/Inflation Rate

Flint	4.51%	/Yr
DWSD	4.7%	/Yr

Capital Expenditure

Amount	$	-		
Reserve	$	-	Reserve Rate	0.00%
Amount plus Reserve	$	-		
Revenue Bond Rate		4%		
Number of Years		25		
Annual Cost	$0			



	Year	Flint WTP O&M	Water Purchase	Revenue Bond Payment	Interest on Reserve	TOTAL
1	2013	$ 5,895,097	6,367,005	-	-	$ 12,262,103
2	2014	$ 6,160,986	6,666,235	-	-	$ 12,827,221
3	2015	$ 6,438,826	6,979,569	-	-	$ 13,418,395
4	2016	$ 6,729,417	7,307,408	-	-	$ 14,036,825
5	2017	$ 7,032,795	7,651,066	-	-	$ 14,683,771
6	2018	$ 7,349,880	8,010,666	-	-	$ 15,360,546
7	2019	$ 7,681,359	8,387,167	-	-	$ 16,068,527
8	2020	$ 8,027,789	8,781,364	-	-	$ 16,809,153
9	2021	$ 8,389,842	9,194,082	-	-	$ 17,583,930
10	2022	$ 8,768,224	9,626,210	-	-	$ 18,394,434
11	2023	$ 9,163,671	10,078,642	-	-	$ 19,242,313
12	2024	$ 9,576,952	10,552,338	-	-	$ 20,129,291
13	2025	$ 10,008,873	11,048,298	-	-	$ 21,057,171
14	2026	$ 10,460,273	11,567,568	-	-	$ 22,027,841
15	2027	$ 10,932,031	12,111,244	-	-	$ 23,043,275
16	2028	$ 11,425,066	12,680,473	-	-	$ 24,105,538
17	2029	$ 11,940,336	13,276,455	-	-	$ 25,216,791
18	2030	$ 12,478,845	13,900,448	-	-	$ 26,379,294
19	2031	$ 13,041,641	14,553,769	-	-	$ 27,595,410
20	2032	$ 13,629,819	15,237,786	-	-	$ 28,867,616
21	2033	$ 14,244,524	15,953,973	-	-	$ 30,198,497
22	2034	$ 14,886,952	16,703,810	-	-	$ 31,590,762
23	2035	$ 15,558,354	17,488,889	-	-	$ 33,047,242
24	2036	$ 16,260,035	18,310,866	-	-	$ 34,570,902
25	2037	$ 16,993,363	19,171,477	-	-	$ 36,164,840
	2038	$ 17,759,764	20,072,537	-	-	$ 37,832,300
	2039	$ 18,560,729	21,016,946	-	-	$ 39,576,675
	2040	$ 19,397,818	22,006,695	-	-	$ 41,401,513
	2041	$ 20,272,660	23,043,869	-	-	$ 43,310,528
	2042	$ 21,186,956	24,130,649	-	-	$ 45,307,605

25 Yrs Cummulative	
$	554,681,681

30 Yrs Cummulative	
$	761,110,308

DWSD Worksheet : 8 MGD Maximum Day Customer with Model Contract at Potter & Baxter/Blending with Flint

Capacity

Flint ADD:	4	MGD	535 MCF/Day
DWSD ADD:	8	MGD	1,070 MCF/Day

Annual Volume

Flint:	195,187	MCF
DWSD:	390,374	MCF

2013 Cost of Supply

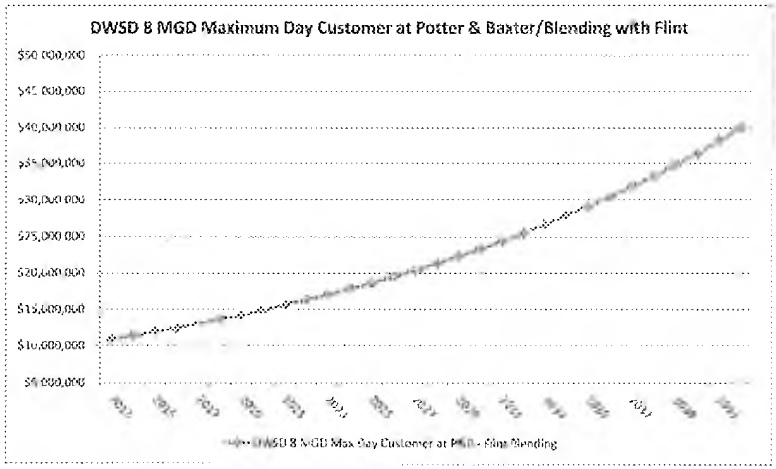
Flint WTP O&M:	$	30.20	/MCF	$ 5,895,097 /Yr
DWSD:	$	12.68	/MCF	$ 4,949,947 /Yr

Escalation/Inflation Rate

Flint:	4.51%	/Yr
DWSD:	4.7%	/Yr

Capital Expenditure

Amount:	$	-		
Reserve:	$	-	0%	Reserve Rate: 0.00%
Amount plus Reserve:	$	-		
Revenue Bond Rate:		5%		
Number of Years:		25		
Annual Cost:	$0			



	Year	Flint WTP O&M	Water Purchase	Revenue Bond Payment	Interest on Reserve	TOTAL
1	2013	$ 5,895,097	4,949,947			$ 10,845,044
2	2014	$ 6,160,966	5,182,594			$ 11,343,560
3	2015	$ 6,438,876	5,426,126			$ 11,865,002
4	2016	$ 6,729,217	5,681,206			$ 12,410,423
5	2017	$ 7,032,705	5,948,223			$ 12,980,928
6	2018	$ 7,349,880	6,227,786			$ 13,577,669
7	2019	$ 7,681,359	6,520,495			$ 14,201,855
8	2020	$ 8,027,789	6,826,959			$ 14,854,747
9	2021	$ 8,389,842	7,147,826			$ 15,537,668
10	2022	$ 8,768,224	7,483,774			$ 16,251,997
11	2023	$ 9,163,671	7,835,531			$ 16,999,187
12	2024	$ 9,578,992	8,203,780			$ 17,780,737
13	2025	$ 10,008,873	8,589,358			$ 18,598,230
14	2026	$ 10,460,228	8,993,057			$ 19,453,330
15	2027	$ 10,932,031	9,415,731			$ 20,347,762
16	2028	$ 11,425,066	9,858,271			$ 21,283,336
17	2029	$ 11,940,336	10,321,609			$ 22,261,945
18	2030	$ 12,478,845	10,806,725			$ 23,285,570
19	2031	$ 13,041,641	11,313,641			$ 24,356,282
20	2032	$ 13,629,819	11,846,429			$ 25,476,248
21	2033	$ 14,244,524	12,403,211			$ 26,647,735
22	2034	$ 14,886,952	12,986,162			$ 27,873,114
23	2035	$ 15,558,354	13,596,512			$ 29,154,866
24	2036	$ 16,260,035	14,235,548			$ 30,495,583
25	2037	$ 16,993,363	14,904,619			$ 31,897,982
	2038	$ 17,759,764	15,605,135			$ 33,364,899
	2039	$ 18,560,729	16,338,577			$ 34,899,306
	2040	$ 19,397,818	17,106,490			$ 36,504,308
	2041	$ 20,272,660	17,910,495			$ 38,183,155
	2042	$ 21,186,956	18,752,288			$ 39,939,245

25 Yrs Cummulative
$ 489,780,792

30 Yrs Cummulative
$ 672,671,705

DWSD Worksheet : 12 MGD Maximum Day Customer with Model Contract at Imlay/Blending with Flint

Capacity

Flint ADD	4	MGD	535 MCF/Day
DWSD ADD	8	MGD	1,070 MCF/Day

Annual Volume

Flint	195,187	MCF
DWSD	390,374	MCF

2013 Cost of Supply

Flint WTP O&M	$ 40.26	/MCF	$ 6,895,097	/Yr
DWSD	$ 14.38	/MCF	$ 5,613,583	/Yr

Escalation/Inflation Rate

Flint	4.51% /Yr
DWSD	4.7% /Yr

Capital Expenditure

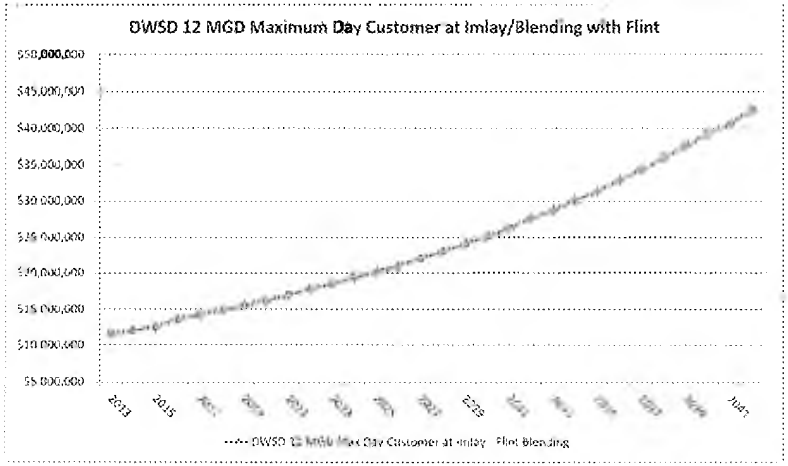
Capital	$ 4,700,000		
Bond Issuance (3% of Total)	195,000	Check	3.0%
3 Years of Capitalized Interest	975,000	Check	5.0% /Yr (Bond Interest on Total)
Reserve (10% of Total)	650,000	Check	10.0%
Total	$ 6,520,000		

Revenue Bond Rate	5%
Number of Years	25
Annual Cost	$462,610
Interest on Reserve	3%

	Year	Flint WTP O&M	Water Purchase	Revenue Bond Payment	Interest on Reserve	TOTAL
1	2013	$ 6,895,097	5,613,583		19,500	$ 11,489,180
2	2014	$ 6,180,866	5,877,421		19,500	$ 12,018,888
3	2015	$ 6,438,826	6,154,660		19,500	$ 12,572,986
4	2016	$ 6,729,217	6,442,882	462,610	19,500	$ 13,615,209
5	2017	$ 7,032,705	6,745,698	462,610	19,500	$ 14,221,512
6	2018	$ 7,348,880	7,062,745	462,610	19,500	$ 14,855,735
7	2019	$ 7,681,359	7,394,694	462,610	19,500	$ 15,519,164
8	2020	$ 8,027,789	7,742,245	462,610	19,500	$ 16,213,144
9	2021	$ 8,389,842	8,106,131	462,610	19,500	$ 16,939,082
10	2022	$ 8,768,224	8,487,119	462,610	19,500	$ 17,698,452
11	2023	$ 9,163,671	8,886,013	462,610	19,500	$ 18,492,794
12	2024	$ 9,576,952	9,303,656	462,610	19,500	$ 19,323,718
13	2025	$ 10,008,873	9,740,928	462,610	19,500	$ 20,192,910
14	2026	$ 10,460,273	10,198,751	462,610	19,500	$ 21,102,134
15	2027	$ 10,932,031	10,678,093	462,610	19,500	$ 22,054,234
16	2028	$ 11,425,066	11,179,969	462,610	19,500	$ 23,048,139
17	2029	$ 11,940,336	11,705,421	462,610	19,500	$ 24,088,867
18	2030	$ 12,478,845	12,255,576	462,610	19,500	$ 25,177,531
19	2031	$ 13,041,641	12,831,588	462,610	19,500	$ 26,316,339
20	2032	$ 13,629,819	13,434,673	462,610	19,500	$ 27,507,602
21	2033	$ 14,244,524	14,066,103	462,610	19,500	$ 28,753,736
22	2034	$ 14,886,958	14,727,209	462,610	19,500	$ 30,057,271
23	2035	$ 15,558,354	15,419,368	462,610	19,500	$ 31,420,852
24	2036	$ 16,260,055	16,144,098	462,610	19,500	$ 32,847,245
25	2037	$ 16,993,363	16,902,872	462,610	19,500	$ 34,339,345
26	2038	$ 17,759,764	17,697,307	462,610	19,500	$ 35,900,181
27	2039	$ 18,560,729	18,529,080	462,610	19,500	$ 37,532,919
28	2040	$ 19,397,818	19,399,947	462,610	19,500	$ 39,240,875
29	2041	$ 20,272,660	20,311,745			$ 40,584,404
30	2042	$ 21,186,956	21,266,397			$ 42,453,353

25 Yrs Cummulative	
$	329,865,071

30 Yrs Cummulative	
$	725,576,803



DWSD Worksheet : 8 MGD Maximum Day Customer with Model Contract at Imlay/Blending with Flint

Capacity

Flint ADD	8	MGD	535	MCF/Day
DWSD ADD	8	MGD	1,070	MCF/Day

Annual Volume

Flint	195,187	MCF
DWSD	390,374	MCF

2013 Cost of Supply

Flint WTP O&M:	$ 30.20	/MCF	$ 5,895,097	/Yr
DWSD:	$ 11.33	/MCF	$ 4,337,059	/Yr

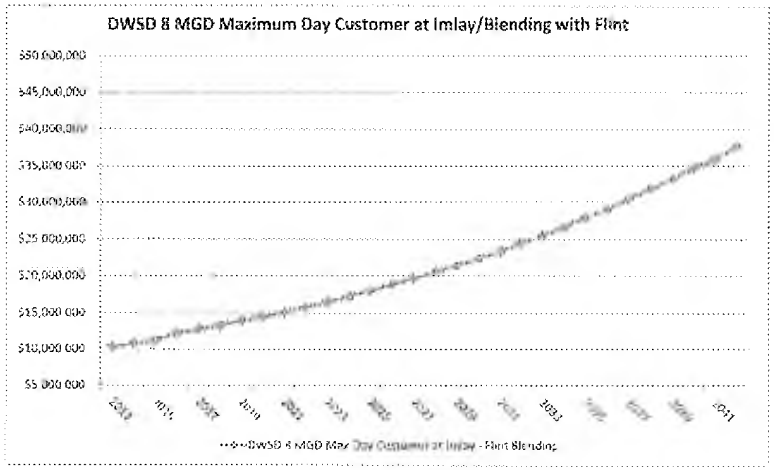
Escalation/Inflation Rate

Flint:	4.51%	/Yr
DWSD	4.7%	/Yr

Capital Expenditure

Capital	$ 4,500,000		
Bond Issuance (3% of Total)	135,000	Check	3.0%
3 Years of Capitalized Interest	885,000	Check	5.0% /Yr (Bond Interest on Total)
Reserve (10% of Total)	450,000	Check	10.0%
Total	$ 6,520,000		

Revenue Bond Rate	3%
Number of Years	25
Annual Cost	$462,810
Interest on Reserve	5%



Year		Flint WTP O&M	Water Purchase	Revenue Bond Payment	Interest on Reserve	TOTAL
1	2013	$ 5,895,097	4,337,059		19,500	$ 10,212,656
2	2014	$ 6,160,966	4,640,901		19,500	$ 10,682,367
3	2015	$ 6,438,826	4,754,323		19,500	$ 11,173,649
4	2016	$ 6,729,217	4,977,776	462,610	19,500	$ 12,150,103
5	2017	$ 7,032,705	5,211,737	462,610	19,500	$ 12,687,546
6	2018	$ 7,349,880	5,456,663	462,610	19,500	$ 13,249,673
7	2019	$ 7,681,359	5,713,147	462,610	19,500	$ 13,837,616
8	2020	$ 8,027,789	5,981,665	462,610	19,500	$ 14,452,564
9	2021	$ 8,389,842	6,262,503	462,610	19,500	$ 15,095,755
10	2022	$ 8,768,224	6,557,155	462,610	19,500	$ 15,768,489
11	2023	$ 9,163,671	6,865,341	462,610	19,500	$ 16,472,122
12	2024	$ 9,576,952	7,188,012	462,610	19,500	$ 17,208,074
13	2025	$ 10,008,873	7,525,869	462,610	19,500	$ 17,977,832
14	2026	$ 10,460,273	7,879,564	462,610	19,500	$ 18,782,947
15	2027	$ 10,932,031	8,249,903	462,610	19,500	$ 19,625,044
16	2028	$ 11,425,066	8,637,649	462,610	19,500	$ 20,505,824
17	2029	$ 11,940,336	9,043,618	462,610	19,500	$ 21,477,064
18	2030	$ 12,478,845	9,468,668	462,610	19,500	$ 22,390,624
19	2031	$ 13,041,641	9,913,696	462,610	19,500	$ 23,398,447
20	2032	$ 13,629,819	10,379,638	462,610	19,500	$ 24,452,569
21	2033	$ 14,244,524	10,867,482	462,610	19,500	$ 25,555,117
22	2034	$ 14,886,951	11,378,254	462,610	19,500	$ 26,708,316
23	2035	$ 15,558,354	11,913,032	462,610	19,500	$ 27,914,496
24	2036	$ 16,260,045	12,472,945	462,610	19,500	$ 29,176,090
25	2037	$ 16,993,363	13,059,173	462,610	19,500	$ 30,498,646
	2038	$ 17,759,764	13,672,954	462,610	19,500	$ 31,875,828
	2039	$ 18,560,729	14,315,583	462,610	19,500	$ 33,319,422
	2040	$ 19,397,818	14,988,415	462,610	19,500	$ 34,829,343
	2041	$ 20,272,660	15,692,871			$ 35,965,530
	2042	$ 21,186,956	16,440,436			$ 37,617,392

25 Yrs Cummulative:
$ 493,063,801

30 Yrs Cummulative
$ 634,795,488

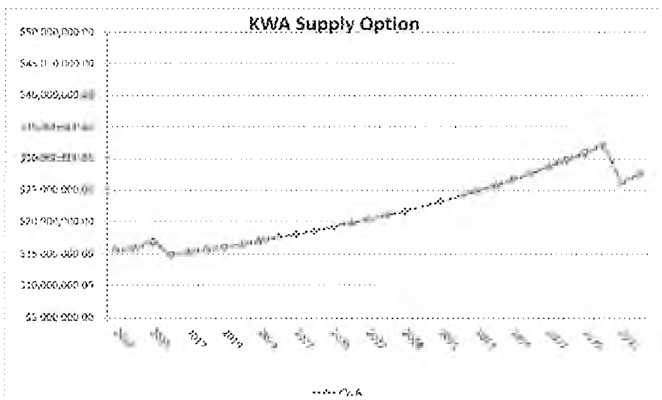
KWA Supply Option Worksheet

KWA 10/31/12 No Operations

	Year	DWSD & Flint WTP Costs	KWA Entry Fee	KWA Debt service	Flint WTP Debt Service	KWA Operations	Flint WTP Operations with KWA	TOTAL
1	2013	$ 14,413,858	1,162,800					$ 15,576,658
2	2014	$ 15,355,135	581,400					$ 15,936,535
3	2015	$ 16,365,534	581,400					$ 16,946,934
4	2016			6,593,155	572,783	878,869	6,843,344	$ 14,888,149
5	2017			6,594,155	572,781	921,812	7,185,511	$ 15,274,260
6	2018			6,593,155	572,781	966,953	7,546,787	$ 15,679,676
7	2019			6,593,155	572,781	1,014,401	7,922,026	$ 16,105,363
8	2020			6,593,155	572,781	1,066,271	8,318,127	$ 16,552,334
9	2021			6,593,155	572,781	1,121,684	8,734,034	$ 17,021,654
10	2022			6,593,155	572,781	1,177,769	9,170,735	$ 17,514,440
11	2023			6,593,155	572,781	1,236,657	9,625,272	$ 18,031,865
12	2024			6,593,155	572,781	1,299,490	10,110,735	$ 18,575,162
13	2025			6,593,155	572,781	1,363,414	10,616,273	$ 19,145,623
14	2026			6,593,155	572,781	1,431,585	11,147,086	$ 19,744,607
15	2027			6,593,155	572,781	1,503,164	11,704,441	$ 20,373,541
16	2028			6,593,155	572,781	1,578,322	12,289,663	$ 21,033,921
17	2029			6,593,155	572,781	1,657,239	12,904,146	$ 21,727,320
18	2030			6,593,155	572,781	1,740,101	13,549,353	$ 22,455,390
19	2031			6,593,155	572,781	1,827,106	14,226,821	$ 23,219,862
20	2032			6,593,155	572,781	1,918,461	14,938,162	$ 24,022,559
21	[illegible]			6,593,155	572,781	2,014,384	15,685,070	$ 24,865,390
22	[illegible]			6,593,155	572,781	2,115,103	16,469,323	$ 25,750,362
23	[illegible]			6,593,155	572,781	2,220,858	17,292,789	$ 26,679,584
24	[illegible]			6,593,155	572,781	2,331,901	18,157,429	$ 27,655,266
25	[illegible]			6,593,155	572,781	2,448,496	19,065,300	$ 28,679,733
	[illegible]			6,593,155	572,781	2,570,921	20,018,565	$ 29,755,422
	2039			6,593,155	572,781	2,699,467	21,019,494	$ 30,884,897
	2040			6,593,155	572,781	2,834,440	22,070,468	$ 32,070,445
	2041					2,976,162	23,173,991	$ 26,150,154
	2042					3,124,970	24,332,691	$ 27,457,662

25 Yrs Commulative	
$	503,456,18[illegible]

30 Yrs Commulative	
$	649,775,166



KWA Supply Option Worksheet
KWA Supply Option

KWA Supply Option Worksheets
KWA 2

Capacity

Flint ADD	12	MGD	1.604	MCF/Day
KWA ADD	25	MGD	1.604	MCF/Day

Annual Volume

Flint	593,562	MCF
KWA	585,562	MCF

2016 Cost of Supply

Flint WTP O&M	$	13.41	/MCF	$ 7,912,118	/Yr
KWA	$	1.50	/MCF	$	[illegible]	/Yr

Escalation/Inflation Rate

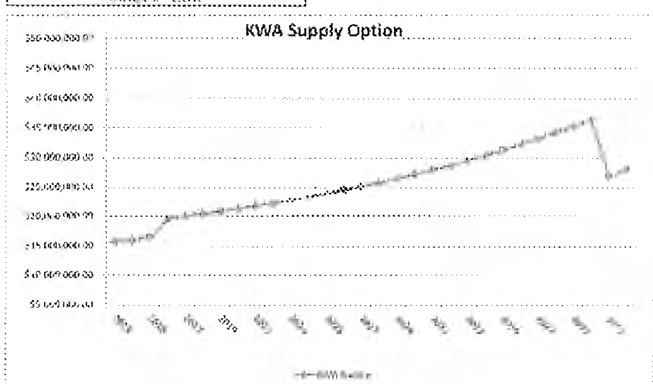
Flint	4.51%	/Yr
KWA	5.0%	/Yr

Capital Expenditure

Capital	$	[illegible]			
Bond Issuance (2.25% of Total)		11,000,000	Check	2.25%	
3 Years of Capitalized Interest		[illegible]	Check	5.0%	/yr (Bond interest on total)
Reserve (10% of Total)		[illegible]	Check	10.0%	
Total	$	[illegible]			
Flint's Share (30%)	$	[illegible]			
Revenue Bond Rate		[illegible]			
Number of Years		25			
Annual Cost		$10,464,666			
Interest on Reserve		[illegible]			

Capital	$	[illegible]			
Bond Issuance (3% of Total)		[illegible]	Check	3.25%	
3 Years of Capitalized Interest		[illegible]	Check	5.0%	/yr (Bond interest on total)
Reserve (10% of Total)		[illegible]	Check	10.0%	
Total	$	10,568,562			
Revenue Bond Rate		[illegible]			
Number of Years		25			
Annual Cost		$756,946			
Interest on Reserve		[illegible]			

	Year	Flint WTP O&M	Water Purchase	KWA Revenue Pre-bond Entry Fee & Bond Payment	Flint Revenue Bond Payment	Interest on Reserve	TOTAL
[illegible]	2013	$ 3,538,224	11,461,700	[illegible]		473,100	$ 15,689,614
[illegible]	2014	$ 3,697,788	12,034,785	[illegible]		[illegible]	$ 15,840,873
[illegible]	2015	$ 3,864,556	12,636,524	[illegible]		[illegible]	$ 16,609,387
[illegible]	2016	$ 7,912,118	[illegible]	[illegible]	[illegible]	[illegible]	$ 19,540,900
[illegible]	2017	$ 8,270,000	[illegible]	[illegible]	[illegible]	[illegible]	$ 19,941,325
[illegible]	2018	$ [illegible]	[illegible]	[illegible]	[illegible]	473,100	$ 20,360,442
[illegible]	2019	$ 9,032,735	[illegible]	[illegible]	[illegible]	473,100	$ 20,798,688
[illegible]	2020	$ 9,440,193	[illegible]	[illegible]	756,946	[illegible]	$ 21,256,946
[illegible]	2021	$ [illegible]	[illegible]	[illegible]	756,946	[illegible]	$ 21,736,101
[illegible]	2022	$ 10,310,657	[illegible]	[illegible]	756,946	473,100	$ 22,237,137
[illegible]	2023	$ [illegible]	[illegible]	10,464,666	756,946	[illegible]	$ 22,761,045
12	2024	$ [illegible]	[illegible]	10,464,666	756,946	[illegible]	$ 23,308,870
13	2025	$ [illegible]	[illegible]	10,464,666	756,946	[illegible]	$ 23,881,705
14	2026	$ 12,300,590	[illegible]	[illegible]	756,946	473,100	$ 24,480,693
15	2027	$ 12,855,352	1,403,164	[illegible]	756,946	473,100	$ 25,107,029
16	2028	$ 13,435,128	1,578,827	[illegible]	756,946	473,100	$ 25,761,965
17	2029	$ 14,041,053	1,657,239	10,464,666	756,946	473,100	$ 26,446,804
18	2030	$ 14,674,305	1,740,101	10,464,666	756,946	473,100	$ 27,162,917
19	2031	$ 15,336,116	1,827,106	10,464,666	756,946	473,100	$ 27,911,733
20	2032	$ 16,027,775	1,918,461	10,464,666	756,946	473,100	$ 28,694,748
21	2033	$ 16,750,627	2,014,384	10,464,666	756,946	473,100	$ 29,513,523
22	2034	$ 17,506,080	2,115,103	10,464,666	756,946	473,100	$ 30,369,696
23	2035	$ 18,295,605	2,220,858	10,464,666	756,946	473,100	$ 31,264,975
[illegible]	2036	$ 19,120,737	2,331,901	10,464,666	756,946	473,100	$ 32,201,150
[illegible]	2037	$ 19,983,087	2,448,496	10,464,666	756,946	473,100	$ 33,180,090
	2038	$ 20,884,213	2,570,921	10,464,666	756,946	473,100	$ 34,203,757
	2039	$ 21,826,201	2,699,467	10,464,666	756,946	473,100	$ [illegible]
	2040	$ 22,810,563	2,834,440	10,464,666	756,946	473,100	$ 36,393,516
	2041	$ 23,839,320	2,976,162				$ 26,815,482
	2042	$ 24,914,473	3,124,970				$ 28,039,443



25 Yrs Cummulative
$ 606,057,940

30 Yrs Cummulative
$ 766,794,313

EXHIBIT 3

From: Jason Lorenz <jlorenz@cityofflint.com>
Sent: Friday, April 25, 2014 4:23 PM
To: undisclosed-recipients:
Subject: PRESS RELEASE: Flint Officially Begins Using River
Attachments: Flint.River.Transition.4.25.14.pdf

For Immediate Release

City of Flint Officially Begins Using Flint River as Temporary Primary Water Source

Flint, Michigan – April 25, 2014 – For the first time in fifty years, the City of Flint is using the Flint River—part of the Saginaw River watershed—as a primary water source for city residents. Today the valve to the pipeline from Detroit was closed and the Flint River officially became Flint's water supply. The temporary switchover is scheduled to support the city's primary water needs for the next two years while construction of the forthcoming pipeline from Lake Huron is completed by Karegnondi Water Authority. Officials from the City of Flint, the Genesee County Drain Commission and the Michigan Department of Environmental Quality were all on hand to witness the historic event.

The Flint River was once the primary source of water for city residents up to the 1960s. Over the past 40 years, it has provided water to city residents as a back-up to water provided to us by Detroit. During our partnership with Detroit, Flint has had to transition to the use of the Flint River for residential water on a few different occasions, with the most recent temporary switchover happening in 2009. Each temporary stint on local water proved three things to city employees and residents alike: That a transition to local river water could be done seamlessly, and that it was both sensible and safe for us to use our own water as a primary water source in Flint.

Even with a proven track record of providing perfectly good water for Flint, there still remains lingering uncertainty about the quality of the water. In an effort to dispel myths and promote the truth about the Flint River and its viability as a residential water resource, there have been numerous studies and tests conducted on its water by several different independent organizations. In addition to what has been found in independent studies, it is also the responsibility of the City of Flint Water Service Center to continually test the water

provided to city residents. Michael Prysby of the Michigan DEQ Office of Drinking Water verified that "the quality of the water being put out meets all of our drinking water standards and Flint water is safe to drink."

For nearly 10 years Mike Glasgow has worked in the laboratory at the City of Flint Water Service Center. He has run countless tests on our drinking water to ensure its safety for public use. Mike has not only conducted tests on water provided to us by Detroit, but also on local water from nearby rivers, lakes and streams including the Flint River. When asked if over the last decade if he has seen any abnormalities of major concern in the water, his response was an emphatic, "No." In his words, "there has been nothing seen that was of major concern," during his ongoing tenure working in the lab. "The tests results have shown that our water is not only safe, but of the high quality that Flint customers have come to expect," announced DPW Director Howard Croft, "we are proud of the end result."

Apart from the water plant's devotion to ensuring that our water is good, Flint is doubly blessed in having the Flint River Watershed Coalition as a separate organization dedicated to monitoring the overall welfare of local bodies of water, overseeing more than 30 different nearby locations. Rebecca Fedewa has been director of the watershed coalition since 2008. By virtue of her passion for her work and her position on the board, she is very conversant with the condition of the Flint River. In her words, "The Flint River is increasingly healthy, and completely suitable as a drinking water source." Fedewa and FRWC are working closely with the city "to monitor flows and habitats between the intake and the waste water treatment plant to ensure there are minimal to no impacts to the overall health of the river."

FRWC also invites city residents to be a part of their monitoring exercises during this spring in order "to gain firsthand knowledge in the health and vitality of our Flint River." Mayor Dayne Walling invited everyone at today's event to toast to Flint's water. "It's regular, good, pure drinking water, and it's right in our backyard," said Mayor Walling, "this is the first step in the right direction for Flint, as we take this monumental step forward in controlling the future of our community's most precious resource."

–END–

-Jason Lorenz
Public Information Officer

City of Flint
(810) 237-2039
jlorenz@cityofflint.com

Darnell Earley
ICMA-CM, MPA
Emergency Manager

Dayne Walling
Mayor

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–CONTINUE–

Darnell Earley
ICMA-CM, MPA
Emergency Manager

Dayne Walling
Mayor

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–CONTINUE–

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–END–

EXHIBIT 4

From: Prysby, Mike (DEQ)
Sent: Wednesday, March 27, 2013 3:12 PM
To: Busch, Stephen (DEQ)
Subject: FW: Flint River as a Source
Attachments: Flint WTP Report Revised August 29, 2011.pdf

Here's the Flint WTP 2011 report – all 91 pages of it….I am going through it looking for the high points

Michael Prysby, P.E.
District Engineer
Office of Drinking Water and Municipal Assistance
517 335-6122

From: Brent Wright [mailto:bwright@cityofflint.com]
Sent: Wednesday, March 27, 2013 3:01 PM
To: Prysby, Mike (DEQ)
Subject: Flint River as a Source

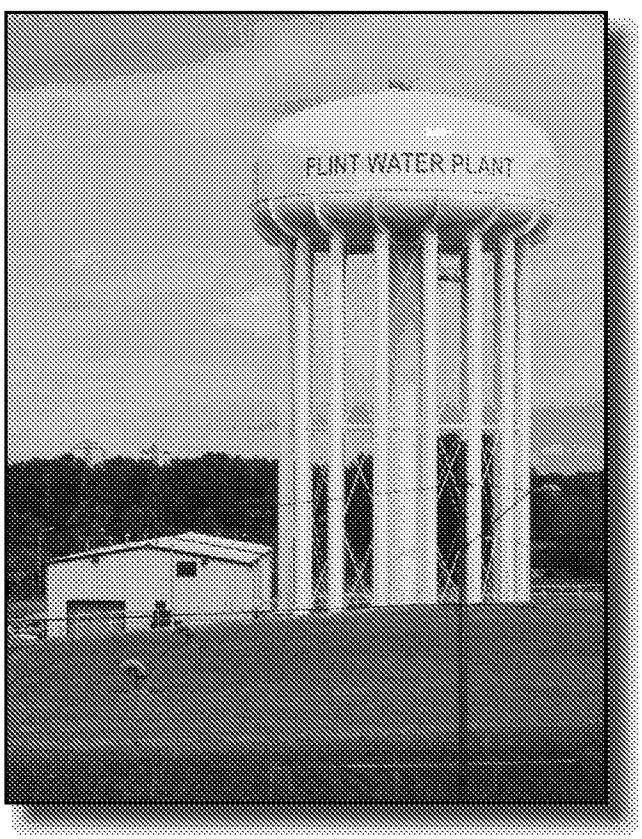
Hope this works…Brent

July 2011

Analysis of the Flint River as a Permanent Water Supply for the City of Flint

Prepared for:

City of Flint
1101 S. Saginaw Street
Flint, MI 48502
(810) 766-7346



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I. Purpose

This study evaluates the feasibility of utilizing the City of Flint's Water Treatment Plant (WTP) and Flint River as the primary water supply for the City of Flint. The study evaluates whether the Flint River is an adequate source of water for the City of Flint and identifies upgrades needed to reliably supply water on a continuous basis.

II. History

The City of Flint's WTP was constructed in 1917 and supplied water to city customers for drinking and industrial uses. Records indicate that Flint supplied approximately 16 mgd in 1940 and that by the mid-1950s water use had increased to about 45 mgd. This significant increase coincided with increases in automobile production and population in the area. The Holloway Reservoir was constructed in 1954 to increase water supply capacity to meet the growing demand. Because of continued concerns regarding the adequacy of the Flint River for meeting the future water supply needs of the area, the city evaluated alternatives for a new water supply and ultimately contracted with the City of Detroit in 1967 for water supply. Detroit continues to supply water to Flint and its customers today. Detroit supplies finished water to the city via a single transmission pipeline. For reliability, the city's WTP has been maintained as a backup water supply in the event of a disruption to the single supply pipeline.

Because of recent concerns with the cost and reliability of the existing water supplies, the City of Flint, Genesee County, Lapeer County, the City of Lapeer, and Sanilac County are evaluating alternatives for their long-term water supply. The most recent study (Preliminary Engineering Report, Lake Huron Supply, Karegnondi Water Authority; September 2009) focused on two primary alternatives: Alternative 1 – continued supply by Detroit, and Alternative 2 – development of a new Lake Huron water supply. This study evaluates a third alternative. Alternative 3 provides for utilizing the existing City of Flint WTP to treat water from the Flint River. Alternative 3 assumes that water will be supplied only to customers within the city.

To evaluate the feasibility of Alternative 3, the river and WTP will be examined to determine their ability to supply water in sufficient quantity meeting current and anticipated regulations. There have been many new rules and regulations for treatment of surface water since 1967 when Flint's WTP was last used as a primary water supply.

III. Regulatory Requirements for Quantity of Source Water

Regulations require that the quantity of water at the source shall:

- Be adequate to meet the maximum projected water demand of the service area as shown by calculations based on a one in fifty year drought or the extreme drought of record, and should include consideration of multiple year droughts. Requirements for flows downstream of the intake shall comply with requirements of the appropriate reviewing authority.
- Provide reasonable surplus for anticipated growth.
- Be adequate to compensate for all losses such as silting, evaporation, seepage, etc.
- Be adequate to provide ample water for other legal users of the source.

IV. Demands

The alternative of utilizing the city's WTP and Flint River as a water supply will be evaluated on the basis of supplying water to Flint's direct customers only. Although Flint currently supplies water to GCDC-WWS, for this analysis it is assumed that GCDC-WWS receives its primary water supply by another source. Table 1 summarizes the city's current and projected demands for direct customers of the city. Projections have been provided by city representatives.

Table 1: City Customer Demand Summary

	2010		2035	
Average Day Demand (ADD)	14.0	mgd	15.0	mgd
Maximum Day Demand (MDD)	17.5	mgd	18.0	mgd

Actual water requirements will be greater than the amount of water provided to customers. About ten percent additional water must be added for treatment processes and system operation. Water for fire-fighting is not included in customer demands and must be added to the quantity of water needed.

Surface water sources must be adequate to supply water through a drought period. Although the MDD is projected to be 18 mgd, the sustained maximum demand over a longer period will be less than the MDD. Analysis of records of water use indicates that the 30-day sustained maximum demand is about 80% of the MDD. Table 2 summarizes the source water requirements to supply the city's future needs.

Table 2: Source Water Requirements

Future Maximum Day Demand (Customers)		18.0 mgd
Future Maximum Day Demand (WTP Backwash / Process Water)		2.0 mgd
Subtotal (Future Maximum Day Demand)		20.0 mgd
Sustained (30 day) Future Maximum Day Demand	(80% of MDD)	16.0 mgd
Replenish Water from Fire Fighting		0.7 mgd
Future Maximum Day Demand (Source Water)		16.7 mgd

V. Drought Flows

USGS records indicate that the most severe drought in Michigan occurred between 1930 and 1937, and that the low stream flows experienced during this period have a recurrence interval of 50 to 70 years. River flow records which include the drought of the 1930s will be used to evaluate the adequacy of the river as a permanent water source.

VI. Reservoir Losses

Both the Holloway Dam and Mott Dam were constructed since the drought period of the 1930s. If used to simulate the "design drought conditions", the records of flow on the Flint River from the 1930's should be adjusted for potential impact from the addition of these two dams and resulting reservoirs.

A. Evaporation

If the two reservoirs had existed during the drought period, the flows in the river would have been a little less because of the volume of water which would have been lost to evaporation from these two bodies of water.

B. Sedimentation

The July 2001 Flint River Assessment completed by the MDNR indicates that sedimentation occurs in the Holloway Reservoir at an accelerated rate, but does not provide specific volumes. Sedimentation reduces the storage volume of reservoirs. No investigation to determine the amount of sedimentation has been completed in the Holloway Reservoir since its construction, but the storage volume of the reservoir has certainly decreased since its construction.

Mott Dam maintains a fixed water level, so storage for water supply is not available. Therefore, sedimentation in Mott Lake is not a concern with respect to water supply.

C. Seepage

The land adjacent to both the Holloway Reservoir and Mott Lake has a relatively high groundwater table. Any loss of water by seepage from the bottom of the reservoirs seems likely to flow back to the river downstream of the respective dams, resulting in little or no impact to the quantity of water available for water supply or flow augmentation. Loss from the reservoirs by seepage is not considered a significant factor.

VII. Other Water Uses

Since 1967 when Detroit began supplying water to Flint, the Holloway Reservoir has been utilized as a backup water source, source of flow augmentation for the river, and for recreational purposes. Although the city maintains control over the dam and water levels; the city has leased their surrounding lands to the Genesee County Parks and Recreation Commission (GCPRC) for park, recreational, and conservation purposes. In 1987, the city and GCPRC adopted the Holloway Reservoir Management Plan (HRMP) which defined how water levels in the reservoir were to be maintained to achieve the goals above. The HRMP establishes a summer water level of 755 and a winter level of 751. Discharge from the reservoir is to be maintained above 65 cfs except when the level is less than 751; outflow from the reservoir is not to exceed inflow to the reservoir. A copy of the HRMP is included in Appendix 1.

Flow augmentation for the city's WWTP discharge is another consideration. The city's NPDES permit for their WWTP indicates that a Flint River drought flow of 85 cfs was used to determine the permitted limits for WWTP effluent. It appears that the HRMP requirement to maintain a 65 cfs minimum at the Holloway Reservoir was established to provide adequate flow in the river at the city's WWTP outfall. An excerpt of the city's WWTP NPDES permit is included Appendix 2.

The existing water supply contract between the city and Genesee County Drain Commissioner Division of Water and Waste Services (GCDC-WWS) provides that both the city and GCDC-WWS supply the other up to 8 mgd of finished water in the event of an emergency or supply disruption. For this analysis, it is assumed that the Flint WTP and river must be able to supply 8 mgd to GCDC-

WWS in the event of an emergency in addition to the quantity consumed by the city's water customers. The need to provide backup to GCDC-WWS is assumed to be limited to a period of two weeks. Over a 14 day period, 125 million gallons of water should be reserved to meet the commitment for an emergency supply.

VIII. Analysis of Adequacy of Flint River

A detailed analysis of the adequacy of the Flint River as a water supply source is included in Appendix 3. This section provides an overview.

In 1977 when the HRMP was executed, water was not withdrawn from the Flint River for water supply. In 1977 without any withdrawal for water supply, the HRMP provided for a minimum discharge of 65 cfs from the Holloway Reservoir, to provide for a river flow of 85 cfs at the city's WWTP. If water is withdrawn from the river for water supply, the minimum flow from the reservoir must be increased by the rate of WTP withdrawal if the 85 cfs base flow is to be maintained at the city's WWTP. With Flint's future sustained demand estimated to be 16.7 mgd (26 cfs), a minimum flow of 91 cfs (65 cfs + 26 cfs) will be needed from the Holloway Reservoir to maintain the 85 cfs base flow at the WWTP.

The United States Geological Survey (USGS) in a 1963 report Water Resources of the Flint Area Michigan examined the Flint River as a water supply for Flint. Using river flow records between 1930 and 1952, the USGS report includes a Draft-Storage curve for the Holloway Reservoir. If a minimum discharge of 91 cfs is to be maintained during a drought period, 6.2 billion gallons water would need to be withdrawn from the reservoir to supplement natural river flow.

In addition to the 6.2 billion gallons of storage to maintain the existing rates of flow in the river plus water supply, additional storage is required to provide GCDC-WWS an emergency supply and to make up for reservoir losses. The following table summarizes the total storage needed.

Table 3: Storage Requirements

Storage to meet sustained demand and WWTP flow	6.20	billion gallons
Storage to provide backup supply to GCDC-WWS	0.11	billion gallons
Storage to make up loss by evaporation	0.90	billion gallons
Storage lost by siltation	0.64	billion gallons (assumed)
Storage to provide loss by seepage	0.00	billion gallons
Storage Needed to Supplement River Flow	7.85	billion gallons

To provide 7.85 billion gallons of storage, the Holloway Reservoir operating level must be raised by at least three feet to 758 feet. Although possible, there are many challenges associated with operating the Holloway Reservoir at the 758 feet level.

- The existing drum gates used to control reservoir level are designed for adjustment over a four feet range (751 feet to 755 feet). The design of the dam is such that the existing gates cannot simply be replaced with larger ones to increase the upper level to 758 feet. The dam spillway will likely need to be reworked to accommodate the larger drum gates. Drawings showing the details of the dam are included in Appendix 4.

- Although operation at the 758 water level provides five feet of freeboard to the top of the dam, the watershed contributing to the reservoir is quite large and has resulted in quick increases in the reservoir level during extreme rain events. The reduction in freeboard will result in a reduced safety factor for managing flood events.
- Seepage through the earthen dam embankment will increase as a result of the increased hydraulic pressure with the higher water level. Increased seepage through the dam's embankment will reduce the strength and integrity of the embankment and is likely to increase maintenance needs.
- The 758 feet water level is based on an assumption regarding the loss of the reservoir volume by siltation. The depth of siltation should be measured to better determine the quantity of siltation and its impact on storage and reservoir level.
- Recreational activities, the fishery, and adjacent properties will be impacted by use of the reservoir for water supply. Normal water levels will be increased by three feet and during dry periods, the water levels may vary by several feet. During an extreme drought period, water levels may be as much as 11 feet below normal levels.
- If the 85 cfs drought flow at the city's WWTP cannot be achieved, a new NPDES permit with stricter discharge limits may issued by the MDEQ. This could result in higher WWTP costs for the city.

Analysis shows that without modification, the Holloway Reservoir can support a sustained maximum day demand of 11.6 mgd for water supply through a drought period.

IX. Dams

If the Flint River is to be used as water supply, existing dams will continue to be critical for management of the flows in the river and water supply. Following is a summary of the dams on and adjacent to the river.

Table 4: Summary of Dams

Facility	Construction Completed	Catchment Area (sq. mi.)	Surface Area (Acres)	Storage (Acre-Feet)	Ownership	Hazard Classification	Condition
Holloway Dam	1954	523	1,973	17,678	Flint	High	Good
Mott Dam	1972	612	684	0	GCPRC		Good
Kearsley Dam	1929	115	175	2,000	Flint	Significant	Satisfactory
Utah Dam	1928	729		0	Flint	Low	Poor
Hamilton Dam		748	17		Flint	High	Poor
Thread Creek Dam	1973	63	80	320	Flint	Significant	Poor

A. Holloway Dam

The Holloway Dam was last inspected in 2008 and was reported to be in good condition. A copy of the 2008 Dam Safety Report is included in Appendix 5. Other than routine maintenance, the following upgrades / modifications are recommended to provide a water supply of up to 11.6 mgd:

- Replacement of drum gate bearings
- Installation of river flow gage on North Branch of Flint River
- Improved instrumentation to measure and monitor gate positions and water surface level

If the river is to be used as a water supply of greater capacity than 11.6 mgd, additional modifications are required at the Holloway Dam to allow for operation at an increased water level. These improvements will include replacement of gates with larger ones and reworking of the dam spillway to accommodate the larger gates. The existing embankment should be armored to strengthen the dam's embankment and protect against erosion from wave action. A budget of $2.57 million is established for the upgrades to the Holloway Dam to provide adequate capacity for the projected future demands.

B. Mott Dam

The Mott Dam is under the jurisdiction of the GCPRC. The reservoir level is maintained by a fixed weir so the reservoir volume is not available for storage. The dam has been reported to be in good condition.

C. Utah Dam

Utah Dam is inoperable and in poor condition. A copy of the 2008 Dam Safety Report is included in Appendix 6. Recent studies and evaluations conclude that the dam is of little benefit and should be removed. The 2010 Hamilton Dam Modifications and Riverfront Restoration PER provides a budget of $1.9 M for removal of the Utah Dam, including replacement with a pedestrian bridge, construction of a boat launch, and local storm sewer upgrades.

D. Hamilton Dam

The Hamilton Dam is in poor condition and considered unstable. A copy of the 2008 Dam Safety Report is provided in Appendix 7. The dam has been the subject of extensive study and recommended for removal and replacement. The 2010 Hamilton Dam Modifications and Riverfront Restoration PER provides a budget of $7.1 M for the removal and replacement of the dam, including ancillary upgrades to adjacent portions of the river.

The new Hamilton Dam is proposed at a lower elevation than the existing dam to reduce potential for flooding. A reduced water level upstream of the dam will reduce the water pool depth at the WTP intake, unless the Utah Dam is replaced or another dam is added. Testing of pumps at the WTP was completed to determine the impact of a reduced water depth at the WTP intake. Allowing for two feet of loss through the WTP intake screens after operation, reduction of the height of the Hamilton Dam by 1.5 feet or more will impact WTP's ability to draw water from the river.

E. Kearsley Dam

The Kearsley Dam is reported in satisfactory condition. Although the dam is located downstream of the city's WTP, water from the dam and Kearsley Lake supplements the river flow in advance of the Hamilton Dam, therefore contributing to the impoundment from which the WTP draws water. Water from the Kearsley Creek also serves to augment river flow at the city's WWTP located further downstream.

The storage volume of Kearsley Lake is relatively minor in relation to the storage deficit from Section VIII. Supplemental flows to the river from the Kearsley Creek are included in the USGS records included in this analysis

The dam is an important component of the city's water supply system because of its potential contribution to the WTP intake. Although currently in satisfactory condition, there will be ongoing maintenance needs to be addressed.

F. Thread Lake Dam

The Thread Lake Dam is reported to be in poor condition. Flow from the Thread Creek supplements the river flow prior to the city's WWTP. The storage provided by Thread Lake is negligible and flow from Thread Creek is included in the USGS records of river flow used for this analysis.

The Thread Lake Dam remains a facility of the city which because of its poor condition needs to be addressed. However, since the dam appears to be of little benefit to the water supply considered in this analysis, a budget for upgrades or removal has not been included in the costs for water supply.

X. Source Water Quality

Since the Flint WTP is the backup water supply in the event of a disruption to the supply from Detroit, raw water at the WTP intake is regularly sampled and analyzed. Available records provide a good understanding of the characteristics of the raw water and ranges of variances, and will be helpful to design water treatment processes and estimate operating costs.

Preliminary analysis indicates that water from the river can be treated to meet current regulations; however, additional treatment will be required than for Lake Huron water. This results in higher operating costs than the alternative of a new Lake Huron supply.

Although water from the river can be treated to meet regulatory requirements, aesthetics of the finished water will be different than that from Lake Huron. As an example, the temperature of water supplied to customers during the summer will be warmer than the present Lake Huron supply, because of the increased summer temperature in the relatively shallow river.

A detailed investigation of potential sources of contamination has not been completed. The MDEQ has reported that the Richfield Landfill is considering an application for an NPDES permit to allow

for discharge of stormwater and/or treated leachate to the Holloway Reservoir. If an NPDES permit is issued, there may be an impact on the quality of source water.

If used for water supply, a source water protection management plan should be developed to study the watershed, identify potential sources of contamination, and enact safeguards to prevent or control future threats.

XI. Water Treatment

For comparison with other alternatives, it is assumed that the Flint WTP will treat water from the river to provide a finished water of similar quality to the other alternatives being considered (continued Detroit supply and new Lake Huron supply).

A review of the city's WTP has been completed (Technical Memorandum, Cost of Service Study, Flint Water Treatment Plant prepared by Lockwood, Andrews, and Newnam (LAN), dated June 2011) to evaluate its ability to treat water from the river on a continuous basis to meet current and anticipated regulations and produce high quality finished water. Details regarding this review and analysis are provided in Appendix 8.

Although the WTP has been maintained and operated as a backup water supply, there have been numerous changes in regulations and standards since the WTP last supplied water on a continuous basis. Although equipment and systems at the WTP have been used sparingly, some existing equipment and systems require replacement from deterioration or obsolescence to provide reliability for continuous operation.

Following is a summary of upgrades needed.

A. Lime Sludge Disposal

Prior to supply of water by DWSD, the city's WTP disposed of lime sludge from water treatment operations at the Bray Road disposal site. The city is working with the MDEQ to address concerns at the Bray Road site; for this study it has been assumed that new sludge handling and disposal provisions will be utilized. Lime residual handling and disposal facilities have an estimated project cost of $15.1 million. No costs have been included for remediation of the Bray Road site.

B. Soda Ash Feed System

Records of analyses of the source water indicate non-carbonate hardness. To remove the non-carbonate hardness and provide softening, soda ash should be added during treatment. The addition of a soda ash feed system has an estimated project budget of $0.5 million.

C. Chemical Storage

Bulk chemical storage of at least 30 days is needed if the plant operates on a continuous basis. New storage tanks for liquid carbon dioxide, liquid oxygen, and liquid nitrogen will be needed. The project budget for chemical storage is $2.1 million.

D. Electrical and SCADA

The power requirements of equipment at the WTP exceed the capacity of the substation which supplies the plant. Backup power generators at the WTP are not currently operable. Upgrades are recommended to power feeders for several of the existing systems. New SCADA is recommended to provide control and monitoring of operations at the WTP. The project budget for these upgrades is $8.1 million.

E. Post Chlorination and Zebra Mussel Control

Zebra mussels are an invasive shell fish which have been introduced to the Great Lakes basin, including the Flint River. Zebra mussels can obstruct pipes and water intake screens. A sodium permanganate feed system is proposed for zebra mussel control. The project budget is $0.3 million.

F. Security Issues

Additional security measures to guard against malevolent threats or terrorism which target the new water source will be required. A project budget for this is $0.3 million.

G. Pumping System Improvements (Low and High Service Pumps in PS No. 4)

The pumps are in poor condition and their capacity is not consistent with the projected demands of the city. The pumps should be replaced with new, more efficient pumps. The project budget for these is $7.8 million.

H. Filter Transfer Station to Dort Reservoir and UV Inactivation

Recent USEPA regulations require additional treatment or enhancement of existing treatment processes for microbial contaminates such as giardia, cryptosporidium, viruses, and bacteria. It is anticipated that enhanced contact time and ultraviolet light deactivation will be required to comply with these new standards. A project budget of $7.0 million is established for compliance with the new surface water treatment rules.

I. Emergency Interconnect

The GCDC-WWS and City of Flint have a mutual aid agreement providing for each to provide the other up to 8 mgd of water as a back-up supply in the event of an emergency with either system's supply. A pumping station and piping interconnect is needed to effectively complete this exchange. The project budget for these upgrades is $8.6 million.

The total of all WTP upgrades above is $49.9 million.

In addition to upgrades to the treatment plant, there will be increased operating costs associated with the continuous operation of the WTP. For comparison with other alternatives for a long-term water supply, only the additional operational costs have been determined.

- Labor – Full scale operation of the WTP and dams on a continuous basis will require additional staffing. It is estimated that labor costs will increase by $2,034,000 per year.
- Chemicals – The cost of chemicals used for water treatment are estimated at $423 per million gallons of water produced.
- Residual Disposal – Disposal costs for lime sludge is estimated to be $453,000 annually.

- Power – Increased power costs are estimated to be $104 per million gallons of water produced.
- Ozone – Ozone treatment will be needed to meet new treatment standards. A budget of $208,000 is assumed.
- Maintenance – Maintenance costs are assumed to be 20% of the O&M budget. Maintenance costs of the WTP and other facilities are expected to be relatively high because of the age of the facilities.

XII. Cost Summary

Upgrades to dams and the WTP will be needed for the Flint River to reliably supply drinking water on a continuous basis to Flint's customers. The cost of these upgrades is presented in the following table. Costs have been adjusted to an ENR Construction Cost Index of 8688 to allow for comparison with the 2009 Study. It has been assumed that design/construction commenced in 2010, to allow for comparison with the alternatives in the 2009 study.

Table 5: Project Costs

WTP Upgrades	$49,888,000
Hamilton Dam Replacement	$7,100,000
Holloway Dam /Reservoir Upgrades	$2,570,000
Utah Dam Removal	$1,900,000
Total Capital Cost	**$61,458,000**

Costs shown are based on upgrades to existing facilities to supply the projected future maximum day demand of 18.0 mgd. These upgrades are based on the assumption that the HRMP is modified to allow for operation over a greater range of water levels. Other options for supplying the projected maximum day demand will result in higher costs.

Operating costs in the initial year of operation are estimated to increase $7 million above current operating costs. Operating costs are projected to increase annually because of inflation and projected growth in demand over the study period.

Figure 1 shows the cost of water for Alternative 3, utilizing the existing WTP and Flint River for water supply. The cost of water is comprised of three components: continued purchase of water from Detroit during construction, debt for construction of facility upgrades, and ongoing operating costs.

Figure 1: Cost of Water Using Flint River as Source

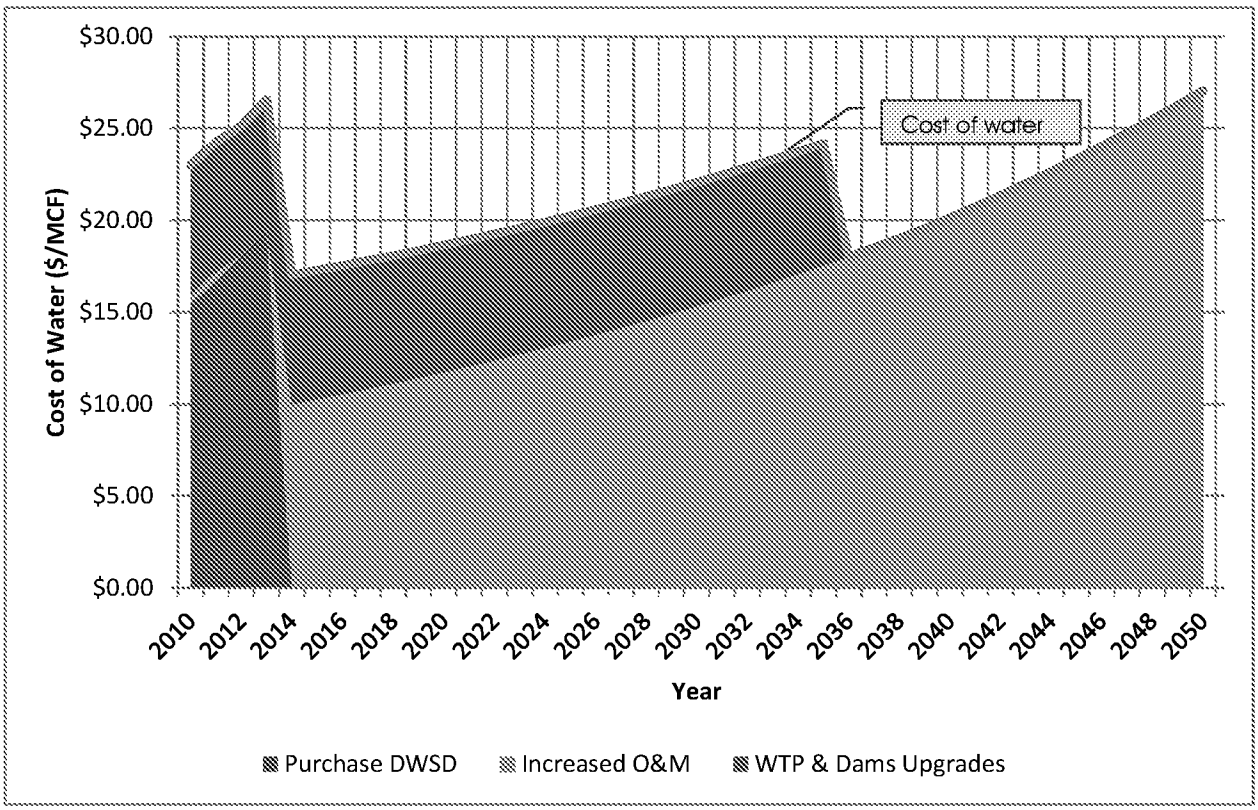
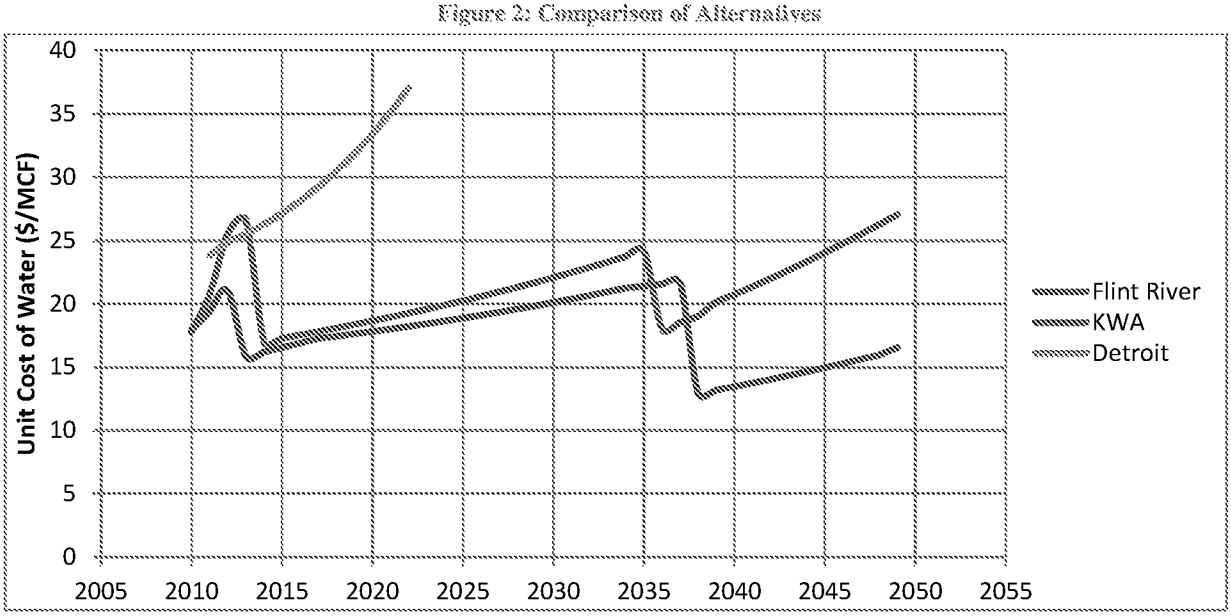


Figure 2 compares the cost of water for all three alternatives. Continued Supply by the City of Detroit results in a higher cost for water supply than the other two alternatives. The city's costs for The KWA-New Lake Huron Supply have been based upon the terms of the current KWA Raw Water Supply Contract, and the assumption that the city purchases 18 mgd capacity in the KWA system. The KWA alternative is projected to result in the lowest cost for water.

Figure 2: Comparison of Alternatives



XIII. Implementation

Planning, design, construction, and start-up will require 52 to 60 months for completion. Additional time may be required to address ancillary issues such as modifications to agreements, permits, and "non-construction related" environmental issues.

XIV. Intangibles

In addition to the upgrades identified for the dams and WTP, other issues will potentially need to be addressed if the Flint River is to be used as a water supply. Examples of these include:

- Environmental impact of work on dams or removal of sediment from the river or reservoirs
- Impact of construction and reservoir operation on the fishery
- Impact to recreational users and land owners adjacent to the Holloway Reservoir
- Potential upgrades to the city's WWTP if river flows are reduced and stricter effluent limits are included in future NPDES permits
- Impacts of the replacement of the Hamilton Dam at a lower level for improved flood control may impact the ability for the WTP to draw water from the river
- Results of a Source Water Protection Plan which may identify potential threats of contamination or other impacts to the water supply

XV. Summary

Analysis indicates that the cost of supplying water from the Flint River on a continuous basis will be greater than the proposed KWA Raw Water Supply Contract, but less than continued supplied from Detroit. Additionally, if the Flint River is to be used for a water supply for city customers, there will need to be some modifications to existing facilities, operating agreements, and permits. Upgrades will be required at the city's dams and the water treatment plant to reliably supply water to the city on a continuous basis. To meet the future maximum day demand of 18 mgd projected by city staff, one or more of the following will be required.

- Modify the Holloway Dam and Reservoir to provide additional storage
- Modify the HRMP to provide for more variance in water levels and/or modify limits on minimum discharge
- Modify the WWTP NPDES permit based on reduced flows in the river and provide resulting upgrades to WWTP for higher treatment
- Provide other raw water storage reservoirs

Addressing the preceding items is likely to require a great deal of time and effort because of the impacts on many other parties. Without making the modifications above, the river is limited to supplying a maximum day demand of about 11.6 mgd.

Appendices

1. Holloway Reservoir Management Plan
2. Excerpt of Flint WWTP NPDES permit
3. Analysis of Adequacy of Flint River as a Water Supply
4. Holloway Dam Drawings
5. 2008 Holloway Dam Safety Report
6. 2008 Utah Dam Safety Report
7. 2008 Hamilton Dam Safety Report
8. Cost of Service Study – Flint Water Treatment Plant

EXHIBIT 5

Message

From: Nakashima, Jeremy [/O=LEO A DALY/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=JNNAKASHIMA]
Sent: 10/22/2013 9:03:44 PM
To: Warren, Jason [/o=Leo A Daly/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=JAWarren]
Subject: FW: Flint
Attachments: SIGNED CONTRACT.pdf; Flint LAN Agreement-Final 6-10-13.pdf

Jeremy N. Nakashima, PE
Senior Project Manager

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
One Oakbrook Terrace, 22nd Street and Butterfield Road, Suite 207 • Oakbrook Terrace, IL 60181
T 630.495.4123 **x** 6602 **C** 773.414.4643
www.lan-inc.com • JNNakashima@lan-inc.com

From: Green, Warren
Sent: Tuesday, October 22, 2013 4:01 PM
To: Nakashima, Jeremy
Subject: FW: Flint

J. Warren Green, PE
Director of Engineering

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
One Oakbrook Terrace, 22nd Street and Butterfield Road, Suite 207 • Oakbrook Terrace, IL 60181
T 630.495.4123 **x** 6609 **D** 630.495.4199 **C** 630.918.2494
www.lan-inc.com • JWGreen@lan-inc.com

From: Green, Warren
Sent: Tuesday, October 22, 2013 3:51 PM
To: Ziegler, Jerri
Subject: Flint

Jerri

COF approved Tasks 1 & 2 of the LAN Final agreement.

Warren

J. Warren Green, PE
Director of Engineering

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY
One Oakbrook Terrace, 22nd Street and Butterfield Road, Suite 207 • Oakbrook Terrace, IL 60181
T 630.495.4123 **x** 6609 **D** 630.495.4199 **C** 630.918.2494
www.lan-inc.com • JWGreen@lan-inc.com

13-046

Lockwood,Andrews&Newnam **Motor & Repair Services**

CITY OF FLINT MICHIGAN

CONTRACTS

Contractor's Copy

EM SUBMISSION NO.: 2013 EM140

PRESENTED: 6-21-13

ADOPTED: 6-26-13

BY THE EMERGENCY MANAGER:

Resolution Authorizing Approval to Enter into a Professional Engineering Services Contract for the Implementation of Placing the Flint Water Plant into Operation

The City of Flint requires professional engineering services for assistance in placing the Flint Water Plant into operation using the Flint River as a primary drinking water source for approximately two years and then converting to KWA delivered lake water when available at a cost of $171,000.00; and

The City of Flint is seeking to enter into a sole source contract with Lockwood, Andrews & Newnam, Inc., with funding coming from the Utilities Administration FY14 account in 591-536.100-801.000; and

IT RESOLVED, That appropriate City Officials are authorized to enter into a Professional Engineering Services contract with Lockwood, Andrews & Newnam, Inc., for the administration of placing the Flint Water Plant into operation using the Flint River as a primary drinking water source at a cost of $171,000.00. Funding will come from the Utilities Administration FY14 account 591-536.100-801.000

APPROVED AS TO FORM:

for

Peter M. Bade, Chief Legal Officer

APPROVED AS TO FINANCE:

Jerry Ambrose, Finance Director

EM DISPOSITION:

ENACT ✓ FAIL _____ DATED 6-26-13

Edward J. Kurtz, Emergency Manager

CITY OF FLINT
CONTRACT WITH LOCKWOOD, ANDREWS, & NEWNAM INCORPORATED

The purpose of this agreement is to enter into a contract pertaining to the implementation of placing the City of Flint Water Plant into operation, the City of Flint (hereinafter "City") and Lockwood, Andrews, Newnam Inc., (hereinafter "Contractor").

Applicable Law: This contract shall be governed by and interpreted according to the laws of the State of Michigan pertaining to contracts made and to be performed in this state.

Arbitration: Contractor agrees to submit to arbitration all claims, counterclaims, disputes, and other matters in question arising out of or relating to this agreement, Contractor must request consent to arbitrate within 30 days from the date the Contractor knows or should have known the facts giving rise to the claim, dispute or question.

(a) Notice of demand for arbitration must be submitted to the City in writing within a reasonable time after the claim; dispute or other matter in question has arisen. A reasonable time is hereby determined to be 14 days from the date the party demanding the arbitration knows or should have known the facts giving rise to his claim, dispute or question. In no event may the demand for arbitration be made after the time when institution of legal or equitable proceedings based on such claim dispute or other matters in question would be barred by the applicable statute of limitation.

(b) Within 60 days from the date demand for arbitration is received by the City, each party shall inform Contractor whether it agrees to arbitrate. If the City does not consent, Contractor may proceed with an action in the appropriate court. If the City does consent, then within 30 days of the consent each party shall submit to the other the name of one person to serve as an arbitrator. The two arbitrators together shall then select a third person, the three together shall then serve as a panel in all proceedings. Any decision concurred in by a majority of the three shall be a final binding decision. The City's failure to respond to a timely, conforming request for arbitration is deemed consent to arbitration.

(c) The costs of the arbitration shall be spilt and borne equally between the parties and such costs are not subject to shifting by the arbitrator.

(d) The remedy for Contractor's failure to comply with this provision is dismissal of the action.

City Income Tax Withholding: Contractor and any subcontractor engaged in this contract shall withhold from each payment to his employees the City income tax on all of their compensation subject to tax, after giving effect to exemptions, as follows:

(a) Residents of the City:

At a rate equal to 1% of all compensation paid to the employee who is a resident of the City of Flint.

(b) Non-residents:

At a rate equal to 1/2% of the compensation paid to the employee for work done or services performed in the City of Flint.

These taxes shall be held in trust and paid over to the City of Flint in accordance with City ordinances and State law. Any failure to do so shall constitute a substantial and material breach of this contract.

Compensation: The City shall pay for such services as have been set forth herein, a contract price not to exceed $__171,000.00_____ upon submission of proper invoices, releases, affidavits, and the like. Contractor recognizes that the City does not guarantee it will require any set amount of services. Contractor's services will be utilized as needed and as determined solely by the City of Flint. Contractor expressly recognizes that it has no right to payment of any amount exceeding $171,000.00. Contractor agrees that oral agreements by City officials to pay a greater amount are not binding.

1. Contractor shall submit itemized invoices for all services provided under this Agreement identifying:

(a) The date of service
(b) The name of person providing the service and a general description of the service provided.
(c) The unit rate and the total amount due.

Invoices shall be submitted to:

City of Flint
Accounts Payable
P.O. Box 246
Flint, MI 48501-0246

City of Flint
Utilities Department
4500 North Dort Highway
Flint, Michigan 48505

It is solely within the discretion of the City as to whether Contractor has provided a proper invoice. The City may require additional information or waive requirements as it sees fit. The City will notify the Contractor of any errors or lack of sufficient documentation within 14 days of receipt of the invoice.

Contract Documents: The invitation for bids, instructions to bidders, proposal, affidavit, addenda (if any), statement of bidder's qualifications (when required), general conditions, special conditions, performance bond, labor and material payment bond,

insurance certificates, technical specifications, and drawings, together with this agreement, form the contract, and they are as fully a part of the contract as if attached hereto or repeated herein.

Disclaimer of Contractual Relationship With Subcontractors: Nothing contained in the Contract Documents shall create any contractual relationship between the City and any Subcontractor or Sub-subcontractor.

Effective Date: This contract shall be effective upon the date that it is executed by all parties and presented to the City of Flint Clerk. This contract shall not extend beyond fiscal year 2013.

Certification, Licensing, Debarment, Suspension and Other Responsibilities: Contractor warrants and certifies that Contractor and/or any of its principals are properly certified and licensed to perform the duties required by this contract in accord with laws, rules, and regulations, and it not presently debarred, suspended, proposed for debarment or declared ineligible for the award of Federal contracts by any Federal agency. Contractor may not continue to or be compensated for any work performed during any time period where the debarment, suspension or ineligibility described above exists or may arise in the course of Contractor contractual relationship with the City. Failure to comply with this section constitutes a material breach of this Contract. Should it be determined that contractor performed work under this contract while non-compliance with this provision, Contractor agrees to reimburse the City for any costs that the City must repay to any and all entities.

Force Majeure: Neither party shall be responsible for damages or delays caused by Force Majeure or other events beyond the control of the other party and which could not reasonably have been anticipated or prevented. For purposes of this Agreement, Force Majeure includes, but is not limited to, adverse weather conditions, floods, epidemics, war, riot, strikes, lockouts, and other industrial disturbances; unknown site conditions, accidents, sabotage, fire, and acts of God. Should Force Majeure occur, the parties shall mutually agree on the terms and conditions upon which the services may continue.

Good Standing: Contractor must remain current and not be in default of any obligations due the City of Flint, including the payment of taxes, fines, penalties, licenses, or other monies due the City of Flint. Violations of this clause shall constitute a substantial and material breach of this contract. Such breach shall constitute good cause for the termination of this contract should the City of Flint decide to terminate on such basis.

Indemnification: To the fullest extent permitted by law, Contractor agrees to defend, pay on behalf of, indemnify, and hold harmless the City of Flint, its elected and appointed officials, employees and volunteers and other working on behalf of the City of Flint, including the Project Manager, against any and all claims, demands, suits, or losses, including all costs connected therewith, and for any damages which may be asserted, claimed, or recovered against or from the City of Flint, its elected and appointed officials,

employees, volunteers or others working on behalf of the City of Flint, by reason of personal injury, including bodily injury or death and/or property damage, including loss of use thereof, which may arise as a result of Contractor's acts, omissions, faults, and negligence or that of any of his employees, agents, and representatives in connection with the performance of this contract. Should the Contractor fail to indemnify the City in the above-mentioned circumstances, the City may exercise its option to deduct the cost that it incurs from the contract price forthwith.

Independent Contractor: No provision of this contract shall be construed as creating an employer-employee relationship. It is hereby expressly understood and agreed that Contractor is an "independent contractor" as that phrase has been defined and interpreted by the courts of the State of Michigan and, as such, Contractor is not entitled to any benefits not otherwise specified herein.

Insurance/Worker's Compensation: Contractor shall not commence work under this contract until he has procured and provided evidence of the insurance required under this section. All coverage shall be obtained from insurance companies licensed and authorized to do business in the State of Michigan unless otherwise approved by the City's Risk Manager. Policies shall be reviewed by the City's Risk Manager for completeness and limits of coverage. All coverage shall be with insurance carriers acceptable to the City of Flint. Contractor shall maintain the following insurance coverage for the duration of the contract.

(a) Commercial General Liability coverage of not less than one million dollars ($1,000,000) combined single limit with the City of Flint, and including all elected and appointed officials, all employees and volunteers, all boards, commissions and/or authorities and their board members, employees and volunteers, named as "Additional Insureds." This coverage shall be written on an ISO occurrence basis form and shall include: Bodily Injury, Personal Injury, Property Damage, Contractual Liability, Products and Completed Operations, Independent Contractors; Broad Form Commercial General Liability Endorsement, (XCU) Exclusions deleted and a per contract aggregate coverage. This coverage shall be primary to the Additional Insureds, and not contributing with any other insurance or similar protection available to the Additional Insureds, whether said other available coverage be primary, contributing, or excess.

(b) Workers Compensation Insurance in accordance with Michigan statutory requirements, including Employers Liability coverage.

(c) Commercial Automobile Insurance in the amount of not less than $1,000,000 combined single limit per accident with the City of Flint, and including all elected and appointed officials, all employees and volunteers, all boards, commissions and/or authorities and their board members, employees and volunteers, named as "Additional Insureds." This coverage shall be written on ISO business auto forms covering Automobile Liability, code "any auto."

(d) Professional Liability - Errors and Omissions. All projects involving the use of Architects, civil engineers, landscape design specialists, and other professional services must provide the City of Flint with evidence of Professional Liability coverage in an amount not less than one million dollars ($1,000,000). Evidence of this coverage must be provided for a minimum of three years after project completion. Any deductibles or self-insured retention must be declared to and approved by the City. In addition, the total dollar value of all claims paid out on the policy shall be declared. At the option of the City, either the insurer shall reduce or eliminate such deductibles or self-insured retention with respect to the City, its officials, employees, agents and volunteers; or Contractor shall procure a bond guaranteeing payment of losses and related investigation, claim, administration, and defense expenses.

Contractor shall furnish the City with two certificates of insurance for all coverage requested with original endorsements for those policies requiring the Additional Insureds. All certificates of insurance must provide the City of Flint with not less than 30 days advance written notice in the event of cancellation, non-payment of premium, non-renewal, or any material change in policy coverage. In addition, the wording "Endeavor to" and "but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives" must be removed from the standard ACORD cancellation statement. These certificates must identify the City of Flint, Risk Management Division, as the "Certificate Holder." Contractor must provide, upon request, certified copies of all insurance policies. If any of the above polices are due to expire during the term of this contract, Contractor shall deliver renewal certificates and copies of the new policies to the City of Flint at least ten days prior to the expiration date. Contractor shall ensure that all subcontractors utilized obtain and maintain all insurance coverage required by this provision.

Laws and Ordinances: Contractor shall obey and abide by all of the laws, rules and regulations of the Federal Government, State of Michigan, Genesee County and the City of Flint, applicable to the performance of this agreement, including, but not limited to, labor laws, and laws regulating or applying to public improvements.

Modifications: Any modifications to this contract must be in writing and signed by the parties or the authorized employee, officer, board or council representative of the parties authorized to make such contractual modifications under State law and local ordinances.

No Third-Party Beneficiary: No contractor, subcontractor, mechanic, materialman, laborer, vendor, or other person dealing with the principal Contractor shall be, nor shall any of them be deemed to be, third-party beneficiaries of this contract, but each such person shall be deemed to have agreed (a) that they shall look to the principal Contractor as their sole source of recovery if not paid, and (b) except as otherwise agreed to by the principal Contractor and any such person in writing, they may not enter any claim or bring any such action against the City under any circumstances. Except as provided by law, or as otherwise agreed to in writing between the City and such person, each such

person shall be deemed to have waived in writing all rights to seek redress from the City under any circumstances whatsoever.

Non-Assignability: Contractor shall not assign or transfer any interest in this contract without the prior written consent of the City provided, however, that claims for money due or to become due to Contractor from the City under this contract may be assigned to a bank, trust company, or other financial institution without such approval. Notice of any such assignment or transfer shall be furnished promptly to the City.

Non-Disclosure/Confidentiality: Contractor agrees that the documents identified herein as the contract documents are confidential information intended for the sole use of the City and that Contractor will not disclose any such information, or in any other way make such documents public, without the express written approval of the City or the order of the court of appropriate jurisdiction or as required by the laws of the State of Michigan.

Non-Discrimination: Contractor shall not discriminate against any employee or applicant for employment with respect to hiring or tenure; terms, conditions, or privileges of employment; or any matter directly or indirectly related to employment, because of race, color, creed, religion, ancestry, national origin, age, sex, height, weight, disability or other physical impairment, marital status, or status with respect to public assistance.

Notices: Notices to the City of Flint shall be deemed sufficient if in writing and mailed, postage prepaid, addressed to **Brent Wright, Water Plant Supervisor, 4500 North Dort Highway, Flint, Michigan 48505** and **Inez Brown, City Clerk, City of Flint, 1101 S. Saginaw Street, Flint, Michigan 48502**, or to such other address as may be designated in writing by the City from time to time. Notices to Contractor shall be deemed sufficient if in writing and mailed, postage prepaid, addressed to **1 Oakbrook Terrace Suite 207, Oakbrook Terrace, Illinois 60181** , or to such other address as may be designated in writing by Contractor from time to time.

R-12 Prevailing Wages: Contractor is aware of City of Flint Resolution #R-12 dated April 8, 1991, which is hereby incorporated by reference, and agrees to abide by all of the applicable covenants and requirements set forth in said resolution.

Records Property of City: All documents, information, reports and the like prepared or generated by Contractor as a result of this contract shall become the sole property of the City of Flint.

Scope of Services: Contractor shall provide all of the materials, labor, equipment, supplies, machinery, tools, superintendence, insurance and other accessories and services necessary to complete the project in accordance with the proposals submitted on June 2013 . Contractor shall perform the work in accordance with the Standard General Conditions and any Special Conditions provided for in this contract and warrants to the City that all materials and equipment furnished under this contract will be new unless otherwise specified, and that all work will be of good quality, free from faults and defects and in conformance with the contract documents. All work not conforming to these

requirements, including substitutions not properly approved and authorized, may be considered defective. In addition to any other remedies the City may have, if, within one year of the date of substantial completion of work, or within one year after acceptance by the City, or within such longer period of time as may be prescribed by law, any of the work is found to be defective or not in accord with the contract documents, Contractor shall correct promptly after receipt of a written notice from the City to do so, unless the City has previously given Contractor a written acceptance of such condition.

Severability: In the event that any provision contained herein shall be determined by a court or administrative tribunal to be contrary to a provision of state or federal law or to be unenforceable for any reason, then, to the extent necessary and possible to render the remainder of this Agreement enforceable, such provision may be modified or severed by such court or administrative tribunal so as to, as nearly as possible, carry out the intention of the parties hereto, considering the purpose of the entire Agreement in relation to such provision. The invalidation of one or more terms of this contract shall not affect the validity of the remaining terms.

Standards of Performance: Contractor agrees to exercise independent judgment and to perform its duties under this contract in accordance with sound professional practices. The City is relying upon the professional reputation, experience, certification, and ability of Contractor. Contractor agrees that all of the obligations required by him under this Contract shall be performed by him or by others employed by him and working under his direction and control. The continued effectiveness of this contract during its term or any renewal term shall be contingent upon Contractor maintaining his certification in accordance with the requirements of State law.

Subcontracting: No subcontract work, if permitted by the City, shall be started prior to the written approval of the subcontractor by the City. The City reserves the right to accept or reject any subcontractor.

Termination: This contract may be terminated by either party hereto by submitting a notice of termination to the other party. Such notice shall be in writing and shall be effective 30 days from the date it is submitted unless otherwise agreed to by the parties hereto. Contractor, upon receiving such notice and prorated payment upon termination of this contract shall give to the City all pertinent records, data, and information created up to the date of termination to which the City, under the terms of this contract, is entitled.

Time of Performance: Contractor's services shall commence immediately upon receipt of the notice to proceed and shall be carried out forthwith and without reasonable delay.

Union Compliance: Contractor agrees to comply with all regulations and requirements of any national or local union(s) that may have jurisdiction over any of the materials, facilities, services, or personnel to be furnished by the City.

Waiver: Failure of the City to insist upon strict compliance with any of the terms, covenants, or conditions of this Agreement shall not be deemed a waiver of any term,

covenant, or condition. Any waiver or relinquishment of any right or power hereunder at any one or more times shall not be deemed a waiver or relinquishment of that right or power at any other time.

Whole Agreement: This written agreement and the documents cited herein embody the entire agreement between the parties. Any additions, deletions or modifications hereto must be in writing and signed by both parties.

IN WITNESS WHEREOF, the parties have executed this contract this (day) of July, 2013.

CONTRACTOR:

Its Director of Engineering

WITNESS(ES):

CITY OF FLINT, a Michigan Municipal Corp.:

Michael K. Brown
Emergency Manager

APPROVED AS TO FORM:

for

Peter M. Bade
Chief Legal Officer

Lockwood, Andrews & Newnam

June 10, 2013

Mr. Brent Wright
City of Flint
Water Treatment Plant Supervisor
4500 N. Dort Highway
Flint, MI 48505

RE: Flint Water Treatment Plant Rehabilitation – Phase II

Dear Mr. Wright,

Lockwood, Andrews & Newnam, Inc. (LAN) is pleased to submit our Scope of Services and Fee Proposal for the above referenced project. LAN's staff has the knowledge, expertise and the technical professionals to handle all aspects of the project. Our staff has firsthand knowledge of the Flint Water Treatment Plant (FWTP) and the type of improvements that has taken place in there since 1997. Our team of professionals was heavily involved with the original Project Plan which secured $36 Million dollars of DWRF Low Interest Loan funding and related improvements to the plant that took place during the late 1990 and early 2000.

In addition, LAN is also working with **Rowe Professional Services**, another local engineering firm, who is familiar with the Water Treatment Plant, its staff and the City of Flint to help provide engineering and survey services related to the upcoming Phase II Improvements. The attached chart highlights the history of LAN's and Rowe's staff involvement with the FWTP for your review and reference.

Our design team, including Rowe and other sub-consultants, are very familiar with the current set up and operation of the plant and we are ready and eager to help the City of Flint swiftly and cost effectively implement the design improvements required for Phase II. These improvements is intended to help the City operates the plant on a full time basis using the Flint River and ultimately be available for treating Lake Huron Water when connected to the Karegnondi Water Authority (KWA) System in the near future.

We are excited about this opportunity and our ability to expedite the design elements to address the City's desire to operate the Plant on a full time basis as quickly as practically possible. We recommend that our tasks 1 & 2 happen concurrently as to minimize the time delay to finalize the intended design parameters.

Schedule is critically important if the City desires to use FWTP to treat water from the Flint River as an interim water supply source. Therefore, testing and preliminary engineering work will need to get started immediately if the City's goals are to be met. The experience and familiarity that LAN and Rowe have with the city's WTP and facilities will allow us to start quickly without having to familiarize new staff with the City's facilities.

1311 SOUTH LINDEN ROAD • Suite B • Flint, Michigan 48532 • 810.820.2682 • Fax: 810.820.2703 • www.lan-inc.com

We look forward to working with you and your staff to address the City's needs. Our tentative schedule could be amended to adjust the timelines to best suit the City and address the requirements of the MDEQ and other interested stakeholders.

Respectfully Submitted,
Lockwood, Andrews & Newnam, Inc.

J. Warren Green, PE
Project Director

Samir F. Matta, PE
Senior Project Manager

LAN & ROWE Staff Involvement Matrix

Project List	Staff Names					
	Warren Green	Samir Matta	Jeff Hansen	Steve Luoma	Eric Brown	Jim Redding
Flint Water Treatment Plant Project Plan 1997-1998	X	X	X			
Flint Water Treatment Plant Phase 1	X	X	X	X	X	
Flint Water Treatment Plant Phase 2	X	X	X	X	X	
Flint Water Treatment Plant Full Operation Report 2003	X					
Flint Water Treatment Plant - Flint River Report 2011	X		X			X

Our Staff has been involved with the changes in the Flint Water Treatment Plant since 1997 and are well acquainted with its operation and functionality.

CITY OF FLINT, MICHIGAN

Phase II Rehabilitation and Improvements of the Flint Water Plant

The purpose of this agreement is to enter into a contract pertaining to rehabilitation of and improvements to the Flint Water Plant to provide water supply continuous service utilizing the Flint River as a water source and to set forth the rights and responsibilities of the parties, the City of Flint (hereinafter "City") and Lockwood, Andrews and Newnam, Inc. (hereinafter "Engineer").

Applicable Law: This contract shall be governed by and interpreted according to the laws of the State of Michigan pertaining to contracts made and to be performed in this state.

Arbitration: Engineer agrees that for all claims, counterclaims, disputes, and other matters arising out of or relating to this agreement, Engineer must request the City's consent to arbitrate within 30 days from the date the Engineer knows or should have known the facts giving rise to the claim, dispute or question.

(a) Notice of a request for arbitration must be submitted to the City in writing by certified mail or personal service upon the City Attorney...

(b) Within 60 days from the date a request for arbitration is received by the City, the City shall inform Engineer whether it agrees to arbitrate. If the City does not consent, Engineer may proceed with an action in the appropriate court. If the City does consent, then within 30 days of the consent each party shall submit to the other the name of one person to serve as an arbitrator. The two arbitrators together shall then select a third person, the three together shall then serve as a panel in all proceedings. Any decision concurred in by a majority of the three shall be a final binding decision. The City's failure to respond to a timely, conforming request for arbitration is deemed consent to arbitration.

(c) The costs of the arbitration shall be split and borne equally between the parties and such costs are not subject to shifting by the arbitrator.

(d) The remedy for Engineer's failure to comply with this provision is dismissal of the action.

City Income Tax Withholding: Engineer and any subconsultant engaged in this contract shall withhold from each payment to his employees the City income tax on all of their compensation subject to tax, after giving effect to exemptions, as follows:

(a) Residents of the City:
At a rate equal to 1% of all compensation paid to the employee who is a resident of the City of Flint.

(b) Non-residents:
At a rate equal to 1/2% of the compensation paid to the employee for work done or services performed in the City of Flint.

These taxes shall be held in trust and paid over to the City of Flint in accordance with City ordinances and State law. Any failure to do so shall constitute a substantial and material breach of this contract.

Compensation: The City shall pay for such scope of services as have been set forth herein, a contract price not to exceed $2,534,640 upon submission of proper invoices, releases, affidavits, and the like. Engineer recognizes that the City does not guarantee it will require any set amount of services. Engineer's services will be utilized as needed and as determined solely by the City of Flint. Engineer expressly recognizes that it has no right to payment of any amount exceeding $2,534,640 for the scope of services as set forth herein. Engineer agrees that oral agreements by City officials to pay a greater amount are not binding.

1. Engineer shall submit itemized invoices for all services provided under this Agreement identifying:

(a) The date of service
(b) The name of person providing the service and a general description of the service provided.
(c) The unit rate and the total amount due.

Invoices shall be submitted to:

City of Flint Water Plant
Brent Wright
4500 N. Dort Highway
Flint, MI 48505

City of Flint
Accounts Payable
P.O. Box 246
Flint, MI 48501-0246

It is solely within the discretion of the City as to whether Engineer has provided a proper invoice. The City may require additional information or waive requirements as it sees fit. The City will notify the Engineer of any errors or lack of sufficient documentation within 14 days of receipt of the invoice.

Disclaimer of Contractual Relationship With Subconsultants: Nothing contained in the Contract Documents shall create any contractual relationship between the City and any Subconsultant.

Certification, Licensing, Debarment, Suspension and Other Responsibilities: Engineer warrants and certifies that Engineer and/or any of its principals are properly certified and licensed to perform the duties required by this contract in accord with laws, rules, and regulations, and is not presently debarred, suspended, proposed for debarment or declared ineligible for the award of any Federal contracts by any Federal agency. Engineer may not continue to or be compensated for any work performed during any time period where the debarment, suspension or ineligibility described above exists or may arise in the course of Engineer contractual relationship with the City. Failure to comply with this section

constitutes a material breach of this Contract. Should it be determined that Engineer performed work under this contract while in non-compliance with this provision, Engineer agrees to reimburse the City for any costs that the City must repay to any and all entities.

Force Majeure: Neither party shall be responsible for damages or delays caused by Force Majeure or other events beyond the control of the other party and which could not reasonably have been anticipated or prevented. For purposes of this Agreement, Force Majeure includes, but is not limited to, adverse weather conditions, floods, epidemics, war, riot, strikes, lockouts, and other industrial disturbances; unknown site conditions, accidents, sabotage, fire, and acts of God. Should Force Majeure occur, the parties shall mutually agree on the terms and conditions upon which the services may continue.

Good Standing: Engineer must remain current and not be in default of any obligations due the City of Flint, including the payment of taxes, fines, penalties, licenses, or other monies due the City of Flint. Violations of this clause shall constitute a substantial and material breach of this contract. Such breach shall constitute good cause for the termination of this contract should the City of Flint decide to terminate on such basis.

Indemnification: To the fullest extent permitted by law, Engineer agrees to defend, pay on behalf of, indemnify, and hold harmless the City of Flint, its elected and appointed officials, employees and volunteers and other working on behalf of the City of Flint, including the Project Manager, against any and all claims, demands, suits, or losses, including all costs connected therewith, and for any damages which may be asserted, claimed, or recovered against or from the City of Flint, its elected and appointed officials, employees, volunteers or others working on behalf of the City of Flint, by reason of personal injury, including bodily injury or death and/or property damage, including loss of use thereof, which may arise as a result of Engineer's acts, omissions, faults, and negligence or that of any of his employees, agents, and representatives in connection with the performance of this contract. Should the Engineer fail to indemnify the City in the above-mentioned circumstances, the City may exercise its option to deduct the cost that it incurs from the contract price forthwith.

Independent Engineer: No provision of this contract shall be construed as creating an employer-employee relationship. It is hereby expressly understood and agreed that Engineer is an "independent Engineer" as that phrase has been defined and interpreted by the courts of the State of Michigan and, as such, Engineer is not entitled to any benefits not otherwise specified herein.

Insurance/Worker's Compensation: Engineer shall not commence work under this contract until he has procured and provided evidence of the insurance required under this section. All coverage shall be obtained from insurance companies licensed and authorized to do business in the State of Michigan unless otherwise approved by the City's Risk Manager. Policies shall be reviewed by the City's Risk Manager for completeness and limits of coverage. All coverage shall be with insurance carriers acceptable to the City of Flint. Engineer shall maintain the following insurance coverage for the duration of the contract.

(a) Commercial General Liability coverage of not less than one million dollars ($1,000,000) combined single limit with the City of Flint, and including all elected and appointed officials, all employees and volunteers, all boards, commissions and/or authorities and their board members, employees and volunteers, named as "Additional Insureds." This coverage shall be written on an ISO occurrence basis form and shall include: Bodily Injury, Personal Injury, Property Damage, Contractual Liability, Products and Completed Operations, Independent Engineers; Broad Form Commercial General Liability Endorsement, (XCU) Exclusions deleted and a per contract aggregate coverage. This coverage shall be primary to the Additional Insureds, and not contributing with any other insurance or similar protection available to the Additional Insureds, whether said other available coverage be primary, contributing, or excess.

(b) Workers Compensation Insurance in accordance with Michigan statutory requirements, including Employers Liability coverage.

(c) Commercial Automobile Insurance in the amount of not less than $1,000,000 combined single limit per accident with the City of Flint, and including all elected and appointed officials, all employees and volunteers, all boards, commissions and/or authorities and their board members, employees and volunteers, named as "Additional Insureds." This coverage shall be written on ISO business auto forms covering Automobile Liability, code "any auto."

(d) Professional Liability - Errors and Omissions. All projects involving the use of Architects, civil engineers, landscape design specialists, and other professional services must provide the City of Flint with evidence of Professional Liability coverage in an amount not less than one million dollars ($1,000,000). Evidence of this coverage must be provided for a minimum of three years after project completion. Any deductibles or self-insured retention must be declared to and approved by the City. In addition, the total dollar value of all claims paid out on the policy shall be declared. At the option of the City, either the insurer shall reduce or eliminate such deductibles or self-insured retention with respect to the City, its officials, employees, agents and volunteers; or Engineer shall procure a bond guaranteeing payment of losses and related investigation, claim, administration, and defense expenses.

Engineer shall furnish the City with two certificates of insurance for all coverage requested with original endorsements for those policies requiring the Additional Insureds. All certificates of insurance must provide the City of Flint with not less than 30 days advance written notice in the event of cancellation, non-payment of premium, non-renewal, or any material change in policy coverage. In addition, the wording "Endeavor to" and "but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives" must be removed from the standard ACORD cancellation statement. These certificates must identify the City of Flint, Risk Management Division, as the "Certificate Holder." Engineer must provide, upon request, certified copies of all insurance policies. If any of the above polices are due to expire during the term of this contract, Engineer shall deliver renewal certificates and copies of the new policies to the City of Flint at least ten days prior to the expiration date. Engineer shall

ensure that all sub-consultants utilized obtain and maintain all insurance coverage required by this provision.

Laws and Ordinances: Engineer shall obey and abide by all of the laws, rules and regulations of the Federal Government, State of Michigan, Genesee County and the City of Flint, applicable to the performance of this agreement, including, but not limited to, labor laws, and laws regulating or applying to public improvements.

Modifications: Any modifications to this contract must be in writing and signed by the parties or the authorized employee, officer, board or council representative of the parties authorized to make such contractual modifications under State law and local ordinances.

No Third-Party Beneficiary: No Engineer, sub-consultant, or other person dealing with the principal Engineer shall be, nor shall any of them be deemed to be, third-party beneficiaries of this contract, but each such person shall be deemed to have agreed (a) that they shall look to the principal Engineer as their sole source of recovery if not paid, and (b) except as otherwise agreed to by the principal Engineer and any such person in writing, they may not enter any claim or bring any such action against the City under any circumstances. Except as provided by law, or as otherwise agreed to in writing between the City and such person, each such person shall be deemed to have waived in writing all rights to seek redress from the City under any circumstances whatsoever.

Non-Assignability: Engineer shall not assign or transfer any interest in this contract without the prior written consent of the City provided, however, that claims for money due or to become due to Engineer from the City under this contract may be assigned to a bank, trust company, or other financial institution without such approval. Notice of any such assignment or transfer shall be furnished promptly to the City.

Non-Disclosure/Confidentiality: Engineer agrees that the documents identified herein as the contract documents are confidential information intended for the sole use of the City and that Engineer will not disclose any such information, or in any other way make such documents public, without the express written approval of the City or the order of the court of appropriate jurisdiction or as required by the laws of the State of Michigan.

Non-Discrimination: Engineer shall not discriminate against any employee or applicant for employment with respect to hiring or tenure; terms, conditions, or privileges of employment; or any matter directly or indirectly related to employment, because of race, color, creed, religion, ancestry, national origin, age, sex, height, weight, disability or other physical impairment, marital status, or status with respect to public assistance.

Notices: Notices to the City of Flint shall be deemed sufficient if in writing and mailed, postage prepaid, addressed to **Inez Brown, City Clerk, City of Flint, 1101 S. Saginaw Street, Flint, Michigan 48502**, or to such other address as may be designated in writing by the City from time to time. Notices to Engineer shall be deemed sufficient if in writing and mailed, postage prepaid, addressed to **J. Warren Green, PE, Lockwood, Andrews and Newnam, Inc., One Oakbrook Terrace, suite 207, Oakbrook Terrace, Illinois, 60181**, or to such other address as may be designated in writing by Engineer from time to time.

Records Property of City: All documents, information, reports and the like prepared or generated by Engineer as a result of this contract shall become the sole property of the City of Flint.

Scope of Services: This project involves the evaluation and upgrade of the Flint Water Plant (FWP) to provide continuous water supply service to the City of Flint (Flint) and its customers. The FWP was extensively renovated in the early 2000's to provide a redundant supply to the Detroit Water and Sewer Department's (DWSD) single 72-inch treated water transmission main. Improvements installed during the renovation included: traveling screens, ozone disinfection, rapid mix units, flocculation basins, plate settlers, softening units, PSF re-carbonation systems, complete filter system rehabilitation, clarification residuals disposal, lime sludge pumping system, chemical storage and feed systems, laboratory facilities, operations room and SCADA system. Maximum day design capacity was 36-mgd. The improvements described above were designated as Phase I.

Phase I improvements were constructed in five separate contracts, referred to as Segments 1 – 5. Since the completion of Phase I improvements, the plant has been periodically operated, usually for about a two-week period and without softening with the water being discharged back to the river. The last plant run, without softening, was done in April 2013, however, the last run, with full chemical treatment to include softening, dates back to 2007.

Recently, Flint joined the Karegnondi Water Authority (KWA) and plans to supply Lake Huron water to its customers. The use of Lake Huron as a water source will significantly modify the above outlined improvements since softening will not be required. However, due to contractual relations with the DWSD, Flint is investigating the possibility of placing the FWP into operation using the Flint River as a primary source for approximately two years and then converting to lake water when available. During this two year interim period, Flint would consider supplying water to Genesee County provided the FWP proves capable of treating and supplying the required 40 MGD maximum day demand. This new operational scenario along with the reduction in maximum day capacity to 18-mgd, after KWA System completion, creates the need for a modified plan that balances the short and long term needs for Flint.

This planned work has three primary tasks that must be performed to develop a cost effective plan for the Flint immediate and long term needs. In order to meet the short schedules, some portions of these tasks will be performed concurrently, while some may be performed consecutively. Based on opinions of probable costs from past reports, the estimated construction cost to prepare the water plant for continuous operation using Flint River water for the interim period is on the order of $33 to $34 million. Construction costs for each component from past reports are shown under Task 3. Note that costs would need to be updated to today's dollars.

Task 1 is a plant test run scheduled for this summer to test the treatment systems and hydraulic capacity of the plant. Task 2 would be the development of an engineering planning report to define the immediate and long term improvements using the Flint River

as a source of water. Task 3 would be fast track design of the immediate improvements for continuous operation and treatment of Flint River water.

Task 1: Plant Test Run

1) Meet with FWP staff and other stakeholders as necessary to review current condition of the water plant facilities and equipment. Develop a preliminary list of issues or concerns that will impact the planned test run.

2) Obtain copies and review existing Phase I documents as provided by Flint. Recreate design calculations, such as plant hydraulic headlosses, as needed to develop plant test run parameters.

3) Perform plant site visit with FWP staff to ascertain the condition of the facilities and equipment.

4) Develop plant test run protocol for submission to MDEQ.

5) Meet with MDEQ representatives to review and discuss test run protocol. Incorporate MDEQ comments into final plant test run protocol.

6) Provide assistance and training/support to the FWP staff on implementing the test run protocol.

7) Collect data and information generated during plant test run. Evaluate the plant and unit systems performance for water quality and hydraulic capacity.

8) Meet with Flint staff, MDEQ and other stakeholders as necessary to discuss plant run findings and present conclusions and recommendations. Prepare and submit interim technical memorandum to City of Flint outlining conclusions and recommendations from the plant test run.

9) Schedule, coordinate and meet with equipment and material vendors as required.

Task 2: Engineering Planning Report

1) Using the technical memorandum as referenced in the preceding section, develop conceptual plan for both immediate and long term improvements.

2) Review site plan information and utilities to define needs and constraints related to immediate and long term proposed improvements.

3) Attend frequent meetings with Flint utility staff to discuss and review potential and recommended improvements to meet the needs for immediate and long term water supply needs

4) Define the finished water quality parameters and goals.

5) Develop plans for temporary facilities as needed, such as lime sludge disposal, to minimize cost for the interim period.

6) Define the basis of design for the needed improvements along with an opinion of probable construction cost referenced to a specific ENR Index value.

7) Re-evaluate issues defined in the 2011 Analysis of the Flint River report for permanent withdrawal versus interim withdrawal from the river such as Holloway Reservoir water levels and Flint River minimum flow requirements.

8) Submit a draft of the planning report to Flint for review.

9) Attend up to four meetings with Flint staff and the MDEQ to finalize the planning report.

10) Incorporate review comments into planning report and deliver final to Flint.

Task 3: Design Phase Services

1) Final design parameters as required will be determined during the course of the investigative phase of this work, however the following target goals should be considered as a minimum:

a) Minimum Day Demand – 10-mgd
Average Day Demand – 12-mgd
Maximum Day Demand – 18-mgd

b) Turbidity – 0.10 NTU

c) Hardness – 80 to 100 mg/l as CaCO3

d) Cryptosporidium – 3-Log Inactivation

e) Giardia – >3-Log Inactivation

f) Viruses – >4-Log Inactivation

g) Taste and Odor – Eliminated with pre-ozonation

h) Trihalomethanes – Less than 80 µg/l

i) HAA5 – Less than 60 µg/l

2) Professional engineering services will include final design, plans, contract documents, and bidding assistance for the following improvements.

   a) Additional oxygen and nitrogen chemical storage along with associated piping and appurtenances for the ozone system. [$2,057,000]

   b) Post chlorination and zebra mussel control. [$322,000]

   c) Electrical and SCADA improvements as outlined in the Phase II project plan. [$8,101,000]

   d) Evaluate long term clarification residuals disposal method. [TBD]

   e) Replace existing low service pumps with new 15-mgd and 20-mgd pumps and 480V motors. Replace existing high service pumps with new 10-mgd and 20-mgd pumps equipped with medium voltage inverter duty motors and variable frequency drives. High service pump numbers 7 and 8 motors will be replaced with medium voltage inverter duty motors and variable frequency drives. Suction piping on existing 6-mgd pump will be altered as needed. [$7,766,000]

   f) Address plant security issues. [$329,000]

   g) Provide auxiliary power to maintain plant operations at limited capacity during power failures. [Included in (2) (c) above]

   h) Improvement of Ct values for regulatory compliance. [TBD]

   i) Filter transfer pumping station and Dort Reservoir. [$5,743,000]

   j) Emergency interconnect with GCDC-WWS. [$8,657,000]

   k) Temporary lime sludge processing and handling equipment. [TBD]

3) Construction phase services scope and fee will be determined after design phase is completed.

Schedule: LAN understands that timeliness is critical for this project and will provide whatever resources are necessary to expedite the project. The following general timeline is anticipated:

Task 1 – Plant Run:	July 8 – Aug. 16
Task 2 – Report / Basis of Design Development	June 17 – Oct. 14
Task 3 – Design Phase	Oct. 14 – TBD

The extent of design will be determined following the plant test run and water plant condition assessment.

Severability: In the event that any provision contained herein shall be determined by a court or administrative tribunal to be contrary to a provision of state or federal law or to be unenforceable for any reason, then, to the extent necessary and possible to render the remainder of this Agreement enforceable, such provision may be modified or severed by such court or administrative tribunal so as to, as nearly as possible, carry out the intention of the parties hereto, considering the purpose of the entire Agreement in relation to such provision. The invalidation of one or more terms of this contract shall not affect the validity of the remaining terms.

Standards of Performance: Engineer agrees to exercise independent judgment and to perform its duties under this contract in accordance with sound professional practices. The City is relying upon the professional reputation, experience, certification, and ability of Engineer. Engineer agrees that all of the obligations required by him under this Contract shall be performed by him or by others employed by him and working under his direction and control. The continued effectiveness of this contract during its term or any renewal term shall be contingent upon Engineer maintaining his certification in accordance with the requirements of State law.

Subcontracting: No subcontract work, if permitted by the City, shall be started prior to the written approval of the sub-consultant by the City. The City reserves the right to accept or reject any sub-consultant.

Termination: This contract may be terminated by either party hereto by submitting a notice of termination to the other party. Such notice shall be in writing and shall be effective 30 days from the date it is submitted unless otherwise agreed to by the parties hereto. Engineer, upon receiving such notice and prorated payment upon termination of this contract shall give to the City all pertinent records, data, and information created up to the date of termination to which the City, under the terms of this contract, is entitled.

In the event of a failure by either party to perform any material provision of this Contract, the other side shall give written notice of the breach along with 30 days to cure the breach. If after the 30 day period the breach has not been cured, the non-breaching party may terminate the contract. Either party may also terminate the contract if required by law to do so.

Time of Performance: Engineer's services shall commence immediately upon receipt of the notice to proceed and shall be carried out forthwith and without reasonable delay.

Union Compliance: Engineer agrees to comply with all regulations and requirements of any national or local union(s) that may have jurisdiction over any of the materials, facilities, services, or personnel to be furnished by the City. However, this provision does not apply if its application would violate Public Act 98 of 2011.

Waiver: Failure of the City to insist upon strict compliance with any of the terms, covenants, or conditions of this Agreement shall not be deemed a waiver of any term, covenant, or condition. Any waiver or relinquishment of any right or power hereunder at any one or more times shall not be deemed a waiver or relinquishment of that right or power at any other time.

Whole Agreement: This written agreement and the documents cited herein embody the entire agreement between the parties. Any additions, deletions or modifications hereto must be in writing and signed by both parties.

IN WITNESS WHEREOF, the parties have executed this contract this June _____, of 2013.

ENGINEER:
Lockwood, Andrews and Newnam, Inc.

J. Warren Green, PE
Director of Engineering

WITNESS:

Samir F. Matta, PE
Senior Project Manager

CITY OF FLINT, a Michigan Municipal Corp.:

Edward J. Kurtz
Emergency Financial Manager

Michael K. Brown
City Administrator

APPROVED AS TO FORM:

Peter M. Bade
City Attorney

Appendix A

DETAIL LEVEL OF EFFORT BY TASK
LOCKWOOD, ANDREWS AND NEWNAM, INC.

PHASE II - CITY OF FLINT WTP REHABILITATION
Date : June 10, 2013

TASK I - WATER TREATMENT PLANT TEST RUN SUPPORT				
CLASSIFICATION	**HOURS**	**BILLING RATE**	**LABOR COST**	**TOTAL**
Project Director	96	$ 240.00	$ 23,040.00	
Senior Project Manager	40	$ 220.00	$ 8,800.00	
Project Manager	120	$ 180.00	$ 21,600.00	
Project Engineer (PE)	80	$ 150.00	$ 12,000.00	
Design Engineer (EIT)	120	$ 120.00	$ 14,400.00	
Project Controls Manager	16	$ 105.00	$ 1,680.00	
Total Staff Hours	**336**			
Total Labor + Direct Overhead			**$ 81,520.00**	
Sub-Consultant(s)				
Expenses				**$2,500.00**
Total Task I				**$84,020.00**

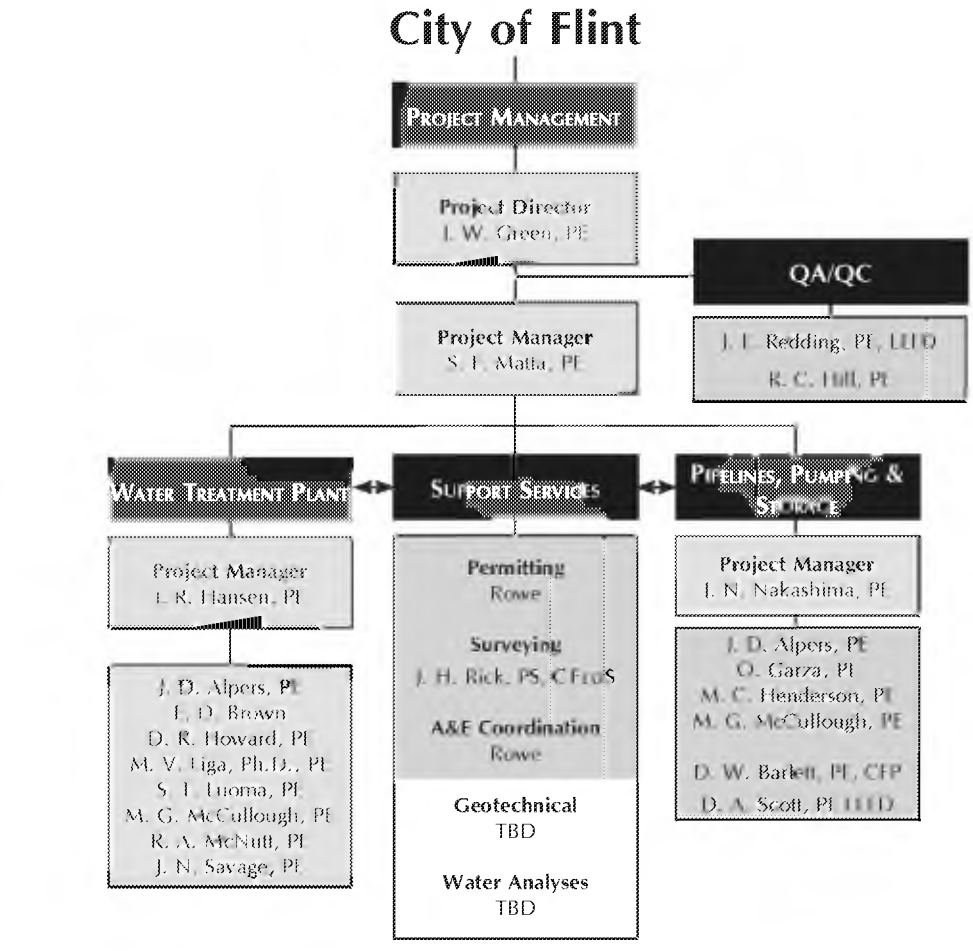
TASK II - ENGINEERING PLANNING REPORT				
CLASSIFICATION	**HOURS**	**BILLING RATE**	**LABOR COST**	**TOTAL**
Project Director	24	$ 240.00	$ 5,760.00	
Senior Project Manager	40	$ 220.00	$ 8,800.00	
Project Manager	120	$ 180.00	$ 21,600.00	
Sr. Electrical Engineer	60	$ 185.00	$ 11,100.00	
Project Engineer (PE)	120	$ 150.00	$ 18,000.00	
Design Engineer (EIT)	120	$ 118.00	$ 14,160.00	
CADD Designer	40	$ 112.00	$ 4,480.00	
Project Controls Manager	8	$ 105.00	$ 840.00	
Total Staff Hours	**468**			
Total Labor Including Overhead			**$ 84,980.00**	
Sub-Consultant(s)				
Expenses				**$2,000.00**
Total Task II				**$86,980.00**

TASK III - FINAL DESIGN AND BIDDING SERVICES				
CLASSIFICATION	**HOURS**	**BILLING RATE**	**LABOR COST**	**TOTAL**
Project Director	240	$ 240.00	$ 57,600.00	
Senior Project Manager	440	$ 220.00	$ 96,800.00	
Project Manager	920	$ 180.00	$ 165,600.00	
QA/QC VE	400	$ 215.00	$ 86,000.00	
Sr. Structural Engineer	160	$ 190.00	$ 30,400.00	
Structural Engineer	600	$ 160.00	$ 96,000.00	
Sr. Electrical Engineer	320	$ 185.00	$ 59,200.00	
Electrical Engineer	600	$ 155.00	$ 93,000.00	
Sr. Mechanical	160	$ 160.00	$ 25,600.00	
Mechanical Engineer	320	$ 127.00	$ 40,640.00	
Project Engineer (PE)	2200	$ 150.00	$ 330,000.00	
Design Engineer (EIT)	3200	$ 120.00	$ 384,000.00	
CADD Designer	4800	$ 112.00	$ 537,600.00	
Project Controls Manager	240	$ 105.00	$ 25,200.00	
Total Staff Hours	**14600**			
Total Labor + Direct Overhead			**$ 2,027,640.00**	
Sub-Consultant(s)				
Surveying			Allowance	**$ 50,000.00**
Geotechnical			Allowance	**$ 35,000.00**
Architectural			Allowance	**$ 200,000.00**
Water Quality Analysis			Allowance	**$ 25,000.00**
Expenses				**$ 26,000.00**
Total Task III				**$ 2,363,640.00**

Appendix B

Org Chart & Staff Resumes

Project Team



Prime: Lockwood, Andrews & Newnam, Inc.

Subconsultants: ROWE Professional Services Company; TBD

J. Warren Green, PE
Director of Engineering

Education.
Bachelor of Science, Civil Engineering
Mississippi State University, 1978

Registration.
Professional Engineer, Michigan, No. 6101040485

Years of Experience.
34

Background
Warren Green brings more than 34 years of experience in engineering management and supervision of complex water treatment and transmission facility projects. He has guided water system improvements through all necessary phases including feasibility studies, pilot testing, design, financial evaluation, land acquisition, construction, start-up, and operation. During his career he has worked on approximately 20 water treatment projects. Mr. Green serves as the Director of Water Treatment & Supply at Lockwood, Andrews & Newnam, Inc. and in this role; he has total firm responsibility for all water treatment projects.

Mr. Green has worked with several municipal utility clients throughout the U.S. and prior to his more than 24 years as a consulting engineer; he managed the water division, which included a 52-mgd surface water treatment plant, for the Public Works Department, City of Jackson, Mississippi.

Additionally, Mr. Green is a previous Class A certified water operator for approximately 20 years and currently teaches basic, intermediate and advanced water system operator training classes. He has taught courses including Class A, B, C, and D 15-week certification classes and numerous one- and two-day seminars from basic math to advanced water treatment technologies. For the Illinois Section of AWWA, Mr. Green currently teaches seminars for water system operator certification training and continuing education units.

Related Experience - Water Treatment Plants
Water Treatment Plant Expansion, City of Flint, Michigan—Mr. Green served as project manager for the preparation of a preliminary design report to upgrade the existing water treatment plant to provide a redundant water supply from the Detroit Water and Sewer Department. Based on recommendations in this report, the water treatment plant improvement project was funded and initiated. The original plant (constructed in the 1950's) had a capacity of 24-mgd and had not been in service since 1968. The City of Flint, in order to meet the regulatory requirements for a redundant supply, elected to renovate this existing facility and to increase the plant capacity to 36-mgd. The project included the evaluation of advanced treatment technologies to meet the current and proposed drinking water regulations. Selected processes included a 1300-ppd LOX ozone facility and contact basin, new rapid mix and tapered flocculation basins, plate settling basins, dual media filtration with air/water backwash, solids contact lime/soda softening units, PSF recarbonation system, residuals processing equipment, site improvements. Chemical systems renovation included ferric chloride, powdered activated carbon, polymers, calcium oxide, chlorine and hydrofluosalic acid. Also included were new employee facilities, water quality laboratory, and SCADA system.

Water Treatment Plant Study, City of Flint, Michigan—Mr. Green was the project manager for the preparation of a preliminary design report for additional improvements to the Flint water treatment plant for operation on a continuous basis as opposed to the current standby status. Recommended improvements included the addition of lime sludge treatment and handling facilities, replacement of the low and high lift pumps and motors, standby power generators, UV disinfection, electrical and SCADA improvements, and additional chemical storage.

Water Treatment Pilot Plant, City of Flint, Michigan—Design, construction, and operation of a custom-built ozone pilot plant for detailed evaluation of ozone treatment for the Flint River. The Flint River water contained high levels of TOC that needed to be removed to comply with the Surface Water Treatment Rule (SWTR). The results of the study indicated that ozonation in conjunction with enhanced coagulation provided the required removal levels of TOC to meet the requirements of the SWTR. The results from this study were used in the design criteria development for the constructed plant improvements.

Water Treatment Plant Study, Division of Water and Waste Services, Genesee County Drain Commissioners Office, Genesee County, Michigan—Project Manager for the preliminary design of a 120-mgd surface water treatment

plant. Proposed treatment processes included ozonation, clarification, plate settling, dual media filtration, UV disinfection, and residuals treatment systems. Assignment included developing basis of design, plan and elevation of drawings of water treatment plant, plant piping layout, site drawings and opinions of cost.

Water Treatment Plant Study, Saginaw-Midland Municipal Water Supply Corporation, Bay City, Michigan—Preliminary Evaluation and Design of WTP and Associated Water System Facilities, Saginaw-Midland Municipal Water Supply Corporation, Bay City, Michigan: As Director of Engineering, Mr. Green oversaw the site evaluation and preliminary design for a 22-mgd surface water treatment plant (WTP) and associated water system facilities in the Bay Area to serve four potential municipal customers. The evaluation included verification of the design flow rate, development emergency water supply options, preliminary treatment plant design based on membrane technology, WTP building layout and sizing, finished water storage, high service pumping, and routing of transmission mains. Preliminary design of the WTP included low service pumping and screening; membrane unit sizing, layout, and piping connections; chemical feed systems; clean-in-place (CIP) equipment, tanks, and chemical waste neutralization; backwash waste treatment and disposal; Ct analysis; and disinfection options including chlorine feed and ultraviolet light. Coordination with applicable regulatory agencies, detailed cost analysis, and a wholesale raw water customer option were also provided.

Water Treatment Plant Renovation (1997), Green Bay Water Utility, Green Bay, Wisconsin—In 1996, Mr. Green was in responsible charge for evaluating the potential impact of the current and proposed drinking regulations on the Green Bay Water Utility's treatment system as well as addressing potential cryptosporidium control issues after the outbreak in Milwaukee, WI. The purpose of this study was to recommend any additional facilities that were needed to ensure a safe and adequate water supply into the next century. The comprehensive report presented a wide range of options, including microfiltration, ultrafiltration, and ozonation. The respective advantages and disadvantages, life cycle cost comparisons, operational impacts, and specific recommendations were also included.

Based on the recommendations included in this report, improvements were initiated at the Green Bay Water treatment plant. These improvements included a 42-mgd LOX ozone facility with three 600 –pound per day generators, 42-mgd rapid mix chamber, 28-mgd flocculation basin, chemical feed systems, filter wash water recirculation basin with a variable speed pump station, and a sludge lagoon with decant towers and return pumping system. This work increased the rated plant capacity to a firm 28-mgd.

Water Treatment Plant Expansion (2004), Green Bay Water Utility, Green Bay, Wisconsin—In 2001, the Green Bay Water Utility entered into negotiations with surrounding suburbs to supply water for a potential regional system. Mr. Green led the technical study team to develop conceptual facility designs and financial options for the Green Bay Water Utility to supply this proposed regional system.

Treatment options evaluated for this potential 100-mgd system included expansion of the conventional treatment system along with the use of advanced technologies such as ultrafiltration and UV disinfection. Also included with this report was the analysis of the raw and treated water transmission systems including required storage, pumping, and metering facilities. As part of this study, a separate cost of service evaluation was performed based on the RCNLD method.

Based on the results of the negotiations, the utility embarked on the expansion of the filter plant to meet the needs of the new additional customers. Mr. Green was in responsible charge for the design and construction management services for this expansion of the Green Bay Water Treatment plant to initially increase the rated plant capacity from 28- to 42-mgd, with provisions to increase the facility to a rated capacity of 55-mgd. The work involved the construction of 14-mgd capacity of slow mix basins, a 14-mgd plate clarification structure, rehabilitation of 12 dual media filters, a sodium hypochlorite structure and associated chemical storage and feed systems, and a 0.5-mg elevated wash water tank.

One of the most challenging aspects of this project included rehabilitation of 12 existing center gullet filters with new filter media, underdrains, and surface wash system. To enhance the filter performance, pilot testing was performed on different media gradations and thicknesses. This pilot testing was performed over a one-year period to address seasonal variations in water quality and temperature. The final media selection included 12 inches of filter sand and 20 inches of anthracite. The existing Wheeler filter bottoms were retrofitted with porous plate inserts to eliminate the support gravel which also allowed for increased media thickness. Each filter was equipped with new laser nephelometers to monitor filter performance. These improvements increased rated capacity to 55-mgd at 4.0 gpm/sf with one unit out of service, increased filter run times by approximately 45% and resulted in an average finished water turbidity of 0.02 NTU.

Water Treatment Plant Renovation, City of Jackson, Mississippi—Project manager for the renovation, including design and construction, of a 52-mgd conventional surface water treatment plant. Project included replacement of chemical feed systems for aluminum sulfate, hydrated lime (pre and post),powdered activated carbon, coagulant aid polymer, chlorine, ammonia and hydrofluosalic acid. The work also involved the rebuilding of 10 – 1-mgd, 6 – 2-mgd and 12 – 2.5-mgd rapid sand filters. Rebuilding efforts involved the repair and/or replacement of vitrified clay underdrains and media removal and replacement. New filter control valves and actuators were also provided in the piping galleries.

Water Treatment Pilot Plant, City of Joliet, Illinois—Mr. Green was the project manager for the design of a 100-gpm pilot treatment plant that included clarification and membrane filtration processes. The purpose of this work was to develop the necessary design parameters for a 34-mgd surface water treatment plant. This design included the parallel evaluation of two membrane units, manufactured by different companies, to determine the most cost-effective design of the treatment process.

Treatment Plant Forensic Evaluation, Department of Public Utilities, Joliet, Illinois—Retained as expert to evaluate the structural failure of five pressure filter underdrains on multi-cell, dual media, horizontal pressure filters for radium removal using the HMO process. Work involved detailed media, hydraulic loading and system control analyses.

Pump Stations

Pumping Station Improvements and Expansion (to 45-mgd), Green Bay Water Utility, Green Bay, Wisconsin—Mr. Green is responsible for the design and contract administration for this project. In 1956, the Green Bay Water Utility changed its water supply source from groundwater to Lake Michigan. As part of the system a 24-mgd pumping station was constructed on the shore of Lake Michigan on the north side of Kewanee, Wisconsin.

The original pumping station was equipped with five vertically mounted split case centrifugal DeLaval pumps taking suction from a wetwell and discharging into a common header. Over the past decade, replacement parts for the existing pumps have become more increasing difficult to obtain from after-market suppliers. Due to this reason and the equipment age, designs were developed for the systematic replacement of the pumps, suction piping and discharge header. During the course of the design, it was also requested to increase the station capacity from 42- to 45-mgd be evaluated to meet projected system demands.

As the selection of pumping equipment proceeded, it became apparent that the original wetwell design would not provide sufficient NPSH for the new pumps. After extended research, two pump models were found that could operate under the NPSH limitations, but the driver horsepower would increase from 800 HP to 1250 HP. These increases would require replacement of the incoming electrical feed, the MCC and the emergency generators. After meeting with the client, the design team recommended the investigation of using vertical turbine pumps for the rehabilitation project.

By changing the design concept to VFD equipped vertical turbines, the NPSH issues have been resolved and the selected pump models can use 800-HP drivers so the electrical issues have also been addressed.

DuPage Pump Station, DuPage Water Commission, DuPage County, Illinois—Project Manager for contract administration and construction management for a 185-mgd, firm rated capacity pump station. This facility is equipped with three 30-mgd vertically mounted split case centrifugal pumps (1750-HP), four 30-mgd horizontally mounted split case centrifugal pumps (1750-HP) and two 15-mgd horizontally mounted split case centrifugal pumps (800-HP). These pumps take suction from a common 84-inch header which is connected to a dual cell 30 MG concrete reservoir and discharge to two 72-inch headers. The station and piping systems are designed for a total capacity of 270-mgd.

Lexington Pump Station, DuPage Water Commission, DuPage County, Illinois—Project Manager for contract administration and construction management for a 340-mgd, firm rated capacity pump station. This facility is equipped with four 40-mgd vertically mounted split case centrifugal pumps (2000-HP), four 40-mgd horizontally mounted split case centrifugal pumps (2000-HP) and two 120-mgd horizontally mounted split case centrifugal low service pumps (2000-HP). These pumps take suction from dual 96-inch headers which are connected to a dual cell 30 MG concrete reservoir and discharge into two 84-inch headers. The station and piping systems are designed for a total capacity of 400-mgd.

Primary Effluent Pumping System (PEPS), Expansion III, Clark County Water Reclamation District (CCWRD), Las Vegas, Nevada—LAN partnered with Whiting-Turner Construction for this Design-Build project in Las Vegas, Nevada. Mr. Green is performing QA/QC on this project,

Project Team

J. Warren Green, PE, Continued

whose primary purpose is the expansion of the existing Primary Effluent Pumping Station from its current peak flow capacity of 120-mgd, to a peak capacity of 320-mgd. In addition to the expansion of the existing wet well and pumping capacity, the project involves the design and construction of a number of associated facilities including 4,000 LF of underground pipelines ranging from 30 inches to 96 inches in diameter, miscellaneous above ground process piping, structural modifications to overhead canopy, electrical system design, odor control system design, and large diameter sanitary sewer pipe rehabilitation.

Water Pumping Station Rehabilitation, Village of Oak Brook, Department of Utilities, Oak Brook, Illinois—As Project Manager, Mr. Green was responsible for the design and contract administration of a 5.0-mgd water pumping station rehabilitation. The project included replacing the four vertically-mounted split case centrifugal pumps with new pumps and electric drivers. For improved operation capability, the electric motors were equipped with variable frequency drives so station output could be optimized to system demand.

Surface Water Intake, Division of Water and Waste Services, Genesee County Drain Commissioners Office, Genesee County, Michigan—Mr. Green served as the Project Director for design engineering services of a new water supply intake system for the Genesee County Drain Commissioner – Division of Water and Waste Services in Genesee County, Michigan. Located on the western shore of Lake Huron at the county line between Sanilac and St. Clair counties, the new 85-mgd water supply intake system consists of two (2) intake structures (timber cribs), an intake pipeline (78- and 60-inch), an onshore junction chamber and including a zebra mussel control system.

Each intake crib is of an octagonal shape (48' L x 48' W x 14' H) with a rated capacity of 65-mgd. Two cribs were provided for system redundancy. The main intake pipeline is 78-inch diameter, has a capacity of 85-mgd, and extends to the furthest intake, Crib #2. At approximately 3,200 feet from shore, a wye fitting on the 78-inch pipeline branches off and reduces to a 60-inch intake pipeline to Crib #1. Two (2) submerged steel stop log chambers are provided on the upstream run and branch of the wye fitting for isolation of each intake crib. Frazil ice mitigation is addressed in the design by providing large intake port openings and is further addressed with the selection of wood as the primary material used in the construction of the cribs as its low thermal conductivity minimizes the formation of anchor ice on its surface. The cribs were designed with 12"x 12" and 6"x12" Douglas fir, No. 1 Structural, RC, Heavy timbers that are joined with steel tie rods and drift pins. The cribs are designed to resist hydrodynamic forces and to be floated partially submerged from shore to their final location.

The onshore junction chamber was designed as a 38-foot inside diameter, 91-foot deep secant pile outer wall with a 5-foot thick bottom pressure slab, an 18-inch thick interior liner wall for a finished interior diameter of 35-feet, and a 12-inch thick top slab. Complicating the design and construction of the junction chamber is the existing artesian groundwater condition at the site, which imposes significant hydrostatic and uplift loads on the structure. The 78-inch intake pipeline terminates inside the junction chamber with a 78"x 78" fabricated stainless steel slide gate with stem extension to the top slab and a pedestal-mounted manual actuator capable of attachment to a portable electric actuator. As this is the first phase of the overall water supply initiative, the junction chamber walls were designed with a blockout for tunneling and piping connection to the future lake pumping station.

Pump Station Renovation and Improvements, Saginaw-Midland Municipal Water Supply Corporation, Bay City, Michigan—Mr. Green had responsible charge for the design and contract administration for the construction of Junction Pumping Station discharge piping system modifications. Piping modifications included the installation of 36-, 48-, and 60-inch diameter steel yard piping for increasing station capacity from 115- to 165-mgd. The project also included the construction of two cast-in-place concrete vaults to house 36-inch control valves and 36-inch mag-meter. A new maintenance building, with an area of 2,400 square feet, was also included as part of the work.

Industrial Pump Station, Gulf Coast Water Authority, Texas City, Texas—Project Director the preparation of a Preliminary Engineering Report (PER) to develop alternatives for the repair or replacement of the existing Industrial Pump Station (IPS). The IPS was initially constructed in 1949 with three (3) pumps. Through the years, numerous modifications and additions were completed. Currently, the station has nine (9) vertical turbine pumps, each with a nominal capacity of 7,500 gpm at 80 psi each. The IPS provides raw water to four major industrial customers, including Dow Chemical, Valero, Marathon Petroleum, and Eastman Chemical. Interruption to the water supply cannot be tolerated for any significant length of time.

The PER defined four alternatives for consideration by the Gulf Coast Water Authority. The recommended alternative included reusing the existing intake structure and pump

suction wetwell, as well as making piping connections to the existing 36- and 42-inch transmission mains. As physical inspections of the existing intake/wetwell structure and underground transmission mains were outside the scope of the original PER work, LAN was requested to further investigate the existing conditions and evaluate the risks associated with reusing the intake/wetwell structure and connections to the existing transmission mains. The objective of this supplemental report is to identify and evaluate potential risks associated with reusing the existing intake structure, pump suction wetwell and making piping connections to existing 36-inch steel and 42-inch cast iron pipe transmission mains, as defined in Alternative 2 of the PER, against the potential risks of building a new pumping facility as defined in Alternative 1 of the PER.

Usually, risk analysis studies are based on a cost-to-benefit/risk evaluation. However, due to the proprietary nature related to the cost of water service interruption, this evaluation was presented on the basis of potential risk and down time associated with cause of service interruption. Based on, the assumption that service interruption of any significant time period is not acceptable and the anticipated risk levels, it is recommended the GCWA implement PER Alternative 1 and proceed with the design and construction of a new pumping station facility.

Transmission Mains

54-Inch Transmission Main, Green Bay Water Utility, Wisconsin—Principal-in-Charge for the design, contract administration and construction of approximately 17 miles of 54-inch diameter steel water transmission main. This project involved the installation of the pipeline through numerous wetlands, river crossings, and along roadways. The work required acquisition from 36 property owners and permits from 12 federal, state, and local governmental entities.

DuPage Water Commission Transmission System, DuPage County, Illinois—Project Manager for contract administration and construction management for 140 miles of 12- through 90-inch diameter water transmission mains and 2.3 miles of 12-foot diameter tunnel. Associated with this project was the relocation and installation of approximately 45,300 feet of 8- through 48-inch diameter sanitary, storm, and combined sewers including flow control structures and junction chambers.

TW-1 48-Inch Transmission Main, DuPage Water Commission System, DuPage County, Illinois—Design and contract administration for the construction of 8 miles of 48-inch diameter steel water transmission main. This project involved the installation of the pipeline through numerous wetlands, river crossings, and under major expressways.

TW-2 48-Inch Transmission Main, DuPage Water Commission System, DuPage County, Illinois—Design and contract administration for the construction of 10 miles of 48-inch diameter steel water transmission main. This project also involved the installation of the pipeline through numerous wetlands, river crossings, and under major expressways.

TSW-3 48-Inch Transmission Main, DuPage Water Commission System, DuPage County, Illinois—Contract administration for the construction of 9 miles of 48-inch diameter water transmission main, and approximately 9,000 feet of 8- through 30-inch diameter ductile iron and reinforced concrete sewers lines.

TE-3 72-Inch Transmission Main, DuPage Water Commission System, DuPage County, Illinois—Contract administration for the construction of 10 miles of 72-inch diameter steel water transmission main, a 130-mgd metering station, and approximately 24,000 feet of 8- through 64-inch diameter ductile iron and reinforced concrete sewers lines.

Transmission Main Program—City of Jackson Department of Public Works, Mississippi: Program Manager for design of 17 miles of 36- through 60-inch diameter water transmission mains. This work involved the coordination of 12 engineering consultants, two financial advisors, and various other city departments.

Forensic Evaluation, Atlanta, Georgia—Responsible charge for the technical evaluation and contract interpretation associated with the structural failure of approximately 30- through 84-, 96-, and 108-inch diameter butterfly valves. Work included development of in-situ testing of the valves and associated three dimensional finite element analysis to determine cause of failure. Worked with City representatives, attorneys, engineers, and contractors to negotiate the settlement for this structural failure.

Forensic Evaluation, Denver Water, Colorado—Project Manager for technical and field evaluations of the structural failure of two 96-inch diameter butterfly valves. Prepared designs to eliminate the loading conditions causing the excessive valve body deflection.

Project Team

Samir F. Matta, PE
Senior Project Manager

Education.
Masters of Civil Engineering
Wayne State University, 1998

BS, Civil Engineering,
Wayne State University 1987

Years of Experience.
26

Registration.
Professional Engineer, Michigan, No. 6201041005

Background
Mr. Matta, P.E., has served as a design, project engineer and/or project manager for numerous design and construction projects in Michigan both as a consultant and as a public employee. He has managed many State and Federal projects for the DTMB, DMVA, USPFO, Corps of Engineers, and other local entities. He also has extensive experience in the design and construction management of various projects that includes Watershed Management, LID design, combined sewer overflow (CSO), sewer rehabilitation, roads and streetscape projects, drainage improvements, water distribution and treatment, environmental cleanup and UST projects.

Related Experience
Flint Water Treatment Plant Expansion, Phase I, Segments 1, 2 & 3, City of Flint, Michigan—Assisted the city in securing $23.5 million dollars in DWRF funding for this project. Another 14 million dollars are anticipated for segments 4 & 5. Phase I - Segments 1 & 2 are currently under construction while the design of phase I – Segment 3 is underway. The overall project is anticipated to be completed within 4 to 6 years period at an estimated cost of $38.0 million dollars for all segments. The project will provide the city with the ability to treat 36.0 million gallons of water to meet maximum day demands of city customers.

Waterford Township Water Treatment Plant, WTP 25-2, Waterford Township, Michigan—Analysis of the addition of new 1,800 GPM well, and new iron removal water filtration system. The project entailed the design of a 1,800 GPM well house, and the addition of water treatment plant expansion to house 3 – 600 GPM high pressure filters to treat well water, and provide iron removal capabilities.

Highland Park Water System Improvements, City of Highland Park, Michigan—Helped the city secure $6.0 million dollars of the State Drinking Water Revolving Fund (DWRF) Loan Program to utilize for distribution and treatment systems repairs. Led the design team in developing construction plans for the replacement of water main, valves and hydrants, water tower, and raw reservoir rehabilitation, and treatment systems upgrades.

West Side Water System Improvements, Lansing Township, Michigan—Analyzed the existing infrastructure yearly needs. Recommended a rehabilitation program that best helps improve the system efficiency, water pressure and fire protection to township residents. Supervised design improvements to upgrade water mains and improve system pressure. Construction Budget: $100,000 - $250,000/year.

Corps of Engineers, Gibraltar Flood Protection Advance Measures Project, City of Gibraltar, Michigan—Project Manager/Lead Project Engineer that led the design team who worked closely with the city and the Corps evaluating flooding potential of areas within the city and developing design plans for pump station facilities and other flood protection measures. The project involved the design of 20 stationary/portable pump stations. Construction Budget: $750,000.

Corps of Engineers, St. Clair Shores Flood Protection Advance Measures Project, City of St. Clair Shores, Michigan—Project Manager/Lead Project Engineer that supervised the evaluation and design of 40 pumping stations to help eliminate the flooding associated with high water level of Lake St. Clair. Worked with the Corps in implementing the construction of the project. Construction Budget: $4,500,000.

Corps of Engineers, Harrison Township Flood Protection Advance Measures Project, Harrison Township, Michigan—Project Manager/Lead Project Engineer that supervised the evaluation and design of 8 pumping stations to help eliminate the flooding associated with high water level of

Project Team

Lake St. Clair. Worked with the Corps in implementing the construction of the project. Construction Budget: $2,500,000.

US-131 Motorsports Park, Martin, Michigan—Managed the design, permitting and construction of 3.5 miles of 8-inch force main and associated pump station to service the new facility. Coordinated the efforts for the design and permitting with the owner, the Village of Martin, City of Plainwell, Michigan Department of Transportation (MDOT) for the US-131 Crossing and Michigan Department of Environmental Quality (MDEQ). The project was fast tracked and required extensive amount of coordination and communication.

Tecumseh River Pump Station (TRPS) Service Area Sanitary Sewer Evaluation, City of Lansing, Michigan—Project Manager for the evaluation and design of the sanitary sewer system within the service area. The project involves the rehabilitation of the sewer system to eliminate potential infiltration/inflow (I/I) sources and minimize the frequency of sanitary sewer overflows (SSOs) and related basement backups. It also requires an evaluation of the system performance at the end of the construction to determine the effectiveness of the rehabilitation methods implemented.

Webberville System Drainage Improvement Project, Ingham County Drain Commissioner Village of Webberville, Michigan—Project Manager for the evaluation, coordination and design of the storm system infrastructure primarily within the boundary of the Village of Webberville and surrounding Townships. The watershed drainage boundary expands across four drainage districts that services the Village and surrounding Townships. They include: (1) Webberville Drain Drainage District, (2) Webberville #2 Drain Drainage District, (3) Monroe & Leach Drain Drainage District, and (4) Kalamink Drain Drainage District, The project entails the evaluation of the storm sewer system within the four drainage districts and the analysis of Best Management Practices (BMPs) and Low Impact Design (LID) alternatives to address the dysfunctional and poor performance of the existing storm sewer system within those districts. Construction budget $5.5 to $8.0 Million.

Western Trunk Interceptor Phase II Route Study, Genesee County Drain Commissioner's Office—Project Manager for the evaluation of route selection for the extension of proposed interceptor sewer to service the following communities: Mundy Township, Gaines Township, Clayton Township, City of Swartz Creek, City of Flushing and Flushing Township. The proposed 48" to 84" interceptor will extend approximately about 15 miles across the listed municipalities and may require the installation of one or two pumping facilities.

Lake Lansing Road, Wood Street Sanitary Project, Lansing Charter Township, Lansing, Michigan—Project Manager for project which includes design and construction engineering for approximately 4,000 LFT of sanitary sewer extension to service areas along Lake Lansing Road and Wood Street in Lansing Township. The pipe size varies between 8- and 10-inch of extra strength vitrified clay pipe as per City of Lansing Design Standards who services Lansing Township with appropriate sanitary sewer service. The project is broken into two phases to correspond with the road reconstruction project handled by the Ingham County Road Commission Office. Phase I will involve the installation of approximately 2500 LFT of 8- and 10-inch Sanitary sewer lines and associated structures and service leads. While Phase II incorporates the addition of roughly 1500 LFT of 8-inch sewer along Wood Street to tie in to Phase I work. Anticipated project cost for the sewer only is $500,000. The Road Commission work will cover all costs associated with the removal and replacement of new pavement and all restoration work on the project.

Smith-Evans Drain Rehabilitation Project, City of Lansing, Michigan—Project Manager that evaluated drainage districts and erosion control measures for stabilizing the banks of an open drain, which accepts storm flow from an enclosed 84-inch diameter storm sewer pipe. Supervised the design of twin 60-inch enclosed pipe replacement that was approved by the City and the Inter-county Drainage Board.

Combined Sewer System Separation Project, Town of South, Whitley, Indiana—Project Engineer that analyzed the performance of an aged combined sewer interceptor across the centerline of State Route 5 (SR5) and developed hydraulics and consequently separation alternatives for proper drainage of the state highway and other city local streets. The project consisted of new sewer construction, trenchless technology rehabilitation work within residential, commercial and light industrial neighborhoods.

South Perimeter Road Repair Project, Selfridge Air National Guard Base, Mt. Clement, Michigan—Oversaw the evaluation and design of approximately 3 miles of road improvements and miscellaneous utility upgrades. The work consisted of a complete reconstruction of about 2 miles of two lane roadway and combination of pavement overlay and resurfacing of the other one mile. Rehabilitation of a 72" storm sewer was also incorporated into the design improvements.

Project Team

James E. Redding, PE, LEED®AP
Principal/VP/Director of Engineering

Education.
BS, Civil Engineering
Michigan State University, 1978

Years of Experience.
36+

Registration.
Professional Engineer, Michigan, No. 6201029394

Certification.
Leadership in Energy and Environmental Design (LEED®AP), 2008

Background
Jim has more than three decades of professional engineering experience, including two years as assistant city engineer in Bay City, MI. He joined ROWE in 1985 as a project manager and was promoted to principal/chief engineer in 1992. His experience has primarily been focused on water and wastewater projects.

Related Experience
Genesee County Division of Water and Waste Services, Genesee County, Michigan—Water Supply Intake: Project manager responsible for the design, permitting, and construction of $30 million water supply intake. Intake includes construction of 78-inch diameter pipeline installed by tunneling and marine construction into Lake Huron a distance of 8,000 feet (design completed in 2012, construction planned to start in spring 2013).

Torrey Road Booster Pump Station, City of Flint, Michigan—QA/QC for analysis and design of upgrades to water pump station ($1.1M construction; ongoing).

Davis Road Water Main, City of Saginaw, Michigan—Principal in charge for design and construction of one mile of 36-inch water main including analysis of pipeline materials and critical schedule (2007).

Water Booster Pumping Station, City of Saginaw, Michigan—Project manager for upgrades to water booster pumping station to increase capacity from 0.7 mgd to 2.3 mgd. Two existing pumps were replaced with larger ones and a third pump was added. The project included reworking piping to accommodate the pumps, SCADA, backup power generation, and building upgrades.

Wastewater Treatment Plant Analysis/Upgrades, City of St. Louis, Michigan—Project manager for the analysis and preliminary engineering for a 4 mgd treatment plant modifications. The existing RBC treatment plant does not reliably meet NPDES permit limits and peak flow conditions cause backups in the disinfection tank and final clarifiers. Flows and loading conditions have been analyzed to identify alternatives for providing treatment to the permitted limits. Hydraulic model of the plant facilities was developed to determine the cause of the backups, and alternatives have been developed for correction. A project plan has been developed to secure SRF funding for the project. A new oxidation ditch has been designed along with upgrades to other facility processes (2013).

Potable/Non-potable Water Supply Survey, Oklahoma City Veterans Affairs Medical Center,(Oklahoma City, OK), Accord Architects & Engineers, Myrtle Beach, South Carolina—Principal in charge of development of an emergency water plan for the facility. The facility had experienced water shortages in the past and hired Accord Architects & Engineers and ROWE to research the existing onsite water supplies and the city water supply. The team reviewed the water supply per VA design guidelines, reviewed the reliability of the city system, developed options and costs for improving the reliability of the onsite system during a water shortage, and worked with the VAMC staff to prioritize and minimize water usage in case of a water outage (2012).

Water Treatment Plant, City of Caro, Michigan—Principal in charge of three-mgd treatment plant and new wells. Treatment plant provides removal of arsenic and iron (DWRF; 2005).

New Well, City of Caro, Michigan—Project manager for construction of new well and water main to provide water supply for ethanol facility (CDBG grant; 2005).

Project Team

Randal C. Hill, PE
Senior Project Manager

Education.
BS, Civil Engineering,
Colorado State University, 1975

Registration.
Professional Engineer, California, No. 48322

Years of Experience.
37

Background
Mr. Hill has over 37 years of diversified experience on water conveyance and water treatment projects involving pumping facilities, pipelines, reservoirs, tunnels, flow control facilities, bidding services, site development and right-of-way acquisitions, treatment facilities, coordination on environmental issues, feasibility studies, facility plans, aerial and topographic surveys, and construction support services.

Related Experience
Advanced Water Purification Demonstration Plant, City of San Diego, California—Mr. Hill served as project manager for design, construction, and operation for this high profile, state-of-the-art project to develop another sustainable source of water for the City's long-term water demands. The water purification process used a multi-barrier approach consisting of micro and ultra-membrane filtration, reverse osmosis and advanced oxidation utilizing ultraviolet light with hydrogen peroxide. This $6,600,000 project with a 1 million gallon per day capacity is being operated to demonstrate that a new local water source is safe, reliable, cost-effective, and can be produced in an environmentally sensitive manner for a full scale system. The project design and construction were completed on schedule and costs were under budget.

Large-Diameter Steel and Yard Piping, 100-million-gallon per-day (mgd) Twin Oaks Valley Water Treatment Plant (WTP) Design-Build-Operate Project; San Diego County Water Authority, San Diego, California—Mr. Hill served as design manager of the large-diameter (42- to 96-inch) steel pipelines and yard piping for this $150 million state-of-the-art facility that will be the largest membrane ultra filtration (UF) facility in the world. This facility employs UF membrane filtration, ozonation for disinfection, advanced oxidation for taste and odor control; and biological activated carbon contactors. It is being delivered under a very aggressive schedule and embodies all the benefits of design-build in terms of flexibility, responsiveness, schedule, and cost-efficiency.

Quality Control/Quality Assurance Engineer, Brawley Water Treatment Plant (WTP), Brawley, California—For the City of Brawley, Mr. Hill performed quality control reviews on final design phase engineering of a 10,500-gpm raw water pump station and 16,000-gpm/13,000-gpm finished water/wash water pump station. The raw water pump station included four vertical diffusion vane pumps; two with variable-speed drives. The finished water/wash water pump station included eight vertical diffusion vane pumps to serve two pressure zones; two pumps had variable-speed drives. He performed design including inlet/outlet piping design, operational considerations, pump and control valve design, and preparation of construction drawings and specification. Coordinated work with WTP including civil, structural, and electrical disciplines.

White Rock Treatment Plant Improvements, Dallas, Texas—For the City of Dallas, Mr. Hill prepared preliminary design report and coordinated design efforts for $8.2 million of hydraulic improvements to a 100-mgd WWTP. Improvements included new raw sewage pumps, sludge pumps, recirculation pumps, addition of four secondary clarifiers, and modifications to plant piping.

Jasper Street WTP Improvements, Wichita Falls, Texas—For the City of Wichita Falls, Mr. Hill directed design and preparation of contract documents for flocculation and sedimentation basin equipment, filter media and under drains, filter control system, wash water tank, chlorine and ammonia feed systems, chemical feed system and the addition of high service pumps.

San Dieguito Water District/ Santa Fe Irrigation District 3, 4, 5, and 6 Flow Control Facilities, Rancho Santa Fe, California—For San Diego Water Authority, Mr. Hill managed and directed design efforts for new flow control facilities consisting of four flow meters to meter 84 cfs of raw water and 42 cfs of treated water to the Badger Filtration Plant. Work included site layout, architectural, mechanical, electrical, and instrumentation design.

Project Team

Jeffrey R. Hansen, PE
Senior Project Manager

Education.
BS, Civil Engineering,
Michigan State University, 1996

Registration.
Professional Engineer, Michigan, No. 6201047425

Years of Experience.
18

Background
Mr. Hansen has extensive experience providing design and construction services for a variety of municipal for a variety of municipal systems, facilities, and drinking water systems including supply, wells, storage, pumping, water main design, water treatment design and water system modeling.

Related Experience
Bay Area Surface Water Treatment Plant Evaluation, SMMWSC, Michigan—Mr. Hansen completed a preliminary engineering report for surface water treatment plant (WTP). The report evaluated treatment technologies, multiple WTP site locations, environmental and site considerations, transmission main routings, reliability, emergency water supply alternatives, and costs.

Bay Area Surface Water Treatment Plant Project Plan, Bay County Department of Water and Sewer, Michigan—Mr. Hansen completed a water treatment plant (WTP) Project Plan for low interest funding through the Drinking Water Revolving Fund (DWRF) program. The Project Plan met the requirements of the Michigan Department of Environmental Quality (MDEQ) and qualified the Owner for $6 million in grant money in addition to low interest loan funding.

Flint Water Treatment Plant Improvements, City of Flint, Michigan—As a Project Engineer, Mr. Hansen assisted with a preliminary engineering report, funding application, and design for water treatment plant improvements.

Highland Park Water Treatment Plant Improvements, Flint, Michigan—As a Project Engineer, Mr. Hansen has assisted with a preliminary engineering report, funding application and design for water treatment plant improvements for the City of Highland Park.

Sims Bayou Water Storage Tank Improvements, City of Houston, Texas—Mr. Hansen served as Project engineer for new overflow weir structures and overflow pipes for four ground storage tanks. Project also included site drainage evaluation.

Katy Addicks Pump Station, City of Houston, Texas—Mr. Hansen served as Project Engineer for 1200 linear feet of new 42-inch steel water line.

Lake Huron Water Supply Initiative, Genesee County Drain Commission, Department of Water And Waste Services, Michigan—Mr. Hansen was the local Project Manager for the design of two lake intake cribs, intake pipeline, and shorewell as the first step in developing a new water supply system. The project included two 60-mgd intake cribs, 78-inch PCCP / steel intake pipe, stop log chambers, pipeline manways, tunneling, HDPE chemical feed piping for zebra mussel control, secant pile wall shorewell / junction chamber and associated appurtenances including a 78" x 78" sluice gate.

US290 / 12th Street Water Main Casing Extension, City of Houston, Texas—Mr. Hansen served as Project Manager for a water main extension of approximately 600 linear feet of split steel casing to be installed on an existing 72-inch water transmission line to allow for highway widening.

Iron and/or Arsenic Removal Water Treatment Plants Design, Multiple Locations—Mr. Hansen has designed numerous arsenic and/or iron removal plants for both public and private organizations with new wells, chemical feed, new housing, above and below ground piping, retrofitting of existing systems, planning for future expansion, etc. Projects have included clients such as the City of Perry, Village of Dryden, Village of Fowler, City of Memphis and Brandon Schools.

Iron Removal Water Treatment Plants Construction Management, Multiple Locations—Mr. Hansen managed construction of Arsenic and/or Iron Removal Water Treatment Plants for the City or Perry, Village of Dryden, Village of Fowler and City of Memphis. Each project included separate bid packages for individual disciplines and therefore required involved management by Mr. Hansen to coordinate efforts between numerous contractors.

Project Team

JEFFREY R. HANSEN, PE, CONTINUED

Booster Pump Station, Muskegon Township, Michigan—As the Project Engineer, Mr. Hansen designed a booster station with three 200 HP (3900 gpm) pumps and a 1-MG ground storage tank for Muskegon Township.

Water CADD Models, Multiple Locations—Mr. Hansen developed working WaterCADD models of many water systems such as St. Johns, Highland Park and South Bend, IN.

Water Treatment Plant Projects, Multiple Locations—As a Project Engineer, Mr. Hansen has assisted with water treatment plant projects for the City of Flint and the City of Highland Park.

Green Oak Township Water Needs Assessment, Green Oak Township, Michigan—Mr. Hansen valuated future water demands and developed water system plan in order to assist the Township with future planning and decision making with the acquisition of a developer owned well.

New Well And Village Wide Water Meters, Village Of Ubly, Michigan—Provided design services / construction plans for a new well, well house, water main, well abandonments and new individual water meters to convert to a metered customer base. The project was funded through the MDEQ – DWRF low interest loan program and allowed the Village to provide low arsenic water for the community.

Water Supply Study, City Of Perry, Michigan—Mr. Hansen completed a study to analyze options for a new well field. The analysis evaluated alternatives including site location, capacity concerns, treatment implications, compatibility with the existing water system and expected costs.

Waste Water Treatment Lagoons, City Of Perry, Michigan—Project Manager for rehabilitation of waste water treatment lagoons including installation of a liner system, rip rap bank erosion protection and SolarBee aerators / mixers. Mr. Hansen completed a project plan allowing the City to obtain funding, both grant and low interest loan, through the MDEQ – State Revolving Fund.

New San Juan Diego Activities Center, Our Lady Of Guadalupe Catholic Church, Michigan—Mr. Hansen worked in cooperation with THA Architects to provide design of a new Activities Center and the associated site work. Mr. Hansen was responsible for grading, parking lot improvements, new sanitary and water services, site drainage system with detention pond, soil erosion control, landscaping, and permitting.

New High School, Lake Fenton Community Schools, Fenton, Michigan—Mr. Hansen worked with THA Architects to provide site design of grading, utilities, roadways, sidewalks, drainage and parking lots. Project included multiple phases, on site wells, and athletic fields.

U.S. 23 Wetland Mitigation and Design, Michigan Department of Transportation, Ogemaw County, Michigan—Modeled existing and proposed wetlands at a yearly run time in order to maximize the proposed replacement wetland.

Glycol Runoff Collection, Capital Region Airport Authority, Lansing, Michigan—Project engineer for system to collect runoff containing glycol and divert to detention pond. Pond designed to pump to sanitary sewer or drain to open channel.

Smith - Evans Storm Drain, City of Lansing, Michigan—Project engineer for nine hundred feet of open channel conversion into a two-barreled, 5-foot HDPE underground piping scheme. Required system modeling using XP-SWMM software.

Dryden Road Reconstruction (West), Village Of Dryden, Michigan—Mr. Hansen provided design and construction engineering for reconstruction of Dryden Road from Union Street to the west Village limits. The project was designed and constructed in accordance with MDOT specification and requirements.

Project	Budget	Final Construction Total	% Under Budget	% MDEQ Milestone
Ubly Well & Water Meters	$455,000	$451,679	0.7%	100%
Dryden WTP	$819,000	$694,868	15.1%	100%
Fowler WTP	$982,800	$755,855	30.0%	100%
Perry WTP	$1,609,000	$1,564,700	2.8%	100%
Perry WWTL	$2,775,000	$2,748,368	1.0%	100%

Jeremy N. Nakashima, PE
Senior Project Manager

Education.
MS, Civil Engineering (Geotechnical), University of Illinois, 1997

BS, Civil Engineering (Environmental), University of Illinois, 1994

Years of Experience.
18

Registration.
Professional Engineer, Michigan, No. 6201058535

Background
Jeremy N. Nakashima is experienced in water and wastewater facility and system planning, engineering, and program management. Mr. Nakashima has been responsible for all aspects of a project from conception through construction. He has overseen the design and construction of numerous water supply, treatment and distribution facilities for municipal and private utility clients throughout the U.S.

Related Experience
Bay County Water Treatment Plant, Saginaw-Midland Municipal Water Supply Corporation (SMMWSC) & the Bay County Department of Water and Sewer, Michigan—The SMMWSC and the Bay County Department of Water and Sewer retained LAN to prepare a preliminary study for the feasibility of locating a 20-mgd surface WTP in the Bay Area to provide finished water to numerous municipal customers. The study included preliminary design of the WTP and associated water system facilities, evaluation of multiple WTP site options, development of various alternatives for secondary supply, and development of a detailed cost analysis. The report was prepared in accordance with the MDEQ requirements for use in applying for a Drinking Water Revolving Fund low interest loan. Mr. Nakashima's responsibilities included the evaluation of existing low and high service pumps at the Bay City WTP for possible reuse in one of the project alternatives, as well as performing QA/QC reviews of the preliminary engineering report.

New Water Treatment Plant, Village of Mahomet, Illinois—Project Manager for multi-million dollar water treatment plant improvements that tripled plant capacity to meet the demand of a growing community. Design of the new 1,800 gpm plant includes the addition of two new 600 gpm package iron removal units for aeration, detention and filtration; four new 9-foot diameter ion exchange softeners; a new softener building; new high service pumps; chemical feed systems; converted brine storage tank; converted backwash wastewater holding tank; a new backwash wastewater pump station; upgraded electrical service, emergency power systems and instrumentation; and miscellaneous site improvements.

Surface Water Intake, Division of Water and Waste Services, Genesee County Drain Commissioners Office, Genesee County, Michigan—Mr. Nakashima served as Assistant Project Director for design engineering services of a new water supply intake system. Located on the western shore of Lake Huron at the county line between Sanilac and St. Clair counties, the new 85-mgd water supply intake system consists of: two 48'x48' octagonal intake structures (timber cribs); 6,575 LF of 78-inch intake pipeline; 300 LF of 60-inch intake pipeline; two submerged steel stop log chambers on the intake pipeline for crib isolation; a 35-foot diameter, 57-foot deep onshore junction chamber for tunneling operations; and a zebra mussel control system. Mr. Nakashima was responsible for overall QA/QC of the bidding documents, assisted in design coordination between subconsultants and prime consultant, and prepared several project specifications and drawing details related to the junction chamber, stop log chambers, intake pipeline, and timber cribs. In particular, he was responsible for the design of the zebra mussel control system, including performing hydraulic calculations for the chlorine solution piping and diffuser design, selection of materials and design details.

Lexington Pumping Station Generator Facilities, DuPage Water Commission, Elmhurst, Illinois—Project Engineer for the design of a new generator building and generator electrical building at the Lexington Pumping Station and Reservoir. Responsibilities include the design of the relocation of existing site utilities necessary for the construction of the new facilities. Utilities requiring relocation include a 36-inch watermain, sanitary and storm sewers, electrical ductbanks and gas mains. During the construction phase, Mr. Nakashima served as Project Manager responsible for all construction-related engineering services.

Project Team

Jeremy N. Nakashima, PE, Continued

New Ammonia Feed System, City of Houston, Texas—Mr. Nakashima was responsible for the preliminary design, final design, and preparation of construction documents for a new Liquid Ammonium Sulfate chemical feed system for chloramine disinfection at the West Houston #3 groundwater treatment facility which included: 1) bulk chemical storage in an outside secondary containment structure sized for a minimum storage of 15-days; 2) new building to house the chemical feed system and electrical with a separate equipment room for four liquid vacuum feed systems, day tank, dual wall containment piping, gas monitoring system, and a separate control room for electrical, instrumentation and SCADA; and 3) sizing of the chemical feed system and storage facilities were based on a maximum plant capacity of 6.7-mgd.

Green Bay Water Utility, Green Bay, Wisconsin Lake Pumping Station Improvements, Contract D—Project Engineer for the design of improvements to the raw water Lake Pumping Station, which includes the phased construction of replacement of the five existing 8-mgd vertical split case centrifugal pumps with five 9-mgd vertical turbine pumps. The project includes modifications to the existing wetwell and drywell suction and discharge piping to accommodate the new pumps, as well as wetwell structural modifications.

Green Bay Water Utility, Green Bay, Wisconsin Lake Pumping Station Improvements, Contract E, 42" Discharge Header Replacement—Served as Project Manager providing construction engineering services, including review of submittals, RFI's, contractor pay requests, change orders, as well as construction observation services, for improvements at the raw water Lake Pumping Station for the Green Bay Water Utility. The project includes modifications to the pumping station discharge header and replacement of a section of an existing 42-inch transmission main with approximately 470 lineal feet of new 42-inch buried steel pipeline. Work also includes modifications to the interior discharge piping, installation of a new 30-inch butterfly valve with electric motor actuator, construction of a new surge relief valve vault, new 16-inch surge piping, new air release and access vaults, new cathodic protection test stations, 42-inch steel pipe connection to existing 42-inch PCCP, new station water piping, relocation of chlorine vacuum lines, new access drive, and miscellaneous site improvements.

Reservoir Groundwater Control Project, Green Bay Water Utility, Green Bay, Wisconsin—The Green Bay Water Utility (GBWU) owns, operates, and maintains one 4 MG and two 2 MG finished water below grade reservoirs at the Filter Plant facility. In an effort to comply with the Wisconsin Department of Natural Resources code regarding allowable groundwater conditions at below grade reservoirs, the GBWU retained LAN to develop a plan and construction documents to lower the groundwater level at the existing reservoirs. Mr. Nakashima served as Project Engineer for the final design of the groundwater dewatering system which consisted of a series of French drains, manholes and pumps to lower the local groundwater table around the reservoirs. He also was responsible for QA/QC of the construction documents.

Junction Pumping Station Improvements, Saginaw-Midland Municipal Water Supply Corporation, Bay City, Michigan—Project Engineer responsible for general construction administration for improvements at the Junction Pumping Station, which included the construction of a new maintenance building, 48-inch and 60-inch reservoir and transmission main piping, valve vaults and miscellaneous site improvements. Duties included submittal review, pay request and change order processing, and general coordination with the Owner and Contractor.

Hydraulic Improvements, Metropolitan Water Reclamation District of Greater Chicago, Illinois—Project Engineer for the final design of three new diversion chambers and large process piping outside of the new 480-mgd High Level Influent Pump Station at the Calumet WRP. Responsible for completing project plans and specifications for the diversion chambers and piping, as well as coordination with other design disciplines and subconsultants. Use of the Calumet WRP MUPPS mapping was instrumental in the final design of the diversion chambers and process piping as it illustrated the extensive and complex underground utilities and structures that have been constructed throughout the history of the treatment plant. Use of the Calumet WRP MUPPS database was useful in identifying contract drawings when details of existing utilities and structures were needed for the final design of the diversion chambers and piping. During the construction phase, Mr. Nakashima served as Project Manager responsible for all construction-related engineering services.

Water Treatment Plant Rehabilitation, Village of Buckley, Illinois—Village Engineer and Project Manager for the design and permitting for the complete rehabilitation of the existing water treatment plant including the refurbishment of the aeration/detention tank and the replacement of the high service pumps, pressure filters, and ion exchange softeners. This project was funded in part by an IEPA low interest loan.

Melissa C. Henderson, PE
Associate, Project Manager

Education.
BS, Mechanical Engineering,
Massachusetts Institute of Technology, 1997

MS, Hydrology for Environmental Management,
Imperial College of Science,
Technology & Medicine, 2000

Years of Experience.
16

Registration.
Professional Engineer, Michigan, No. 6201058110

Background
Melissa Henderson is LAN's lead engineer on hydraulic and transient modeling with extensive experience in water system hydraulic analysis. Her experience includes water system analysis using EPANET, InfoWater, WaterCAD and WaterGEMS, and transient analysis using the Liquid Transient (LIQT) program.

Ms. Henderson has performed analyses of numerous water, storm and sanitary systems to develop and update utility master plans, water supply feasibility studies, and has been involved in route evaluations, design of water and sanitary mains, population and water demand projections, demand allocation, and hydraulic and transient analysis of water and sanitary treatment plants and associated facilities. Ms. Henderson has developed and calibrated extended-period simulation hydraulic models to analyze existing infrastructure facilities and their operation, identify system deficiencies, optimize supply management, and determine system improvements.

Related Experience
Model Development, Saginaw-Midland Municipal Water Supply Corporation (SMMWSC), Bay City, Michigan—Ms. Henderson was the leading hydraulic modeler and project engineer for this project, which included creating a hydraulic model for SMMWSC and provided training to allow Saginaw-Midland personnel to perform hydraulic analyses using the model. As part of this effort, an extended-period simulation hydraulic model for the current system will be created utilizing either the U.S. EPA's EPANET software. The developed hydraulic model will be calibrated with historic field data. As part of the effort, Ms. Henderson is leading the data collection and review; set-up of the model, development of demand patterns and calibration of the model. She will also develop a model manual that provides detailed information regarding the model created and data used, and serves as a guide for performing hydraulic analyses.

Lake Shore Pump Station and Associated Raw Water Transmission Mains Transient Analysis, Green Bay Water Utility (GBWU), Wisconsin—Ms. Henderson was the project engineer overseeing the transient analysis of the GBWU Lake Shore Pump Station and associated transmission mains. Her team created a detailed transient analysis model utilizing LIQT software that included the Lake Shore Pump Station (LSPS), the 42-inch and 54-inch transmission lines beginning at the LSPS, the surge protection devices located along the transmission lines and at the LSPS and Booster Pump Station (BPS). The team also developed boundary conditions were also determined for the discharge at the Water Filtration Plant where the two transmission lines terminate. Based on the transient analyses results, Ms. Henderson and her team provided several conclusions and recommendations to GBWU. Analyses confirmed the existing normal and emergency operating procedures, surge protection devices and check valves all serve to protect the LSPS discharge header and connected transmission lines from excessive surge pressures and vacuums. Her team also identified and recommended continued operation of key surge protection devices to maintain sufficient surge protection within system along with additional recommendations for normal pump start-up, normal pump shut down and emergency conditions.

West Harris County Regional Water Authority (WHCRWA) Surface Water Master Plan, Harris County, Texas—Ms. Harrison is currently involved in the development of a "Master Plan" for the surface water infrastructure necessary to supply the 226 square miles for the WHCRWA, which is located in Western Harris County outside the City of Houston. As part of this project, she calculated the total water demand using the University of Houston's Center for Public Policy Census Tract population projects, 2000 Pumpage data, and supplemental data regarding water usage from the WHCRWA Municipal Utility Districts (MUDs). Ms. Henderson allocated population and water demand for each of the 107 MUDs and areas within WHCRWA not within a MUD. She evaluated proposed surface water pipeline routes. Ms. Henderson evaluated costs and analyzed financial alternatives for the proposed surface water system.

She analyzed system curves for proposed pumps, performed preliminary pump and motor selection and determined the preliminary plant layout for pumps. Estimated construction cost $483,750,000.

78-inch Transmission Main, Segment 1, Brushy Creek Regional Utility Authority (BCRUA), Cities of Cedar Park, Leander and Round Rock, Texas—Ms. Henderson worked as the lead project engineer for the transient hydraulic modeling of the proposed BCRUA Segment 1 Transmission Main. Ms. Henderson and her team performed transient hydraulic analysis for all BCRUA transmission main design teams. Ms. Henderson led the development of a transient model for the BCRUA utilizing preliminary alignments. Ms. Henderson assessed the system under both normal operating and failure conditions. Ms. Henderson also conducted analyses to determine the impact on the transmission system of the flow control valves at the various take points. Based on the results of the transient modeling, Ms. Henderson determined the anticipated transient pressures and required appurtenances for transient pressure relief. Ms. Henderson provided a technical memorandum of the results of the transient analysis, which included the assumptions used in the model, transient pressures anticipated along the alignment, and a table of recommended appurtenances including location and type. Transient Hydraulic Analysis was to be performed at 60% and 90% for all designs. In addition, Ms. Henderson designed the air release valves including size, location, and type of valve needed for draining, filling, and air release functions (not related to surge). Air release valves will be designed utilizing AWWA M51 and appropriate information from vendors. Ms. Henderson also reviewed the standard Air Release Valves details for the transmission main design projects.

West Harris County Regional Water Authority (WHCRWA) Water Pump Station No. 1—WHCRWA, City of Houston, Texas: Ms. Henderson developed booster pump station layouts for two phases of development for the WHCRWA's Water Plant No. 1 to delivered treated surface water. In addition to providing conceptual booster pump station layouts, she also provided preliminary pump selection recommendations based on the system's Phase 1 and Phase 2 flow and pressure requirements. Ms. Henderson's analysis of Water Plant No. 1 included hydraulic modeling of the WHCRWA surface water transmission system and an evaluation of normal pump start-up and shutdown, and pump failure scenarios for transient surge conditions.

Green River Pumping Plant Project, Transient Analysis, Franson Civil Engineers, Unitah County, Utah—Ms. Henderson was the lead project engineer and transient modeler responsible to perform a transient analysis to support the proposed pump station and the 42-inch raw water line design, known as the "Green River Pumping Project" (GRPP). She led a transient modeling team that performed analyses using the LIQuid Transient, also known as LIQT program. Four major operating conditions were modeled, with comparison between the use of a surge anticipator valve (SAV) and a surge tank (ST). Two different pump manufacturers were also compared, American-Marsh and National pumps. Additionally, two control valves were analyzed in conjunction with the type of surge protection utilized. Ball valves were utilized in the SAV scenarios and butterfly valves (BFV) were analyzed in the ST scenarios. An analysis of the transient conditions in the proposed pump station and proposed 42-inch pipeline was performed for pipeline filling, pump start-up, pump shut-down and power failure. Based on results of the modeling scenarios, recommendations were made regarding the type and location of surge protection devices to adequately protect the system in the event of a transient occurrence.

Mt. Carmel Water Treatment Plant (WTP) to Hillcrest Ground Storage Tank (GST) Water Transmission Line Design, City of Waco, Texas—Ms. Henderson assisted with the hydraulic modeling efforts related to the proposed transmission main from the Mt. Carmel WTP to the Hillcrest GST. Based on recent meetings with City staff, she investigated the impacts of tying the proposed transmission main into an existing 12-inch distribution line and converting the existing 16-inch Hillcrest GST refill line into a transmission/distribution main. Ms. Henderson also performed analyses to verify the size of the proposed Mt. Carmel to Hillcrest transmission main.

Surface Water Transmission System Design, City of Sugar Land, Texas—Ms. Henderson served as the senior hydraulic engineer to perform a hydraulic analysis and transient modeling services related to the City's proposed surface water transmission main system, which included a 22-mgd Surface Water Treatment Plant (SWTP) and transmission waterlines ranging in diameter from 16- to 36-inches.

HCFWSD 61 - WWTP No. 2 - Hastings Green, Harris County FWSD No. 61, Texas—Ms. Henderson reviewed previous hydraulic calculations for the Hastings Green Waste Water Treatment Plant No.2 (Hastings Green). In addition, she updated the plant's hydraulic model to determine cause of poor performance at the plant. Standard hydraulic equations were used to develop the plant's hydraulic profile and calculations were performed in Microsoft Excel.

Denney R. Howard, PE
Chief Electrical Engineer

Education.
BS, Electrical Engineering,
Texas Tech University, 1981

Registration.
Professional Engineer, Michigan, No. 6201057532

Years of Experience.
30

Background
Mr. Howard has more than 29 years of experience in the engineering design field of electrical, controls, instrumentation, and site electrical utility systems. Mr. Howard's electrical design background includes water and wastewater utility facility projects which incorporates utility coordination, medium-voltage and low-voltage distribution systems, standby and emergency power distribution systems, computer-aided power system coordination studies, grounding and surge protection systems, SCADA and telemetry systems, instrumentation and control systems interior and exterior lighting systems, fire alarm and security systems, and lightning protection systems.

Related Experience
Red Bluff Water Treatment Plant Upgrades, Coastal Water Authority (CWA), Pasadena, Texas—CWA has asked LAN to implement five of the seven projects identified in the preliminary engineering report (PER). LAN developed detailed drawings and specifications and provided bid and construction phase services for the projects, which included adding a fourth 22-ft.-diameter filter with all piping, power, valves and controls; replacing three other 22-ft. diameter filters, its 120-V power supply, automatic controls and control panels; replacing numerous pieces of non-functional equipment; replacing the existing manual chlorine gas system with an automated sodium hypochlorite dual-feed system and installing new pump systems for the chemicals; and designing a new SCADA system to fully integrate all existing control functionality and new improvements. Mr. Howard provided all electrical engineering design for the distribution system and conducted quality assurance and quality control (QA/QC) reviews of the SCADA and instrumentation and controls designs.

Water Treatment Plant Study and Improvements, City of Lubbock, Texas—As Lead Electrical Engineer, Mr. Howard provided electrical, instrumentation, control, and SCADA systems tasks, which were integrated in the overall plant evaluation and energy audit. Mr. Howard supervised a plant power system study that included short-circuit and load-flow analysis, protective device coordination and arc-flash study and electrical system condition assessments. He also supervised an energy audit of the electrical, HVAC, and pumping systems. Mr. Howard was also engaged with the City to implement recommendations from this study. Improvements included replacement of the plant's service entrance switchgear with 2,000-A/480-V main-tie-generator-tie-main draw-out switchgear, additional electrical distribution system equipment, lighting systems with energy-efficient systems, HVAC systems with energy-efficient systems, motors with energy-efficient motors, and SCADA system with a state-of-the-art system that provided a more user-friendly interface.

Water Treatment Plant Preliminary Engineering Report (PER), Coastal Water Authority, Pasadena, Texas—Mr. Howard provided electrical engineering for the preparation of a PER for proposed improvements to the Red Bluff WTP including installing a new gravity filter, replacing the existing chlorine system with a sodium hypochlorite feed system, implementing a new SCADA system to replace the timer and relay-driven master control panel, and replacement or upgrades to various system components that or no longer functioning or are obsolete.

Saginaw-Midland Municipal Water Supply Corporation (SMMWSC) Whitestone Point Pumping Station Variable Frequency Drive (VFD) Feasibility Study, Augres, Michigan—As lead electrical engineer, Mr. Howard provided SMMWSC a preliminary design report (PER) investigating the feasibility of adding VFDs to the Whitestone Point Pump Station in order to save energy while improving operational capabilities. Whitestone Point is located on the western shores of Lake Huron in Michigan. The pump station was constructed in 1946 with three 1,200-hp pumps equipped with 2,400-V synchronous motors. From 1965 through 1994, five 2,500-hp pumps were added. During preparation of the report, LAN investigated available VFD manufacturers, existing motor compatibility with VFDs, electrical distribution modifications, control system modifications and HVAC system modifications potential energy savings. LAN and

SMMWSC found that adding VFDs to two 1,200-hp pumps and discontinuing the use of flow-control valves for the same pumps, would save SMMWSC approximately $114,000 per year, which would pay back the investment in 6.5 years. Following the PER, Mr. Howard assisted SMMWSC in the procurement and installation of two 1200-hp medium-voltage VFDs and the main 5-KV switchgear.

Capacity Evaluation Study, Coastal Water Authority (CWA), Pasadena, Texas—LAN completed a capacity evaluation for the Red Bluff WTP in an effort to determine and compare the original design capacity against the actual capacity of the plant at existing conditions. The study then identified and examined immediate and future improvements required to deliver upon CWA's contractual agreements and then determined the plant's ultimate site capacity. Mr. Howard evaluated the existing electrical service and distribution; visually inspected electrical panels, pumps, sensors and other systems; made recommendations for further infrared inspection of aging electrical systems; and evaluated potential equipment locations for future expansion of the plant and/or addition of electrical systems.

Southwest Pump Station and Ground Storage Tank, Lubbock, Texas—As lead electrical engineer, Mr. Howard supervised the design of low-voltage power, instrumentation and control, lighting and fire alarm systems for a new 14-mgd water pumping station serving the western portion of the City of Lubbock and Lubbock County. The design included coordination with Lubbock Power and Light to provide electrical service to the facility. Since this facility needs to remain in service during emergency events, the facility was designed with a large, 1,200-kW, standby diesel-engine generator set. The design also included two 150-hp, medium-voltage variable frequency drives (VFD) and two 250-hp, medium-voltage solid-state drives. Mr. Howard also provided the design of the instrumentation, control and SCADA systems for the pump station. The SCADA system incorporated a radio telemetry system to allow the pump station to communicate with the City's existing SCADA communication system.

City of Rosenberg WWTP No. 2 Expansion and Improvements, Rosenberg, Texas—Expansion and improvement of the City's existing 3-mgd WWTP increasing the plant's current average daily flow (Qadf) capacity from 3-mgd to 4.5-mgd and its 2-hour peak flow (Qpk) rate from 9-mgd to 18-mgd. Mr. Howard served as the senior electrical engineer for the project. In particular, his role involved the electrical, instrumentation and controls design for all of the proposed treatment components, as well as specification development, code compliance, project detailing, calculations and coordination with other design disciplines, which included the on-site lift station, headworks, aeration splitter box, new and existing aeration basins, aeration blowers, clarifier splitter box, new clarifier No. 3, RAS/WAS pump station, scum pump station, selected disinfection system, NPW system, rotary drum thickener, aerobic digester basins and digester blowers. In addition, Mr. Howard designed new process control panels, six additional motor control centers (MCC), new power distribution switchboard, automatic transfer switch and auxiliary 2,000-kVA generator. Finally, Mr. Howard participated in submittal reviews during the course of the project's construction phase.

WWTP No. 1 Expansion and Improvements, Killeen, Texas—Mr. Howard served as the lead electrical engineer for the Bell County Water Control and Improvement District No.1 South WWTP project, which involved the design and construction of a new 6-mgd average daily flow facility, with a corresponding 2-hour peak flow of 18-mgd.

In particular, Mr. Howard was responsible for the electrical design for all of the new process components, which included the headworks fine screening and grit removal, sequencing batch reactor, disc filtration, ultraviolet (UV) disinfection, aerobic digesters, belt press dewatering, and effluent pump station. In addition, Mr. Howard's efforts included provisions for an emergency stand-by generator system, sized to support the full forward flow of the new treatment plant.

Chisholm Trail-Legend Oaks Highway 29 Pump Station - Georgetown and Austin, Texas—As lead electrical engineer, Mr. Howard supervised the design of low-voltage power, instrumentation and control and lighting systems for a new 7.8-mgd water pumping station serving the a suburban area north of Austin. The design included coordination with Georgetown Electrical Cooperative to provide electrical service to the facility. Since this facility needs to remain in service during emergency events, it was designed to allow connection of a portable 500-kW, standby diesel-engine generator set. The design also included two 250-hp, medium-voltage variable frequency drives (VFD) and two 250-hp, medium-voltage solid-state drives. Mr. Howard also provided the design of the instrumentation, control and SCADA systems for the pump station. The SCADA system incorporated a radio telemetry system to allow the pump station to communicate with the Chisholm Trail Special Utility District's existing SCADA communication system.

Project Team

Meredith G. McCullough, PE
Engineer IV

Education.
MS, Environmental Engineering,
Texas Tech University, 2005

BS, Environmental Engineering,
Texas Tech University, 2005

Registration.
Professional Engineer, Texas No. 105081

Years of Experience.
9

Background
Ms. McCullough provides engineering for water and wastewater facilities and utility systems. She is an expert in water/wastewater system modeling and infrastructure planning.

Related Experience
A.R. Davis Water Treatment Plant Filter Process Improvements and Valve Replacement, City of Austin, Texas—LAN provided engineering services to the filtering system and recommending modifications to enhance the performance in the filter pipe gallery. Ms. McCullough was involved in the design of the replacement of 162 large-diameter valve and actuators for 27 dual media filters. Additionally, she provided construction phase services responding to construction submittals, RFIs, and general engineering support for the construction phase of this project.

Filter Improvements Project, Schertz-Seguin Local Governmental Corporation (SSLGC), Nixon, Texas—Ms. McCullough designed a filter rehabilitation project for the SSLGC WTP. This project included the replacement of four (4) pressurized filter media, protective coatings and interior air scour piping and nozzles. Additionally she, preformed construction management on this project managing contractor pay applications, on-site inspection of blasting and painting, change orders and miscellaneous construction activities.

Robinson Water Treatment Plant Improvements Project, City of Robinson, Texas—Ms. McCullough was the Project Engineer for the design on a 500,000 million gallon Clearwell, pump station relocation, and yard piping improvements for the Robinson water treatment plan. The project involved groundwater uplift design and continued plant operations considerations for the Clearwell construction. She developed plans and specifications for this project.

Water System Hydraulic Modeling, Brushy Creek Regional Utility Authority (BCRUA), Cedar Park, Texas—Ms. McCullough evaluated the preliminary operations and hydraulics of the booster pump station, storage tanks, and transmission main for the BCRUA WTP. The hydraulic modeling aided in the design of the water system and transmission main, which was complex due to the difficulties of providing treated water to three different cities with different pressure zones and flow requirements. The BCRUA WTP will have an ultimate built out of 105.8-mgd in 2025. She also completed the final design of the BCRUA booster pump station for three vertical turbine pumps.

Pump System Evaluation, City of Lubbock, Texas—Ms. McCullough evaluated the eleven pump stations for future capital improvements for the City of Lubbock. This evaluation included an inspection of pumps, motors, pipe, and associated storage tanks. A list of improvements was generated to add the City of Lubbock Capital Improvements Projects. As part of the project Ms. McCullough preformed pump tests on all of the pumps to study pump efficiency and perform an energy analysis.

Primary Effluent Pump Station Ph III, Las Vegas, Nevada—Clark County PEPS III is a 416 MGD permitted wastewater treatment plant serving the Las Vegas Nevada area. LAN was hired to design the Influent Lift Station for the WWTP. Ms. McCullough provided QA/QC on the pump hydraulic model. She verified quantities, system head curves, and static and friction losses in the model.

Strategic Study, Coastal Water Authority, Fort Bend County, Houston, Texas—The purpose of this study was to provide a plan for the future infrastructure requirements needed to meet the wholesale water needs of the Greater Houston Region. Ms. McCullough utilized GIS to determine water demand projections through 2060 in Fort Bend County. This study included a thorough analysis of the surface water required to convert the County's water supply to surface water from groundwater, due to groundwater subsidence.

Rollie A. McNutt, PE
Mechanical Engineer

Education.
BS, Mechanical Engineering,
Texas Tech University, 1992

Registration.
Professional Engineer, Michigan, No. 6201057124

Years of Experience.
19

Background
Mr. McNutt has 19 years of experience in the design of mechanical systems. He has designed a wide variety of systems including central utility plants, large air handling unit systems, smoke evacuation systems, industrial exhaust systems, and laboratory systems to National Institute of Health (NIH) guidelines. His areas of expertise include energy analysis, HVAC system optimization, building automation, and system commissioning. He has expertise in air conditioning, chilled water systems, thermodynamics, heat transfer and fluid mechanics.

Related Experience
Muddy Creek Regional Wastewater Treatment Plant (WWTP), North Texas Municipal Water District (NTMWD), Texas—The NTMWD contracted LAN to provide design, construction drawings, specifications, and construction phase services for the first phase expansion of the Muddy Creek Regional WWTP from its existing 5-mgd capacity to 10-mgd capacity. In addition to serving as the mechanical engineer during construction administration, Mr. McNutt designed HVAC systems for several buildings as part of this project. The overall expansion included modification of the on-site lift station, addition of a primary clarifier, two aeration basins, a secondary clarifier, two filters and ultraviolet disinfection modules. With the increase in energy costs, LAN evaluated options to reduce energy costs, particularly those associated with the aeration units and odor control system.

Primary Effluent Pump Station Ph III, Las Vegas, Nevada—LAN partnered with Whiting-Turner Construction for this design-build project for expansion of the PEPS from its current peak flow capacity of 120-mgd, to a peak capacity of 320-mgd. In addition to the expansion of the existing wet well and pumping capacity, the project involved the design and construction of a number of associated facilities including underground large diameter pipelines (72-inch and 96-inch), miscellaneous above-ground process piping, structural modifications to overhead canopy, electrical system design, odor control system design and large-diameter sanitary sewer pipe rehabilitation. The construction cost of the facility was approximately $29 million to be designed and constructed over an 18-month period. Mr. McNutt served as a technical resources and quality reviewer for the project.

Southwest Pump Station, City of Lubbock, Texas—LAN converted the City's existing hydraulic model from H2ONet to WaterCAD and incorporated growth projections. LAN prepared a preliminary report with recommendations and the subsequent construction documents. Mr. McNutt provided mechanical engineering evaluations of the existing cooling equipment (exhaust fans) for the pumps as well as the large compressors. Finally, LAN provided full construction phase services for the project.

Pump System Evaluation, City of Lubbock, Texas—Mr. McNutt was the mechanical engineer responsible for significant elements of the technical mechanical engineering systems design, documentation, calculations, code compliance, project detailing, specifications and mechanical engineering coordination. The project added a new 14-mgd pump station and included hydraulic modeling, site analysis, transmission line design, cost estimation, water conservation, and pump station design that included modifications to improve system maintainability and reliability. LAN also assisted with construction-phase (submittal review, inspection, and preparation of record drawings) and start-up services.

Hubbard Hall HVAC Systems Upgrade, Denton, Texas—As a mechanical engineer, Mr. McNutt was responsible for significant elements of mechanical engineering systems design, documentation, calculations, code compliance, project detailing, specifications and mechanical engineering coordination. TWU selected LAN to perform mechanical, electrical and infrastructure modifications for Hubbard Hall. The bulk of the construction required creative phasing to accommodate the numerous ongoing campus activities. All work was completed without major interruption to the building's complex schedule of activities.

Osvaldo Garza, PE
Project Engineer

Education.
BS, Civil Engineering,
University of Illinois at Chicago, 2008

Registration.
Professional Engineer, Illinois, No. 061033485

Years of Experience.
10

Background
Mr. Garza joined LAN in 2008 and has worked extensively on all aspects civil site and utility design. He has focused primarily on water distribution projects, while also gaining experience in roadway, storm sewer, and sanitary sewer design. His design experience has included developing final design drawings, technical specifications, construction cost estimates, bid documents, and providing construction phase services. Additionally, Mr. Garza has served as field engineer on a variety of projects including conducting internal inspections and evaluations of pipelines, utility vaults, and above ground utility structures.

Related Experience
Lake Pumping Station Improvements, Green Bay Water Utility, Green Bay, Wisconsin—Mr. Garza assisted with the preparation of plans and specifications. Preparation of plans included pump station site plan, 42-inch discharge header plan and profile design, as well as structural details and cross sections. Mr. Garza also performed thrust restraint calculations for the 42-inch discharge piping.

Tri State Village Water Association Water Distribution Improvements, DuPage County, Illinois—Mr. Garza assisted with the preparation of a complete construction package, including plans, specifications and estimate, for water main replacement within a residential neighborhood. Project consisted of 6,000 LF of 6-inch, 8-inch, and 10-inch water main installation.

Knollwood Wastewater Treatment Plant Air Header Replacement, DuPage County, Illinois—Mr. Garza assisted with the preparation of a complete construction package, including plans, specifications, and estimate for modifications to an existing air header and installation of a 30-inch air header and three blowers. As part of this effort, Mr. Garza reviewed record information and developed piping plans, structural details, as well as cross sections.

Surface Water Transmission Program (SWTP), City of Houston, Texas—Mr. Garza has served as Project Engineer on several large diameter water main projects ranging from 36 inches to 72 inches in diameter. His responsibilities included design of horizontal and vertical alignments, design of utility relocations, CAD drafting, development of technical specifications, preparation of bid documents, as well as coordination with private utility companies and public agencies. The complexity of these projects included design of thrust restraint systems, review of cathodic protection systems, traffic control plans, geotechnical reports, and environmental assessments to address specific design requirements. Some of the SWTP projects Mr. Garza worked on include:

Contract 73B-2: Approximately 8,500 LF of 42 inch water transmission main, 425 LF of 30-inch yard piping at SBPS, a new 30-inch metering station with 24-inch bypass, four 30-inch tank connections, and improvements at SBPS to the chlorinator, ammoniator, and SCADA system. In addition, the project included extensive pavement reconstruction along Tidewater, South Post Oak, West Orem, and Croquet.

Contract 70A-1: Approximately 5,600 LF of 72-inch water transmission main, interconnection to an existing 96-inch water transmission main, as well as storm sewer upgrades and relocations. The project also included removal and replacement of two lanes of reinforced concrete pavement along Fuqua St. from east of Beamer Rd. to Stover St.

Contract 70A-2: Approximately 6,700 LF of 72-inch water transmission main, 6,600 LF of 12-inch water main, storm sewer upgrades and relocations, relocation of 12-inch and 24-inch parallel force mains, and two lanes of reinforced concrete pavement replacement along Fuqua St. from Stover St. to Moers Rd. The project also included improvements to Southwest Pump Station consisting of roof replacement of existing Pump and Ammonia Buildings, installation of 30-inch, 36-inch, and 42-inch yard piping and tank connections, as well as a 42-inch metering station.

Project Team

Jennifer N. Savage, PE
Structural Engineer

Education.
BS, Civil Engineering
Texas Tech University, 2007

Registration.
Professional Engineer, Texas, No. 111686

Years of Experience.
7

Background
As a production enginer in the structural engineering department of LAN, Mrs. Savage designs and analyes components of contcrete and steel structures for a variety of projects including including buildings, water/wastewater treatment plants, port container yards, marine structures, pipeline aerial crossings, and miscellaneous structures.

Ms. Savage has designed numerous structures in the Gulf Coast Region to withstand hurricane force winds. Among these structures are the structural steel framed roof for a six story building in New Orleans, LA; a lift station elevated 20 feet above grade in Galveston, TX, and several elevated platforms to house hydraulic equipment for the Galveston-Bolivar Ferry in Galveston, TX and Bolivar, TX. She has provided preliminary and final engineering services as well as construction services for a wide variety of clients including, the US Army Corp of Engineers, Baylor University, Xavier University, Coastal Water Authority, City of Houston, Port of Houston Authority, and the City of College Station.

Related Experience
Primary Effluent Pump Station Ph III, Las Vegas, Nevada—Ms. Savage served as the structural designer for the portions of expansion of an existing pump station; a multi-chamber odor control tank and a CMU building. The multi-chamber odor control tank was 60 feet by 25 feet containing three main chambers with interior baffles and gates that would allow water to flow between the chambers. This design was especially challenging due to the high seismicity of this region. In addition to designing this tank for dead loads, live loads, and the static load of water in the tank. Ms. Savage calculated and designed the tank for the sloshing effect of the water in the chamber during a seismic event, using the design reference "Rectangular Concrete Tanks" by PSI to calculate the seismic force of the water.

Additionally, she designed portions of a load bearing rectangular CMU building that was approximately 50 feet by 15 feet; calculating the seismic force on the building in two orthogonal directions, and the relative stiffness of each of the walls to be used as shear walls. All CMU walls were designed to resist the seismic forces as well as the dead, live, and wind forces.

Water Treatment Plant Improvements, City of Robinson, Texas—Due to increased demand for potable water in this area the City was faced with a need to provide additional pumping and storage for the treatment plant and other miscellaneous items. The City authorized LAN to provide the design for the improvements that included the construction of a new 500,000 gallon clearwell, an additional 1000 GPM vertical turbine pump, relocation of two existing 2250 gpm pumps, piping and connection to existing piping, site work, electrical improvements for the additional vertical turbine pump, replacing spray bars on the Microfloc units, and check valve replacement at the raw water intake. Ms. Savage served as the structural designer for this project.

Sugarland Aerial Crossing at Ditch H and Oyster Creek—Ms. Savage designed two identical 150 foot, three-span aerial crossings to carry a 24-inch diameter waterline and a future 18-inch diameter force main across Ditch H and Oyster Creek. The superstructure consisted of TxDOT Pre-stressed Box Beams designed using the program PGSuper. Dead and live load to the superstructure were designed in PGSuper, and structure modeling was prepared using to analyze stresses imposed by the wind load and to calculate the reactions to be transmitted into the bent caps.

Regional Water Treatment Plant (WTP) Filter and River Crossing Improvements, Gatesville, Texas—Ms. Savage served as structural designer for the addition of two new filter trains, including a common piping gallery, pump pads and trenches consisting of cast-in-place concrete elements supported on thickened, slab-on-grade foundation elements. The addition of a new blower building, which consisted of a pre-engineered metal building founded on a slab-on-grade, and the addition of a new control building consisting of a pre-engineered metal building founded on an elevated, cast-in-place concrete slab was provided. The project was scheduled for completion within 200 days.

Project Team

Jeffrey D. Alpers, PE
Project Manager

Education.
Masters of Civil Engineering, Water Resources Engineering
Michigan Technical University, 1997

Bachelor of Engineering, Civil Engineering
Michigan Technical University, 1995

Years of Experience.
15

Registration.
Professional Engineer, Michigan, No. 6201050978

Background
Mr. Alpers as a Project Engineer is responsible for the technical aspects of design, plan and specification preparation, and client correspondence on a variety of civil/ municipal projects working closely with the Project Manager. Mr. Alpers has been involved in sewer studies and design and also water main design. Mr. Alpers has experience in construction observation, inspection, and material testing. Mr. Alpers undergraduate studies were in environmental engineering while his graduate studies emphasized hydraulics and hydrology.

Related Experience
William R. Starr Camp and Conference Center Sanitary Sewer Rehabilitation Project—Project Engineer and Resident Project Representative. Performed preliminary investigations, design, preparation of construction documents, permit applications, construction administration duties, construction observation, and project close-out documentation.

Dimondale Estates Drain Improvements, Eaton County Drain Commission—Project Engineer. Performed initial field investigations, design, contract document preparation, construction administration dutie, and project close-out documentation.

I-94 Pelham Rd. to Wyoming Ave. Water and Sewer Improvements—Project Professional. Performed design and layout of water and sewer improvements and specification development.

Western Sub-Trunk Interceptor Parts A and B, Genesee County Drain Commission—Project Professional, performed preliminary design calculations and layouts, utility coordination, construction document preparation.

Tecumseh River Service Area Sanitary Sewer Rehabilitation (Trenchless), City of Lansing, Michigan—Project Professional, Performed construction administration duties, supervision of field personnel, and construction.

Tecumseh River Service Area Open Cut Sewer Rehabilitation, City of Lansing, Michigan—Project Professional and Resident Project Representative. Performed construction administration duties, supervision of field staff and construction observation.

Wastewater System Improvements, Village of Ashley, Michigan—Project Professional. Oversight performing preparation of environmental report and USDA-Rural Development Funding application.

2013 South Sewer Separation Project, City of Lansing, Michigan—Prepared preliminary design, Basis of Design report.

Northeast Interceptor, City of Lansing, Michigan—Prepared final design, performed Project Performance Certification (PPC) investigations and developed draft PPC report.

Moores Park Trunk Sewer, City of Lansing, Michigan—Performed preliminary design investigations and layout, conducted Project Performance Certification (PPC) investigations, and developed final PPC report.

022 West and Area I/J Sewer Separation Project, City of Lansing, Michigan—Performed Project Performance Certification (PPC) field investigations and developed draft PPC report.

Tecumseh River Road Pump Station Inflow/Infiltration Study, City of Lansing, Michigan—Project Engineer, performing field investigations, developed preliminary recommendations, prepared report.

Project Team

Steven T. Luoma, PE
Senior Project Manager

Education.
Bachelor of Engineering, Civil Engineering
University of Michigan, 1997

Registration.
Professional Engineer, Michigan, No. 6201049188

Years of Experience.
16

Background
Mr. Luoma has 16 years of experience on a wide variety of civil engineering projects. As a Project Engineer/Manager he is responsible for the technical aspects of design, plan and specification preparation, project management and client management for a variety of civil/governmental/municipal projects. Mr. Luoma has been involved in highway improvement design, airfield pavement design, storm sewer, sanitary sewer, water treatment, wastewater treatment and site design. Mr. Luoma has extensive experience in preparation of permit applications, construction engineering and project management.

Related Experience
Main Street Pump Station, City of East Tawas, Michigan—Project Manager/Design Engineer for evaluation of sanitary sewer pump station in downtown East Tawas. A new pump station was required due to high maintenance of existing pumps and poor configuration of pump station. Designed a new pump station adjacent to the old pump station that allowed for continued service throughout the construction period. Prepared design documents and provided oversight of bidding and construction of the new pump station.

General Motors Hot Weather Facility, Yuma, Arizona—Project Engineer for this 2,500 acre test track facility and associated building campus area for hot weather vehicle testing. Responsible for preparing USACE permit, Arizona Department of Environmental Quality permits for water system, sanitary sewer system, and aquifer protection from wastewater discharge. Designed potable water distribution network from well to buildings, fire protection network, water treatment for potable water system, potable water storage (50,000 gallon above ground tank), fire protection storage (250,000 gallon above ground tank), and booster pump station for water system. Water treatment consisted of a green sand filter system for removal of arsenic from the groundwater source and design of evaporation ponds for backwash water from water treatment. Also responsible for preparation of design plans and specifications for wastewater facilities for the building campus, treatment of discharge from cooling tower, and treatment of discharge from car wash (package unit).

US Army Corps of Engineers, Soo Locks Multi-Building Rehabilitation Soo Locks, Sault Ste. Marie, Michigan—Assisted in the design, plan preparation and specification development for the rehabilitation of five historically significant buildings on the Soo Locks Complex. Repairs included rehabilitating and restoring function to historical building features (windows, doors, masonry). Project required approval from State Historic Preservation Office. Also prepared detailed cost estimates for each building's planned renovations using the Corps of Engineers MII cost estimating software.

Tecumseh River Pump Station SSO Area, City of Lansing-Public Service Dept., Lansing, Michigan—Staff Engineer reviewed and implemented I & I study recommendations for sanitary sewer system rehabilitation and repair. Prepared plans, details and specifications for selected trenchless and open-cut sewer repairs implemented. The project involves the rehabilitation of the sewer system to eliminate potential infiltration/inflow sources and minimize the frequency of sanitary sewer overflows and related basement backups. It also requires an evaluation of the system performance at the end of the construction to determine the effectiveness of the rehabilitation methods implemented. Construction phase involved the daily inspection and testing for sanitary sewer upgrades, storm drainage and road reconstruction including aggregate base courses, concrete curb, and HMA construction.

US Army Corps of Engineers, Soo Locks Master Plan, Sault Ste. Marie, Michigan—Design Engineer for future Soo Locks Canal Park development activities, specifically redesign and rehabilitation of parking lots, pier lighting upgrades, park lighting modernization, and landscape improvements. Principally in charge of preparing project plans and cost estimates for the four segmented project.

Project Team

Eric D. Brown
Senior Designer

Education.
BS, Building & Construction Management
Michigan State University, 1992

Years of Experience.
20

Background
Mr. Brown has 20 years of experience on a wide variety of civil engineering and architectural projects. As a Engineering Tech, he is responsible for the technical aspects of design, drafting and construction document preparation on a variety of civil/governmental/municipal projects working closely with the Project Manager. He is experienced in the preparation of drawings from surveyed field data showing topographical features, surface model creation, plan and profile generation depicting road and utility design, construction detail drawings and everything else required for project construction documents. Mr. Brown has been involved in subdivision plat, condominium docs, municipal utility, site plan, architectural, road design, streetscape and many other design projects. He has extensive knowledge and experience with AutoCAD 2010, AutoCAD Civ3D 2010, Microstation and Microsoft office products.

Related Experience
Highland Park Water System Improvements, Highland Park, Michigan—Prepared construction Documents for improvements to water distribution system and water treatment system in the city of Highland Park funded by Drinking Water Revolving Funds. Established base plans from aerial photography and survey to be used for design in project set.

Western Sub Interceptor, Genesee Co. Drain, Swartz Creek, Michigan—Developed design drawings for the construction of approximately 8.5 miles of 40" interceptor sewer for four municipalities throughout the county. Developed topographical feature drawings from survey information and collected field data using Landdesk 2004. Created plan and profile drawings depicting sanitary sewer layout design. Drafted complete set of plans for construction documents and assisted the county in establishing CAD drafting standards.

Watermain Project, Board of Water and Light, Bath, Michigan—Established existing topographical feature drawing from survey information. Developed plan and profile drawings depicting water main layout design. Drafted complete set of plans for construction documents.

Waverly Road Watermain Upgrade Project, Lansing, Michigan—Established digital terrain models using caice software from points collected from survey crew. Established full construction documents using AutoCAD including plan and profile drawing depicting project design. This was a waterman system upgrade project.

Glycol Collection System, Capital Region Airport Authority, Lansing, Michigan—Developed existing topographical drawing from surveyed and existing aerial map information. Developed construction plans including plan and profile drawings depicting existing utilities and design utilities.

Tecumseh River Pump Station SSO Area, City of Lansing-Public Service Dept., Lansing, Michigan—Plan preparation for sanitary sewer system rehabilitation and repair. Prepared construction documents including base plans, plan and profile plans for trenchless and open-cut sanitary sewer repair. The project involves the rehabilitation of the sewer system to eliminate potential infiltration/intflow (I/I) sources and minimize the frequency of sanitary sewer overflows (SSOs) and related basement backups.

Bath Township Sewer Master Plan, Southern Clinton County Municipal Utilities Authority, Michigan—Developed an AutoCAD master plan map of Bath Township sewer system from existing as-built information plans.

City of Lansing CMI Riverfront Project, Lansing, Michigan—Established construction documents for the design of the river trail and other project amenities between Michigan Ave. and Shiawassee Street along both sides of the Grand River in downtown Lansing. The project includes design and construction engineering for approximately 2,500 LFT of 14' to 20' wide river trail along with 4' retaining wall and elevated truss bridge section including outlook areas, landscaping and wetland areas.

Michael V. Liga, Ph.D., PE

Education.
Ph.D., Environmental Engineering & Science
Rice University, 2012

MS, Civil and Environmental Engineering
Rice University, 2009

BS, Agric. and Biosystems Engineering
University of Arizona, 2004

Years of Experience.
8

Related Experience

Rice University Department of Civil and Environmental Engineering, Houston, Texas

- Development of advanced oxidation processes using engineered nanomaterials for drinking water treatment with focus on human adenovirus inactivation
- Development of strategies to improve nanomaterial efficiency and elucidation of improvement mechanisms
- Reaction kinetic modeling
- Investigation of virus photocatalytic inactivation mechanisms using biochemical assays to probe protein and genetic damage (SDS-PAGE, PCR methods)
- Development of processes and protocols for evaluating the long term efficacy of antimicrobial surfaces. Troubleshooting and optimization of existing short-term assays for evaluating antimicrobial activity
- Development of nano-functionalized fabrics for trapping viruses in aqueous media
- Collaboration with other research groups / departments
- Operate and maintain biosafety level 2 lab equipment and protocols
- Authorship of technical publications and presentations
- Management, training, and supervision of undergraduate research assistants
- Ordering and inventory of laboratory supplies

Natural Resources Conservation Service, Salinas, California

- Planning, design, drafting, and construction inspection of water treatment and reuse systems, pressure and drainage pipelines, open channels, stormwater management systems, wastewater management systems
- Hydrological analysis
- Topographical surveying, land surface modeling, and cartography
- Construction site survey
- Resource management and planning for agricultural operations
- Consultation with regulatory agencies, property owners / operators and contractors
- Technical reporting and design presentation
- Operate in term environment

USDA Natural Resources Conservation Services, Tucson, Arizona

- Surveying, design, and inspection of pipelines, irrigation systems, and animal waste management systems
- Engineering calculation and report writing

Project Team

Daniel W. Bartlett, PE, CFM
Senior Engineer

Education.
BS, Civil Engineering
Michigan State University, 2002

Years of Experience.
14

Registration.
Professional Engineer, Michigan, No. 6201054092

Certification.
Certified Floodplain Manager (CFM), 2009 (no. US0904117)

Background
Dan joined ROWE in 1999 as a student survey field technician. He joined the firm as a full-time graduate engineer in 2002, was promoted to assistant project engineer in 2006, and to project engineer in 2008. In 2012, Dan was named associate (owner) and promoted to senior engineer. At ROWE, Dan is in charge of water modeling efforts, hydrology, and hydraulic studies for storm water, water, and sewer systems.

Related Experience
Water Reliability Study, City of Lapeer, Michigan—Prepared water model and reliability study update using WaterCAD. Incorporated recent and proposed improvements as well as changes in supply and demand. Included analysis comparing options between continuing to receive water from an existing regional authority, a new authority, and converting backup wells to production wells (ongoing).

Waste Water Treatment Plant Improvements, City of Lapeer, Michigan—Project engineer for design and construction of improvements to the wastewater treatment plant, which consist of the following: new bypass pumping station, replace existing Parshall flume, replace/upgrade raw water screw pumps, new grit removal system, replace various meters and pumps, refurbish final settling tanks, replace rotating weir structures in the oxidation ditches, refurbish sand filters, construct new phosphorous selector tank, replace influent gravity sewer pipe with larger pipe, replace existing water main, upgrade main electrical controls and equipment and install new SCADA system (2010).

Booster Station Design and Water Storage Analysis, Birch Run Township, Michigan—Utilized WaterCAD model of the township's system to design a new booster pump station for water supply. Developed options for providing water storage and recommended a location and height of an elevated storage tank to serve the township (2009).

Sanitary Sewer System, Green Oak Charter Township, Michigan—(Awarded 2005 Public Works Project of Year, Environmental Category, $2-$10 M Category, American Public Works Association): Design engineering for sanitary sewer system. Project included four large pump stations, several thousand feet of gravity and low pressure sewer and force mains ($6M construction; 2005).

Silver Lake Sanitary Sewer Study: Assisted with preparation of feasibility study report. Included evaluation of several different sewage collection systems and routes to serve approximately 170 lake parcels. Presented alternatives for gravity collection and grinder pump/low-pressure sewer systems. Report also included projected wastewater flows and cost estimates for each alternative sewage collection system (2004).

Water Reliability Study, Oxford Charter Township, Michigan—Revised previous water master plan based on current development and future developments. Analyzed current water usage based on development type (i.e., with or without irrigation systems) and projected future water consumption. Analyzed several distribution system improvements using WaterCAD software. The township's system features several supply wells with SCADA controls, storage facilities, and multiple pressure zones. Model utilized extended period simulations to analyze existing system performance and expected results from recommended improvements. Prepared comprehensive report outlining findings and recommended improvements. Held meetings with representatives from the Oakland County Water Resources Commissioner's office to illustrate the existing system performance and presented several different options for improving performance (2006).

Douglas A. Scott, PE, LEED®AP BD+C

Project Manager

Education.
BS, Civil Engineering
Michigan State University, 1992

Years of Experience.
21

Registration.
Professional Engineer, Michigan, No. 6201042673

Certification.
Leadership in Energy and Environmental Design (LEED®AP), 2008
LEED®AP Building Design and Construction, 2011
NCEES Board Certified, 2007 (no. 32412)

Background

Doug has 21 years of professional experience, focusing on project design and development for a variety of municipal and private clients. He joined ROWE as an assistant project engineer in 1995, was promoted to project engineer in 1997, was named an associate (owner) in 1998, and was promoted to project manager in 2001.

Design emphasis has been in water and wastewater, including design of well houses, water storage, water and wastewater pump stations, treatment plants, and municipal water and sewer projects. He has also served as project manager/engineer for numerous site development and redevelopment projects for institutional and commercial facilities. Doug has been involved in the design of many school, parks, and hospital site plans throughout Michigan. He has also managed a number of demolition projects ranging in size from single-family structures to large multi-story buildings.

Related Experience

Wastewater Treatment Plant Improvements, City of Lapeer, Michigan—Project engineer for design and construction of improvements to the wastewater treatment plant, which consist of the following: new bypass pumping station, replace existing Parshall flume, replace/upgrade raw water screw pumps, new grit removal system, replace various meters and pumps, refurbish final settling tanks, replace rotating weir structures in the oxidation ditches, refurbish sand filters, construct new phosphorous selector tank, replace influent gravity sewer pipe with larger pipe, replace existing water main, upgrade main electrical controls and equipment and install new SCADA system (2010).

Water Treatment Plant, City of Linden, Michigan—Project manager preparing construction documents for a new 1,350-gpm water treatment plant. Project involved selection of filtration equipment and complete design of treatment system including coordination of architectural, electrical and mechanical trades. Project included the design of a SCADA system to operate the city water system. Obtained an NPDES discharge permit for the backwash water. Construction administration and coordination of construction observation were also included (2005-09).

Back-Up Well System, City of Imlay City—The city receives water from the Detroit water system, but the MDEQ requires that the city have a back-up water source. The project involved expansion of an existing Type I water system, including a complete well house, new well, and connection to the public system. Additional amenities included variable frequency drives, a standby generator, and a control system to maintain constant pressure in the distribution system, in the event the elevated tank was out of service. Coordinated with the MDEQ through the permitting process (2007 design; 2008 construction).

2005 Water System Improvements, Village of Holly, Michigan—Project engineer for planning, design, and construction of major improvements to the water system (designed in 2005 and 2006; construction began in spring 2006 and was complete in summer 2007).

- New 1,000 gpm production well
- 500,000-gallon elevated storage tank
- Complete renovation and expansion of the water treatment plant, including the addition of three 10-foot-diameter filter vessels with automated backwash system, detention tank with discharge pump system, new service pumps, clearwell rehabilitation, and new electrical system, including standby generator with automatic transfer switch.
- Implementation of a new SCADA system for the water plant, including creation of a new high-pressure district.

Project Team

Jonathan H. Rick, PS, CFedS
Project Manager

Education.
BS, Surveying
Michigan Technological University, 2004

Registration.
Professional Surveyor, Michigan, No. 55562
Certified Federal Surveyor (CFedS), No. 1259

Years of Experience.
9

Background
Jonathan has been employed with ROWE since 2004, and has accumulated experience in the areas of topographic, ALTA, and cadastral PLSS surveys and Global Positioning System (GPS) surveys and control networks. He is responsible for overseeing the completion of survey projects in ROWE's corporate office.

Related Experience
Bay Area Water Treatment Plant, CDM Smith, Inc., Detroit, Michigan—Project surveyor for boundary, right-of-way, and topographic survey for the design of new 23 mgd water treatment plant and 20,000 lineal feet of 30-inch raw water transmission mains in Bay County, MI. Survey work was completed on an expedited schedule using multiple survey crews because of short design schedule. Base mapping and drawings were prepared for plant site and transmission main routes for use by designers (2013).

DWRF & SRF Project Plan, City of Flint, Michigan—Project surveyor for the development of project plan that met MDEQ requirements for potential funding (2009).

Federal Energy Regulatory Commission (FERC) Licensing Update Submittal, City of St. Louis, Missouri—Project surveyor for the licensing renewal submittal (recertification) to the FERC for the St. Louis Hydroelectric Dam (2011).

2010 Sanitary Sewer Replacement, City of Alma, Michigan—Project surveyor for the replacement of 24-inch sanitary sewer along the Pine River (2011).

2010 Summer Civil Design and Construction Administration, Central Michigan University, Mt. Pleasant, Michigan—Design, construction observation, and contract administration for three construction projects on campus: parking lot projects, IM field improvements, and water main directional drill (2010).

Gratiot Wind Farm, Aristeo, Gratiot County, Michigan—Project surveyor responsible for scheduling, calculations, data processing and QA/QC. The wind farm includes 132 proposed wind turbine sites in four townships. Project included topographic survey, civil design and construction staking of 56 intersection widenings and 10 rail road crossings along the haul routes (2011).

West Oakland Pipeline (Clarkston, MI) (Awarded 2013 Surveying Excellence Honorable Conceptor Award: American Council of Engineering Companies-Michigan), Consumers Energy, Clarkston, Michigan—Field project surveyor for six miles of gas pipeline. This very fast-paced project involved staking centerline, right-of-way determination, and temporary construction use areas for clearing and again for installation of a 36" pipeline. Project included approximately 2/3 mile horizontal drill and 5.33 miles of open cut ditch, as-built pipeline, monitor railroad tracks and overhead power tower, and sight topo survey. Assisted restoration crews with final site cleanup. Specific duties included attending daily project contractor meetings and biweekly project management meetings, scheduling field crews, processing and checking field data, assisting field crews when necessary, providing contractor assistance in ground cover checks, and assembling data for final project submittal (2009).

Appendix C

Project Resumes

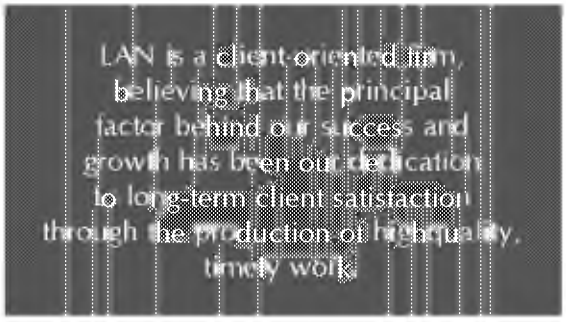
Water Treatment

Lockwood, Andrews & Newnam, Inc. (LAN)

LAN is a national engineering firm offering planning, engineering, and program management services. **LAN is consistently rated in the top 100 A/E firms by Engineering News-Record magazine.** As a subsidiary of Leo A Daly, one of the largest planning, architecture, engineering, and interior design firms in the United States, LAN has access to the expertise of more than 1,100 professionals in 25 offices in 21 cities worldwide.

Water System Engineering.

Water system engineering is the largest component of LAN's infrastructure practice and constitutes almost half of LAN's annual work. We have in-house capabilities in all aspects of water supply, transmission, distribution, and treatment.



Our approach to water system design and construction is to fully integrate all engineering disciplines, including civil, environmental, hydrologic/hydraulic, mechanical, electrical, instrumentation and controls, and structural for every project. Relying on this approach, we are able to take a program or project from feasibility studies and preliminary planning to construction and operation while providing program, project and construction management.

Water Treatment Expertise.

LAN has a reputation for designing facilities that are innovative, durable, convenient to operate and maintain, and are cost-effective throughout their life cycle. **Our expertise includes conventional and advanced treatment technologies.**

LAN has provided services for more than 30 water treatment projects throughout the US, ranging from 2- to 120-mgd. LAN has the capability and capacity to successfully complete every aspect of a water treatment project, from feasibility studies, all the way through facility start-up. Our in-house engineering design services include: process, civil, structural, hydraulic, chemical, mechanical/HVAC, and electrical.

Our project implementation services include: project management, progress scheduling, contract administration, on-site technical observation, start-up support, operational assistance, and operator training.

Regional WTP Filter & River Crossing Improvements
Gatesville Regional Water Supply System, Gatesville, Texas

LAN was authorized by the City of Gatesville to provide the design, bidding, construction administration, and construction observation services for a project to accomplish improvements and additions to the facility's existing filters at the regional water treatment plant. The existing filters were rated for 12.0-mgd and had been in service for more than 20 years without any significant improvements.

In particular, the design effort included the replacement of the dual media in each of the four existing filters along with the removal and replacement of the existing filter under drains, and the addition of two new dual media filters for a total filtering capacity of 16.0-mgd. New filter controls were also installed for both the existing and proposed filters. In addition, the existing surface wash system for the existing filters was removed and air scour added to the back wash cycle.

Moreover, the City of Gatesville requested that filter to waste capability be added to the existing filters, as well as in conjunction with the design of the new filters. Upon review of the existing pipe gallery, LAN discovered that there was no available space to install the piping required to facilitate the filter to waste provision, therefore, LAN proposed to utilize the existing backwash line, along with the backwash waste line, as a filter to waste, with a few piping modifications and the addition of one valve.

Project Information	
Original Construction Cost	$2,132,000
Final Construction Cost	$2,382,037
Change Orders	$250,036
Client Contact	Berry Mansell 254.986.8281

Red Bluff Water Treatment Plant Upgrades
Coastal Water Authority, Texas

LAN evaluated the existing water treatment plant to determine maximum capacity of each process unit and to establish a method to debottleneck the entire plant. It was determined that the plant flow could be increased utilizing the existing clarifier as long as additional filtration was provided. In addition process modifications were recommended. There was high variability of the raw water flow rate because the single loop PID controller varied the position of the raw water valve, based only on the level in the clearwell. Because of highly variable customer demand and a relatively small clearwell, the raw water flow rate varied over a wide range and short period of time, negatively impacting the stability of the lime softening process.

The PLC-based system allowed for the programming of a unique function that adjusted the raw water flow rate on a backward-looking rolling average flow, with duration and update time operator adjustable. This allowed for better utilization of the clearwell and dampens changes in raw water flow rate. The plants old relay-based master control panel (MCP) was replaced with a new PLC-based SCADA system which included a data historian.

LAN developed detailed drawings and specifications, and provided bid and construction phase services for implementing these upgrades.

Project Information	
Original Construction Cost	$2,478,729
Final Construction Cost	$2,451,463
Change Orders	($27,266)
Client Contact	Donald Ripley 713.658.1915

Davis WTP Filter Valve Replacement
City of Austin, Texas

LAN provided preliminary engineering, final design, and construction- and warranty-phase services for filter process improvements and valve replacements. LAN evaluated the filter infrastructure including piping, valves, actuators, pipe supports, surge/air release devices, wall penetrations, back-wash pumping and piping under drain systems, and recommended modifications to improve system maintainability and reliability. LAN provided the necessary electrical upgrades to the power, instrumentation and controls systems.

LAN completed the Preliminary Engineering Report (PER) that evaluated the existing filtering system and recommended modifications to enhance the treatment process. The PER presented the improvement options with associated estimated life-cycle and the construction costs of each option. The preliminary report required close coordination with the City staff so that timing of the proposed improvements could be properly dictated to the contractor. In addition, LAN worked closely with the Staff to make certain the proposed improvements and equipment was acceptable from an operation and maintenance standpoint.

LAN then prepared construction plans and specifications for the project, including the replacement of the old back-up backwash pump. Because of the tight nature of the working area, the construction documents had to be extremely thorough so that the bidding contractors properly understood the constraints. **As a result of the thorough design documents, the low bid came in at 20% below the Engineer's estimate.**

Services Provided: LAN then prepared construction plans and specifications for the project, including the replacement of the old back-up backwash pump. Because of the tight nature of the working area, the construction documents had to be extremely thorough so that the bidding contractors properly understood the constraints. As a result of the thorough design documents, the low bid came in at 20% below the Engineer's estimate.

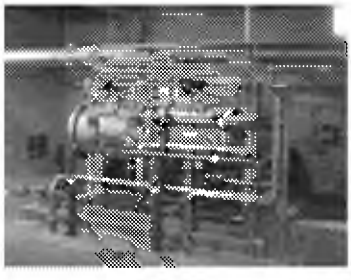
Project Information

Original Construction Cost	$4,875,000
Final Construction Cost	$5,073,391
Change Orders	$198,391
Client Contact	James King, PE 512.972.7194

Water Treatment Plant Study
Genesee County Drain Commissioner, Flint, Michigan

LAN was retained for the preparation of a preliminary design report for additional improvements to the Flint water treatment plant as part of the Lake Huron initiative. This preliminary engineering report outlined the additional requirements and improvements for water treatment plant continuous operation as opposed to the current standby status. Recommended improvements included the addition of lime sludge treatment and handling facilities, replacement of the low and high lift pumps and motors, standby power generators, UV disinfection, electrical and SCADA improvements, and additional chemical storage.

Due to decrease in population and subsequent reduction of water demands, the proposed improvements were based on an average day demand of 14-mgd, down from 20-mgd, and a maximum day demand of 28-mgd, down from 36-mgd. Each of the major project elements a described in the following sections.



Project Information

Original Construction Cost	$38,000
Final Construction Cost	$38,000
Change Orders	$0
Client Contact	Dave Jansen 810.732.7870

Bay County Water Treatment Plant
Saginaw-Midland Municipal Water Supply Corp. (SMMWSC), Michigan

The Saginaw-Midland Municipal Water Supply Corporation retained LAN to prepare a preliminary study for the feasibility of locating a 22-mgd surface water treatment plant (WTP) in the Bay Area to provide finished water to four potential municipal customers. The study included preliminary design of the WTP and associated water system facilities, evaluation of multiple WTP site options, and development of a detailed cost analysis.

Preliminary design of the WTP included:

- Verification of the design flow rate
- Development and evaluation of emergency water supply options
- Preliminary treatment plant design based on membrane technology
- WTP building layout and sizing
- Finished water storage
- High service pumping
- Routing of transmission mains
- Low service pumping and screening
- Membrane unit sizing, layout, and piping connections
- Chemical feed systems
- Clean-in-place (CIP) equipment, tanks, and chemical waste neutralization
- Backwash waste treatment and disposal
- CT analysis
- Disinfection options including chlorine feed and ultraviolet light

LAN evaluated seven potential WTP site options in terms of environmental and cultural factors, existing utilities and infrastructure, and technical considerations. In total, 24 categories were developed to analyze and score each site including items such as wetlands, site drainage, floodplains, soils, potential of site contamination, gas and electric service, sanitary service, site security, start-up of the WTP, operability, future growth, and integration with the existing water system. Various emergency water supply options were developed for each site including on-site raw water storage, off-site raw water storage, and/or utilization of a secondary intake. The evaluation categories were weighted in terms of importance and each site was assigned a non-monetary score. The non-monetary scores were then combined with the cost rankings to provide overall quantifiable rankings for all sites.

Project Information

Original Construction Cost	$75,000
Final Construction Cost	$75,000
Change Orders	$0
Client Contact	Mike Quinnell 989.684.2220

130-10273-000

Saginaw Midland Municipal Water Supply Corporation Water Treatment Plant

Saginaw Midland Municipal Water Supply Corporation (SMMWSC) retained LAN to prepare a preliminary study for the feasibility of locating a 22-MGD surface water treatment plant (WTP) in the Bay Area to provide finished water to four potential municipal customers. The study included preliminary design of the WTP and associated water system facilities, evaluation of multiple WTP site options, and development of a detailed cost analysis.

Preliminary Design of WTP and Associated Water System Facilities

Preliminary design of the WTP included verification of the design flow rate, development and evaluation of emergency water supply options, preliminary treatment plant design based on membrane technology, WTP building layout and sizing, finished water storage, high service pumping, and routing of transmission mains. In order to verify the design flow rate, LAN collected current and projected water supply minimum, average, and maximum daily demand and fire flow information. Potential connection points to the existing distribution system were analyzed and the minimum and maximum pressures at each point were determined. Preliminary design of the WTP included low service pumping and screening; membrane unit sizing, layout, and piping connections; chemical feed systems; clean-in-place (CIP) equipment, tanks, and chemical waste neutralization; backwash waste treatment and disposal; Ct analysis; and disinfection options including chlorine feed and ultraviolet light. Preliminary design was developed in accordance with state regulations and input was obtained from MDNRE review staff. The WTP building was sized to accommodate treatment equipment, pumps, chemical storage and feed systems, electrical equipment, staff workspace and offices, mechanical equipment, maintenance rooms, laboratory and employee facilities.

Preliminary Evaluation of WTP Site Options

LAN evaluated seven potential WTP site options in terms of environmental and cultural factors, existing utilities and infrastructure, and technical considerations. In total, 24 categories were developed to analyze and score each site including items such as wetlands, site drainage, floodplains, soils, potential of site contamination, gas and electric service, sanitary service, site security, start-up of the WTP, operability, future growth, and integration with the existing water system. Various emergency water supply options were developed for each site including on-site raw water storage, off-site raw water storage and/or utilization of a secondary intake. The evaluation categories were weighted in terms of importance and each site was assigned a non-monetary score. The non-monetary scores were then combined with the cost rankings to provide overall quantifiable rankings for all sites.

Detailed Cost Analysis

Cost estimates developed for each site included property acquisition, building construction, HVAC, building electrical, treatment equipment, pumping equipment, storage facilities, SCADA and controls, transmission mains, site development, access drives and parking, utility services, and improvements necessary to the existing water system. In addition to capital costs, operation and maintenance costs were evaluated for each site. Items such as existing staff time, required new staff time, chemicals, membrane maintenance costs, utility costs, communications, insurance, lab operations, training, and general facilities maintenance were factored into O&M costs. Present worth values were then calculated in a detailed cost analysis. As part of the report, user rates were estimated based on the project cost and expected financing. A rate structure was assumed with a fixed portion to cover debt service and variable cost based on volume of water used by the customer.

Untreated Water Supply Option

As part of the report LAN also evaluated a wholesale raw water customer option where the customer would be responsible for treatment. Connection to the existing raw water supply pipeline, routing of the new transmission main(s), metering, and secondary supply options were developed along with the associated costs.

170-10156-000
City of Lubbock WTP Assessment and Energy Audit

Lockwood, Andrews & Newnam, Inc. (LAN), in conjunction with Alan Plummer and Associates, completed a plant assessment and energy audit of the City's 80-mgd water treatment plant. The study was completed in early 2008, and LAN has begun design on Package 1 of 4 packages. Package 1 includes improvements to the flocculation, sedimentation and plant electrical systems. Package 2 will include backwash handling and disinfection improvements. Package 3 will include rapid mix and chemical system improvements. Package 4 will include terminal storage and administration building improvements.

Improvements selected by the City for implementation by LAN in the four packages include:

- Replace plant distribution switchgear with modifications to electrical service.
- Replace control building switchboard and distribution panels.
- Replace chemical building motor control center.
- Provide miscellaneous electrical, instrumentation, control, and SCADA improvements.
- Replace miscellaneous lighting systems with energy-efficient systems.
- Provide miscellaneous repairs to better seal building envelopes.
- Provide HVAC repairs and replacements with energy-efficient systems.

120-10793-000
Bell County WCID Water and Wastewater Master Plan

LAN was authorized by Bell County WCID No. 1 to complete a water and wastewater master plan that would represent an improvement and future development plan for the District, as well as its existing and future customers. In particular, LAN was responsible for baseline information collection, population and demand projection determination, and the wastewater master planning portion of the project. Specifically, the baseline data and information was used to develop population projections for the District over a 50-year planning horizon (2010 to 2060). Per capita water usage and population projections were determined based on planning information received from the District's customers, as well as available Texas Water Development Board (TWDB) data. The per capita usage information was subsequently applied to anticipated population estimates for each customer entity over the period of concern. This information was ultimately used to calculate the water demand projections that were utilized as the basis for the water master planning effort.

In terms of the wastewater-related portion of the master plan, LAN initiated its assessment by establishing the existing average and peak wastewater flows of each customer entity using available recorded daily plant flow data and monthly billing data provided by the District. Next, a dry weather period was defined using rainfall records obtained from the National Weather Service. By definition, recorded wastewater flows during this timeframe were assumed to be representative of the baseflow condition for each treatment plant, as any additional flows from Infiltration and Inflow (I&I) sources would be eliminated as a contributing factor. The dry weather base flow data was then used in conjunction with the available baseline population data to calculate the per capita wastewater flow for each customer entity.

The dilapidated condition of the wastewater collection system infrastructure owned and maintained by the customer entities had resulted in significant I&I contributions at the District's treatment plants; therefore, LAN also completed an analysis to quantify the respective I&I flows being received at each wastewater facility. This was accomplished through a multi-step process, which effectively involved establishing a dry weather base flow over four consecutive 12-month wet weather periods. Using the per capita wastewater flow calculated for each member entity, and subsequently, subtracting that from the District-recorded plant flows for the same periods, an average I&I contribution percentage was determined. To conclude its existing conditions evaluation, LAN also identified and prioritized a list of required improvements at each of the District's wastewater treatment facilities.

The remainder of the wastewater master planning effort focused on an analysis of future conditions. Specifically, the projected wastewater flow contributions anticipated for each plant through the year 2060

were determined by multiplying the projected population for each year within the planning horizon by the established per capita flow rate, in order to quantify the base flow rate for each year. The base flow was then multiplied by the average I&I percentage for the facility, and the I&I flow and base flow subsequently summed to determine to total projected wastewater flow for each facility in a given year. From this information, the 75- and 90% capacity thresholds, per the Texas Commission on Environmental Quality (TCEQ) Chapter 305 regulations, were identified for each plant. A similar process was repeated as a means of evaluating the District's ability to serve additional customer entities in the future, as well as the impact of such a service area increase on the need for future plant expansions.

Finally, LAN prepared detailed probable cost estimates for the recommended wastewater capital improvements. Specifically, the estimates developed summarized the projected capital costs anticipated to be incurred by the District in association with the improvement of the identified existing treatment plant deficiencies, required future expansions, and the recurring end of equipment life expenditures at each facility. The anticipated costs were then allocated and prioritized over multiple five-year CIP cycles for the duration of the planning horizon with the intent of facilitating and guiding the District's future budgeting and project allocation efforts.

120-10167-000

City of Beeville

The City of Beeville has continuously violated Haloacetic Acid (HAA) parameter of the Disinfection By-Products regulation of the Enhanced Surface Water Treatment Rule (ESWTR). That regulation sets a maximum limit of .06 mg/l on the concentration of HAA in drinking water. The Texas Commission on Environmental Quality (TCEQ) has directed the City to (1) cease these violations and (2) publicly notify their customers of the violations.

As part of their corrective action the City directed their engineer, Urban Engineers, to identify the cause of the high HAA level violations and recommend corrective action. Urban, recognizing LAN's expertise in water treatment matters, requested LAN assist them in identifying the cause of the high HAA levels and corrective action. The City produces drinking water at their Swinney Switch Water Treatment Plant (WTP). This plant is a surface water treatment plant located on the City's far east side. Water from this WTP is pumped to several pump stations located around the City for final distribution to local customers. Each pump station consists of at least one ground storage reservoir (GST) and a booster pump facility. Treated surface water is disinfected at the WTP using chloramines.

LAN's investigation noted the City only disinfects at the WTP. There were no supplemental disinfection facilities at the City's two pump stations. Since the chloramine disinfection concentration degrades with time, the City operators were compensating for that degradation by increasing the chloramine dosage level at the WTP. To maintain an acceptable minimum chloramine concentration at the farthest point in the water distribution system the WTP plant operators were increasing the chloramine dosage to a very high level, 5 mg/l or greater. That high a chloramine dosage level led to the formation of HAAs in the water distribution system. LAN proposed installing supplemental chloramine injection system at the City's pump stations. Once installed, the City could lower the initial chloramine dosage at the WTP. By operating their distribution system at a lower overall chloramine concentration level the City would be able to better control the formation of HAAs in the distribution system.

The cost of installing these chloramine booster injection systems was a major concern for the City. To reduce the cost of installing these systems, LAN approached this project somewhat differently than a standard design/bid project. First, LAN established a priority for installing the chloramine booster injection systems. That enabled the City to treat each installation as a completely separate system. LAN also worked with the City to identify tasks the City could complete with internal resources or existing "on-call" contracts. The technical specification prepared by LAN clearly stated tasks with the responsible party (contractor or City). That allowed the City to directly solicit cost proposals, greatly reducing the City's administrative costs on this project.

As a result of this project the City was able to reduce the concentration of HAAs in the water distribution system to allowable levels. As an added benefit, the City was able reduce its WTP operating costs because less chemicals are being used since the overall chloramine concentration in the treated drinking water is lower.

130-10215-000
Coastal Water Authority (CWA) Strategic Studies (Overall Description)

The Coastal Water Authority owns and/or operates a number of facilities to provide water to industrial and municipal customers, including the City of Houston. The major facilities include: the Trinity River Pump Station and main transfer canal (including major turnout), the Lynchburg Reservoir and pump station (which provides water through three large transmission mains), the Lake Houston dam, pump station, and West Canal (which provide water to numerous customers, including the City of Houston (EWPP) and an industrial process water treatment plant near the Houston ship channel.

Task 117 – Red Bluff Water Treatment Plant Upgrade
The Coastal Water Authority (CWA) owns and operates an industrial process water treatment plant on Red Bluff Road in Pasadena, TX (Red Bluff WTP). This facility utilizes the cold lime softening process followed by gravity filtration to provide the required quality of water to their customers. The equipment at this facility is more than 30 years old and some systems are in need of improvement or replacement. The standards for the process water have also recently been changed, resulting in a requirement for improved process control and for additional analytical testing and data reporting.

Lockwood, Andrews, & Newnam, Inc. (LAN) was retained to provide a preliminary engineering report (PER), detailed design, and bid/construction phase services for the improvements to achieve the goals of this project. This project includes the following improvements and replacements: a new gravity filter for process water; three replacement gravity filters for process water; a new sodium hypochlorite feed system to replace the existing gas chlorine system (to remove the component of risk management from this facility); a completely new SCADA system to replace the timer and relay driven master control panel – one to control not only the new components, but all existing components as well; and replacement of various system components (such as level transmitters and flow meters) that are no longer functioning and/or are obsolete.

The SCADA system was designed in coordination with Mbroh Engineering, Inc. (Mbroh). While LAN developed the majority of the control narratives during the PER phase, Mbroh took those control narratives and designed the SCADA system required to implement those strategies. Mbroh developed all instrumentation drawings, including wiring to all field devices, the PLC architecture, P&ID drawings for the new and/or replacement equipment, and the overall SCADA system architecture.
This project is presently in the bid phase and it is anticipated that the project will be completed by the end of 2010.

Task 471 – Lake Houston Pump Station, Water Intrusion Project
LAN conducted a site visit to investigate source(s) of moisture intrusion at the Lake Houston Pump Station and identify remedial action(s). LAN reviewed the findings and recommendations in Binkley & Barfield Report, Moreno Engineering Report, Molina Walker Architects Report and Blast, Inc. Report, and observation and investigations for possible other problems and potential solutions. LAN also prepared recommendations for maintenance and repairs for CWA approval. LAN is to prepare plans and specifications and Option of Probable Costs for CWA approval, assist CWA in the bid or proposal phase activities, provide construction phase observation and contract administration services and coordinate all project closeout activities and warranty activities.

130-10120-000
City Of Houston Groundwater Treatment Plant(s)

The City of Houston contracted Lockwood, Andrews & Newnam, Inc. (LAN) to provide professional engineering services for improvements at the City's groundwater treatment plants. The City is currently transitioning from groundwater to surface water and the plants are being repurposed for surface water distribution with groundwater as a backup. The project, currently underway, is organized into two phases. Under the completed Phase 1, LAN provided recommendations and professional services, including preliminary design documents for various improvements at ten groundwater plants. This included modification of chemical feed systems, addition of booster pumps, modification and replacement of electrical systems, addition of instrumentation, drainage improvements and driveway access.

Under Phase 2, LAN is currently providing preliminary and final design documents for the recommended improvements at five groundwater plants for the City. This includes modification of chemical feed systems, replacement of valve actuators, addition of booster pumps (1200 HP, 4160 V), replacement and rehabilitation of electrical systems including switchgear and motor control center replacement, replacement and programming of control system PLCs, reconfiguration of the SCADA system HMI for the associated changes, additional instrumentation, drainage improvements and driveway access.
Planning for the replacement of the switchgear at one of the sites is extremely critical as the plant supplies potable water to approximately one quarter of the City and cannot be out of service for more than a few hours.

A subsequent project will perform the modifications and upgrades at the remaining five plants in the report generated in phase 1.

Mbroh Engineering, Inc. (MEI) serves as a minority subconsultant on the project assisting LAN with electrical power and instrumentation design.

120-10965-000

Surface Water System Hydraulic Analysis & Transient Modeling — City of Sugar Land, TX

LAN was retained to perform a hydraulic analysis and transient modeling services related to the City's proposed surface water transmission main system, which included a 22 MGD Surface Water Treatment Plant (SWTP) and transmission waterlines ranging in diameter from 16- to 36-inches.

Hydraulic Analysis
To assist the City's SWTP design engineer in pump selection, LAN developed system head curves, referred to as the transmission main dynamic head curves in this study, for the proposed surface water transmission system were developed from the fence line of the SWTP finished water pump station to the fence line of the existing groundwater plant facilities that will be used as surface water re-pump stations.

LAN created an EPANet hydraulic model of the City's proposed surface water transmission system to develop system curves. Fort Bend County LIDAR (elevation) data was used for estimating the transmission main elevations in the model. Since the surface water system was being design by three separate design firms – SWTP engineer, transmission waterline engineer, and surface water re-pump station engineer - elevation datums provided were compared and adjusted as necessary to perform the analysis on a consist basis.

The proposed surface water system is being constructed in two 11 MGD Phases – Phases I and II. Hydraulic analyses for the Phase I and Phase II surface water transmission system were developed based on flow operating scenarios provided by the City. Eight transmission main dynamic head curves were developed for all the operating scenarios to demonstrate the full range of transmission main dynamic head curves for the surface water transmission system.

Each transmission main dynamic head curve was developed by varying demands in maximum increments of 1,000 gpm. The flows to each groundwater plant were kept proportional based on the projected flows for each operating scenario when developing the transmission main dynamic head curves. A total of approximately 90 hydraulic model scenarios were analyzed for the various operating scenarios. All the transmission main dynamic head curves developed assume a minimum pressure of 30 psi at any groundwater plant fence line based on information provided the surface water re-pump station engineer. The minimum pressure of 30 psi is required at the fence line of each groundwater plant to account for head loss through yard piping, valves, metering station, and filling of ground storage tanks at the groundwater plants.

A transmission main dynamic head curve for each operating scenario was developed for the following three system conditions:

1. A pipeline C-value of 145
2. A pipeline C-value of 120
3. A pipeline C-value of 100

Based on the results of the surface water transmission system hydraulic analysis, the hydraulic grade line at the SWTP fence line required to meet the system flow requirements for the Phase I and Phase II scenario and provide the minimum of 30 psi at the groundwater fence lines for each of the scenarios.

Surface Water Treatment Plant Transient Analysis

LAN developed a detailed transient analysis model, utilizing the Liquid Transient (LIQT) software, of the City of Sugar Land's proposed Surface Water Treatment Plant (SWTP) finished water pump station from the ground storage tanks to the discharge piping header in order to determine closing and opening times for the pump control valves. The transient modeling included analysis of the worst case emergency conditions to determine if the type and location of surge protection devices within the SWTP are adequate for the treatment plant system. LAN worked with the SWTP design engineer to collect data related to the design and operation of the SWTP.

Using the data collected, the transient was developed for the SWTP to include:

- Suction side header and branch piping between the pumps and ground storage tanks
- All pumps and control valves
- Discharge branch and header piping

To analyze the system, hydraulic boundary conditions were developed to represent the flow to the various take-points. To protect the SWTP against the worst case transient conditions analyses were performed for the Phase II maximum firm pumping capacity of the SWTP.

Four scenarios were modeled for this study:

1. Normal pump start-up
2. Normal pump shutdown
3. Emergency shutdown - all SWTP pumps running and all failing simultaneously (i.e., total pump station power failure) [assumes firm pumping capacity]
4. Partial power failure – failure of one pump while remaining pumps continue to run [Assumes all pumps are the same size. If not, failure of the largest running pump will be considered.]

Based on the analyses results, valve closing and opening times for the control valves at the SWTP were recommended. Results were also used to determine the recommendations for minimizing positive (up-surge) and negative (down-surge) transient pressure occurrences at the SWTP, including the size and location of air vacuum valves and modifications to plant operational procedures. Analysis results were also used to illustrate there was no need for surge anticipator valves for the unique system providing cost savings to the City.

Transmission Waterline Transient Analysis

LAN developed a transient analysis model of the City of Sugar Land's proposed transmission main system from the Surface Water Treatment Plant (SWTP) finished water pump station to the ground storage tanks at the system take-points. The primary purpose of this transient modeling was to analyze the worst case conditions to determine the type and location of surge protection devices along the transmission mains to the Lakeview and First Colony No. 1 pump stations and at the surface water metering station (metering station). Analyses considered the Phase I and Phase II design flows. Although the SWTP was not modeled in as much detailed in these analyses as in the SWTP specific transient analyses, information from the SWTP analyses will be used as a basis for the transmission system.

LAN performed analyses to determine the minimum closure time of the flow control valve at the metering station to prevent high pressure surges from occurring in the transmission mains. LAN also recommended the type, size and location for air valves along the proposed transmission mains to protect the mains against worst case transient conditions and to fill and empty the mains.

The scenarios modeled included:

1. Emergency Pump Shutdown – Emergency shutdown of all SWTP pumps running and all failing simultaneously (i.e., total pump station power failure).
2. Normal Flow Control Valve Closure – Normal closure of the flow control valve at the Lakeview Water Plant metering station.
3. Emergency Flow Control Valve Closure – Emergency closure of the flow control valve at the Lakeview Water Plant metering station.

155-00543-037

Dallas Water Utilities

LAN provided engineering services for Dallas Water Utilities to determine the appropriate facilities required to provide sludge handling and disposal and to design these facilities located at the East Side Water Treatment Plant. The East Side Water Treatment Plant has a treatment capacity of 400 million gallons per day (mgd) with an ultimate capacity of approximately 750 mgd. Raw water for the plant is provided by two reservoirs located north and east of the plant. The project goals to be addressed by LAN include providing on-site sludge disposal facilities with a minimum life span of 15 years and providing for a "zero" discharge of the process waters, recycling them back to head of the plant.

The Technical Memorandum prepared by LAN recommended that the sludge collected in the sedimentation basins be drained to a new sludge pump station, then pumped to the new sludge lagoons. The sludge lagoons consist of five cells located on approximately 80 acres south of the plant and have a total storage capacity of over 64 million cubic feet. This volume will provide well over 25 years of storage capacity for the treatment plant. Water flows from one lagoon to the next through a series of overflow weirs, then flows into an overflow structure in the fifth lagoon and drains back to the forebay at the head of the plant.

The filter backwash water will drain to a new 150-foot-diameter clarifier allowing for the fines to settle out through a continuous draw-off system and draining to the new sludge pump station. The effluent from the clarifier will flow into the existing sludge pump station, then will be pumped back to the forebay area utilizing the existing pumps. An overflow pump station was constructed adjacent to the new sludge pump station providing redundancy for both the new sludge pump station and the existing pump station ensuring a zero discharge system. The overflow pump station and sludge pump station will be wet wells utilizing submersible pumps and will have capacities of approximately 24 mgd and 18 mgd, respectively.
LAN also provided instrumentation design allowing for remote operations of all new facilities as required, as well as automation of the periodic draining of the sedimentation basins. Construction cost was estimated to be approximately $7.6 million. LAN provided a Technical Memorandum, design phase services, construction phase services, and start-up and operations assistance.

110-02041-001 (120-02041-001)

City of Houston's East Water Purification Plant #3

LAN provided construction management assistance for replacing the existing plant control system hardware at the City of Houston's East Water Purification Plant #3. The project included new PLC-based process control units with redundant communication links, workstations that maintain real time and historical databases of all processes in the process control units, and chemical feed control panels. The redundant plant control system workstations and non-redundant process control units monitor control the water plant's chemical feed system, filters, transfer pumps, and other unit processes. Additional work included the installation of new instrumentation, control valves, sample lines, conduit, wire, fiber optics equipment and related equipment for a complete functional plant control system.

LAN teamed with ESPA and Thompson Professional Group to provide extensive evaluations of the East Water Purification Plant that serves a large portion of the City of Houston. LAN's unique contribution to the team is the knowledge of modeling piping systems and the identification of the impact that different operational scenarios can make to system performance and cost. LAN provided the following services.

Hydraulic Analysis to:

1. Determine appropriate electrical power cost
2. Support review of existing operating conditions and establish new operation conditions
3. Support investigation of flow control alternatives (i.e., VFDs, control valves) and
4. Support investigation of pumping combinations to meet different system conditions and operate the three pumps to achieve maximum efficiency.
5. Compare and correlate operation of high service pumps to total plant electrical power cost using historic data to establish typical average and peak day operation.
6. Perform analysis to select a combination of pumps that achieves the best possible efficiency/power cost for assumed boundary conditions of tank level, discharge pressure and water demand.

7. Establish proper criteria to determine appropriate suction line, header, and cross over size. For example, average velocity, maximum velocity, CT, allowable headloss/suction head required at pump inlet, operation during emergency conditions, etc.
8. Simulate selected size(s) and arrangement of discharge header and associated piping to confirm satisfactory operation for the range of average day, peak day and emergency conditions anticipated. Identify bypass alternatives during various phases of construction. Include possibility of prolonged plant shut down.

Develop physical details of surge model for EWPP #1&2 and EWPP #3 including proposed improvements. Model included individual storage tanks, interconnecting piping, suction mains and headers, pumps with their control valves, existing and proposed surge protection devices, discharge headers and appropriate lengths of transmission mains.

Based on the proposed future operating conditions, identify possible causes of undesirable transients. Consider temporary conditions due to normal maintenance procedures that may increase probability or severity of transients.

The project included the study, design and construction of the pump station upgrade. LAN's role included the preliminary engineering, design engineering, architectural design, and construction management. LAN's unique contribution to the team is the knowledge of modeling piping systems and the identification of the impact that different operations scenarios can make to system performance and operations cost.

The hydraulic analyses provided valuable insight to the design team for reducing and managing operations cost for the facility. The analysis considered: existing operation conditions and established new operation conditions; investigation of flow control alternatives (i.e., VFDs, controls valves, etc.); evaluation of pumping combinations to meet different system conditions and operate the three pumps to achieve maximum efficiency; compare and correlate operation of high service pumps to total plant electrical power cost; and simulation of selected size(s) and arrangements of discharge header and associated piping to confirm satisfactory operation for the range of average day, peak day and emergency conditions anticipated.

Upon design completion, LAN provided construction management assistance, including a resident inspector, for the project. The construction management included installation of new PLC-based process control units with redundant communication links, workstations that maintain real time and historical databases of all processes in the process control units, and chemical feed control Panels. The redundant plant control system workstations and non-redundant process control units monitor and control the water plant's chemical feed system, filters, transfer pumps, and other unit processes. Additional work included the installation of new instrumentation, control valves, sample lines, conduit, wire, fiber optics equipment and related equipment for a complete functional plant control system. LAN also provided hydraulic modeling analysis, surge modeling, and a water quality analysis.

Water Quality Analysis

With the expansion of the City of Houston's surface water treatment capacity, the likelihood of mixing relatively hard ground water with soft surface water became a concern. As this mixing zone shifted due to water demand, industrial, commercial and residential customers would experience changing water quality. As part of the East Water Purification Plant Project, LAN conducted a water quality analysis to determine the extent of this problem. The analysis included determining the quality of both surface water sources and ground water sources; application of the Rynar and Langelier indexes to predict stability and the development of possible controls. The water quality analysis also addressed the effect of this mixing on disinfection.

Value Engineering Study of the East Water Purification Plant Reliability Improvements and Studies was also done to Increase Plant Capacity to 350 mgd.

120-01821-005

WCID No. 2, the City of Missouri City, and the City of Sugar Land for a Surface Water Treatment

LAN was contracted to help in the development of a preliminary study of the requirements and options available to WCID No. 2, the City of Missouri City, and the City of Sugar Land for a surface water treatment plant to serve three cities' conversion from ground water to surface water. The effort was divided into five parts.

The initial part of this study involved collection of data and other studies and reports that relate to the existing and future water demand and impacts on the regional surface water supply. As part of this effort LAN included other efforts undertaken in Fort Bend County to examine surface water options and availabilities. Concurrent with that effort, under part two of this project, LAN updated the existing development and projected population growth and corresponding water usage within the service area. This effort was based on data provided by participants for desired service areas.

The third part of this project involved the development of preliminary costs for a projected surface water treatment plant. In developing those costs LAN worked to examine potential plant and raw water collection sites, transmission costs for raw and finished water, and construction and operational and maintenance costs for different treatment plant processes and configurations. The analysis considered a range of plant capacities in order to determine whether a certain capacity or phased construction was the most cost effective for the situation. Unit costs were developed based on full capacity of the plant.

LAN included an analysis of the current and projected legislative and regulatory issues pertinent to a surface water treatment plant. In this part of the study LAN also examined environmental concerns and the impact of locating such a plant within the City's current and future boundaries. This investigation applied to the plant site as well as required conveyance facilities.

In concluding this report LAN, presented a summary of the alternatives available to the City. The presentation highlighted economic, environmental, as well as political impacts of the alternatives examined. Financial implications of the various alternatives were also presented with this summary.

156-02303-001

Mt. Carmel Water Plant

LAN provided architectural and mechanical/electrical/piping design support for the Mt. Carmel Water Plant, a 40 million gallon per day facility. This project replaced the existing chemical storage and feed equipment. Key design elements included chemical storage/feed and chlorine storage/feed buildings, an alum storage area, a demineralized water system, and improvements to various chemical injection points throughout the plant.

The new buildings provided improved storage areas, updated chemical feed equipment, integration of the chemical feed systems into the plant SCADA system, an improved electrical/control room, and equipment storage space. With the new chlorine storage/feed building, the plant has enclosed storage for all chlorine cylinders. The chlorine feed system was also converted from a pressure system to a safer vacuum feed system. Both buildings were designed to blend with the existing plant structures.

As part of this project, LAN examined the existing chemical injection points to determine whether the existing locations were at the optimum points in the plant. As a result of this examination, several chemical injection points were relocated to improve chemical residence times and mixing. These relocations not only increased the effectiveness of the chemicals from a treatment aspect, but also improved chemical use efficiency.

The City of Waco requested a compressed timeline, and LAN was able to quickly complete the design enabling construction to be completed on schedule.

130-01852-001

Brazos Bend Water Authority Planning Study

LAN provided engineering services to the Brazos Bend Water Authority for a regional water supply and wastewater treatment plan. The Authority had been authorized to develop surface water supplies and wastewater treatment and disposal for a large portion of Brazoria and Fort Bend Counties comprised of the Cities of Pearland, Manvel, Brookside Village and Missouri City and their extraterritorial jurisdictions. Planning assistance was obtained from the Texas Water Development Board in the nature of a grant for half the plan cost and a loan for the matching local share. Based on population projections for a 50-year planning horizon, the study evaluated existing groundwater supplies and limitations, and investigated potential surface water resources.

The recommended plan provided estimated costs per 1000 gallons and included the cost of water, capital and operating costs, and supply, treatment and delivery system costs. The results of the study for the 150-square-mile service area recommended two water treatment plants with a total capacity of 30 mgd. The regional plan also recommended construction of more than 75 miles of water transmission mains varying in diameter from 8 to 36 inches. The estimated construction costs for the regional water plants and distribution facilities were approximately $120 million. The wastewater portion of the study recommended a single treatment plant with an ultimate capacity of 18.25 mgd. The planned collection facilities consisted of gravity sewer system varying in diameter from 12 to 48 inches, with in-line lift stations as required to limit depth. The proposed $115 million wastewater construction project included a phasing plan for the incremental construction of the plant and collection facilities as required to meet customer demand.

It was originally planned that the Authority would eventually provide wholesale services to the local municipalities and utility districts, thereby achieving efficient economical regional operations. As a result of this initial planning effort, LAN has since been selected by the City of Missouri City for planning and design of new collection and treatment facilities required for the consolidation of the numerous in-city Municipal Utility Districts and their associated facilities.

160-10405-000

Gatesville Regional Water Supply

The Gatesville Regional Water Supply system with a capacity of 12 MGD provides treated water to the City of Gatesville (City), Flat WSC, The Grove WSC, Fort Gates WSC, Mountain WSC, Coryell City WSD, Texas Department of Criminal Justice, and the United States Army at North Fort Hood. The regional system is comprised of a raw water intake at Belton Lake in Bell County, Texas, 12 million gallon per day (MGD) surface water treatment plant, high service pump station, three booster pump stations, and four ground storage tanks.

Lockwood, Andrews, & Newnam, Inc. (LAN) was authorized by the City to provide the design, construction administration, and construction observation for improvements and additions to the existing filters at the Gatesville Regional Water Treatment Plant. The existing filters are rated for 12 MGD and have been in service over 20 years without any significant improvements. The improvements included replacement of the dual media in each of the four existing filters along with removal and replacement of the existing underdrains and the addition of two new dual media filters for a total filtering capacity of 16 MGD. New filter controls will be installed for both the existing filters and the proposed filters. The existing surface wash system for the existing filters will be removed while air scour was added to the back wash cycle. The project also included a blower bldg along with blowers for the air scour and valve rehabilitation of the existing valves.

The City of Gatesville requested that filter to waste be added to the existing filters along with including it in the design of the new filters. Upon review of the existing pipe gallery it was discovered that there was not available space to install piping to allow the filter to waste. LAN proposed to utilize the existing backwash line along with the backwash waste line as a filter to waste with a few piping modifications and the addition

of one valve. This allows the city to operate in their preferred manner without significant costs or upgrades.

The additional capacity along with the improvements of the existing filters will ensure the City of Gatesville and the surrounding areas have potable water over the next 20 years without any significant capital expenditures.

120-01752-030

Surface Water Treatment Plant Options, Sugar Land, Texas

The City of Sugar Land engaged LAN to prepare a preliminary study of the requirements and options available for a surface water treatment plant to serve the city's conversion from groundwater to surface water. LAN previously completed a water master plan in 1996, an update of that plan in 2000, and a model of the city's existing water system production (groundwater), storage, and distribution. With this study LAN expanded upon that work to refine future water requirements as well as identify surface water options. The study area encompassed four master planned development communities, four state-owned land tracts, and six municipal utility districts not in the city's extra-territorial jurisdiction, but within a reasonable service area for a city operated water plant.

LAN organized this effort into five distinct parts:

- Collection and review of related data and studies
- Updating the current and future development projections
- Development of preliminary costs
- Analysis of the current and projected legislative and regulatory issues including environmental concerns
- Summary of the alternatives, highlighting economic, environmental, as well as political impacts

EXHIBIT 6

From: Busch, Stephen (DEQ)
Sent: Wednesday, April 23, 2014 11:09 AM
To: Wurfel, Brad (DEQ)
Cc: Shekter Smith, Liane (DEQ);Benzie, Richard (DEQ);Prysby, Mike (DEQ)
Subject: RE: Flint

Brad,

Here are some talking points:

- The City of Flint is going beyond minimum public health standard requirements to provide drinking water at a level of service meeting its customers' expectations (softening and ozone treatment to address taste and odor).

- While the Department is satisfied with the City's ability to treat water from the Flint River, the Department looks forward to the long term solution of continued operation of the City of Flint WTP using water from the KWA as a more consistent and higher quality source water.

- This is not a one time review. The Department will continue to oversee compliance by the City of Flint with all requirements under the Safe Drinking Water Act and monitor its operations in the same manner it does for the over 1400 community water systems throughout the State of Michigan.

- We support the City's commitment to enhance capital improvement work within its water distribution system, and not just here at the water treatment plant.

How is this for a start?

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

From: Wurfel, Brad (DEQ)
Sent: Monday, April 21, 2014 11:09 AM
To: Busch, Stephen (DEQ)
Subject: Re: Flint

Half a dozen key talking points would e great.

Sent from my iPhone

On Apr 21, 2014, at 10:29 AM, "Busch, Stephen (DEQ)" <BUSCHS@michigan.gov> wrote:

> Brad,
>
> Given that Flint is expected to complete work on the WTP and potentially change over from Detroit later this week, should we prepare a response statement from the DEQ in preparation for this event?

Obviously Flint is going to have a press release and invite media in as it's historic for them, but I know we are going to get questions.

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

EXHIBIT 7

From: Dempkowski, Angela (Treasury)
Sent: Tuesday, March 18, 2014 3:43 PM
To: Workman, Wayne (TREASURY)
Subject: One Resolution for Approval - EME1982014
Attachments: EME1982014.PDF

Importance: High

Please approve

Angela Dempkowski
Senior Executive Management Assistant
Michigan Department of Treasury
dempkowskia@michigan.gov
(517) 373-4415

From: Cline, Richard (Treasury)
Sent: Tuesday, March 18, 2014 3:27 PM
To: Dempkowski, Angela (Treasury)
Cc: Byrne, Randall (Treasury)
Subject: Modified - One Resolution for Approval - EME1982014
Importance: High

Angela,

I have reviewed the following resolution:

EME1982014 - Resolution to Zito Construction for Initial Watermain Cut-In @ the Water Plant - $676,300.00 (Water Fund)

The recommended vendor was the only submission to the City's request for bid. Typically, I have concerns about awarding bids to only one bidder.

However, the City has a very aggressive timeline in order to meet an April completion date before losing service from DWSD. The City also stated that they held multiple meetings to encourage maximum vendor participation, however, this aggressive timeline may have impacted the number of bids received.

This resolution does appear to conform with Section 12 (3) of PA 436 as it exceeds $50,000 in value and was competitively bid. Also, per the same section, the City is not requesting the State Treasurer to issue an exemption from this section.

The City also appears confident that this contract can execute the requested work.

Given the aggressive timeline, I am, therefore, recommending approval of this resolution.

Eric Cline | Unit Operations Specialist - Office of Fiscal Responsibility
State of Michigan | Michigan Department of Treasury
430 W. Allegan Street, 3rd Floor | Lansing, MI 48922
(517) 335-2078 | cliner1@michigan.gov

From: Dempkowski, Angela (Treasury)
Sent: Tuesday, March 18, 2014 9:43 AM
To: Cline, Richard (Treasury)
Subject: FW: One Resolution for Approval - EME1982014

Angela Dempkowski
Senior Executive Management Assistant
Michigan Department of Treasury
dempkowskia@michigan.gov
(517) 373-4415

From: Maxine Murray [mailto:mmurray@cityofflint.com]
Sent: Monday, March 17, 2014 11:37 AM
To: Dempkowski, Angela (Treasury)
Subject: One Resolution for Approval - EME1982014

Good morning Angela,

I am submitting the following resolution for State approval:

EME1982014 - Resolution to Zito Construction for Initial Watermain Cut-In @ the Water Plant - $676,300.00 (Water Fund)

Please see the attached.

Thank you.

--
Maxine Murray
Executive Assistant to
Mayor Dayne Walling
Darnell Earley, Emergency Manager
1101 S. Saginaw Street
Flint, MI 48502
810.237.2035 Telephone
810.766.7218 Fax

EXHIBIT 8

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

In re: FLINT WATER CASES	Civil Action No. 5:16-cv-10444-JEL-MKM (consolidated) Hon. Judith E. Levy Mag. Mona K. Majzoub
Jennifer Mason, et al., Plaintiffs, vs. Lockwood, Andrews & Newman, PC, et al., Defendants.	STATE OF MICHIGAN IN THE CIRCUIT COURT FOR THE COUNTY OF GENESEE Case No. 17-108646-NO Case No. 16-106150-NM Hon. Joseph J. Farah

HIGHLY CONFIDENTIAL

VIDEOTAPED DEPOSITION OF WARREN GREEN

VOLUME I

Thursday, June 25, 2020

at 9:00 a.m.

Taken at: LAN
One Oakbrook Terrace, Suite 300
Oakbrook Terrace, Illinois 60181

REPORTED BY: SARA S. CLARK, RMR/CRR

GOLKOW LITIGATION SERVICES

877.370.3377 ph | 917.591.5672 fax

deps@golkow.com

we do things in Michigan."

Q. Okay. Was there any further discussion about corrosion control at the June 26th, 2013 meeting other than what you've just told us, sir?

A. There -- after the meeting, I approached Daugherty Johnson with the City of Flint. I refer to him as Duffy. That's how I know him.

I went up to Duffy and said, "Duffy, we need to revisit this corrosion control issue." And Duffy's response was something to the effect of, "Well, we dodged a bullet on that one." And he said, "I have been told that we are not going to do anything that the MDEQ doesn't require us to do."

And that statement stuck out -- or sticks out in my mind to this day, because literally, almost one month before in May in a meeting with Ed Kurtz, Ed Kurtz, the emergency manager, told me the same thing.

Q. Did either Mr. Kurtz or Duffy Johnson tell you why they were not going to do anything that DEQ did not require?

MR. BAJOKA: Objection as to form.

Q. You can answer, sir.

A. No, they did not tell me why.
Q. Did you have an impression as to why?
MR. GAMBILL: Object to form.
A. They didn't want to spend --
Q. Mr. Gambill is objecting, but you can answer, sir.
A. Didn't want to spend the money.
Q. Was it your belief that that was an ongoing theme with the Flint Water Treatment project, sir, that they did not want to spend the money?
MR. BAJOKA: Objection; form and foundation.
Q. You can answer, sir.
A. They were definitely controlling the budget. Let me put it that way.
Q. And were there other times where you saw them controlling the budget, as you say, sir, by cutting back on scope of work that LAN was asked to perform initially?
A. Yes, sir.
Q. Can you give me some examples, please, sir?
A. I'm going to need to kind of describe a

situation to you, and then I'll get to your question. Is that okay, sir?

Q. That's fine, sir. Thank you.

A. We started operating the water plant in July of 2013, put the plant through a test run to see how it would perform. And at that time, the purpose of that test run was to make sure the plant operated fine from a treatment perspective and a hydraulic perspective.

The plant was in such a stage of disrepair, could not really treat water, so the City terminated the plant run early. We had determined the hydraulic data. The plant performed flawlessly from a hydraulic point of view.

And after that test run, in the month of August of 2013, there was a series of meetings held. And we outlined some specific improvements that the City should attempt to get done in the next year, but they also needed to fix portions of the water plant.

The major portions that needed to be repaired were the east softening clarifier, the ozone system, and the SCADA system.

Q. Can you just tell us, what does SCADA stand for, sir?

A. System control and data acquisition. And it's kind of a monitoring system for the plant. And you can do some control, but usually it's for monitoring.

At a meeting, I think it was August -- I don't remember the date, late August, we met at the plant, City, MDEQ, LAN. And at that meeting, LAN's scope was really narrowed and reduced. We were no longer serving as a treatment advisor, but we were assigned some specific projects to perform. And at that point in time, the City assumed responsibility for getting the plant fixed and ready to run. MDEQ provided some design information, and then we were given these specific design elements for us to work on.

I really wanted to be involved in that other work. I was asking for that other work. It's the kind of work that I enjoy. Over the course of my career, I like to work in older facilities and bring them back to life, so to speak.

So that was one where our scope got

focused and narrowed. The City took on correcting the clarifier, fixing the ozone system, and then doing the SCADA system in-house with their in-house techs, I believe, from the wastewater plant.

Q. Sir, I believe the system went operational at the end of 2014.

Is that your understanding as well, sir?

A. Yes, but I don't know the specific date.

Q. Fair enough, sir.

And do you know whether all of the systems were, in fact, operational at the Flint water plant by the time it went operational?

A. Do I know today?

Q. Yes, sir.

MS. COLLINS: Objection; form.

Q. You can answer, sir.

A. I know -- came to know later on -- and I don't remember when, but it was months after the project went online -- that those systems had not been fixed prior to starting.

Q. And are those some of the systems that had been taken off of your scope of work from the original scope, sir?

A. All of those systems were taken off of our original scope.

Q. And what systems did you later learn were not operational at the time of the startup, sir?

A. The east softening clarifier, the ozone system. The ozone system was making ozone; they just couldn't control it. And the SCADA system.

Q. Okay. With your experience, sir, if you were the one in charge of operating the plant, would you have started operation of the plant with those three systems not working properly, sir?

MS. COLLINS: Objection; form; foundation; calls for speculation.

Q. You can answer, sir.

A. I would not, but I am a perfectionist. I have a professional difference of opinion of whether they made the right decision or not.

Q. Do you believe that the system should have gone operational without having a corrosion control study performed, sir?

A. Are you -- please describe what system.

Q. The Flint Water Treatment Plant started providing water to the citizens of Flint in the

MR. ERICKSON: I do want to just note that I -- I was not the person objecting to form.

MR. McELVAINE: Oh, I'm sorry. I'm sorry.

MR. ERICKSON: It doesn't matter. Unless the court reporter wants to know.

THE STENOGRAPHER: I understood it was Mr. Gambill.

MR. McELVAINE: Thank you.

BY MR. McELVAINE:

Q. Mr. Green, I'm pointing out to you pages -- and I think we have it on the screen for all to see -- under Priority 2, there are three items; is that correct, sir?

A. Yes.

Q. And that's on Pages 9 and 10, and the first deals with GAC, correct?

A. Yes.

Q. And what is GAC, sir?

A. Granular activated carbon.

Q. Okay. And the third item under Priority 2 deals with corrosion control, recommending a study, correct?

A. Scroll down just a touch.

Q. Yes, sir. Absolutely, sir.

A. That's enough.

Q. Do we have it there? Can you see it, sir?

A. Yes.

Q. Okay.

A. And the answer is yes to your question.

Q. Okay. Thank you.

In March 2015, did you discuss these Veolia recommendations with anybody from the City of Flint?

A. I cannot tell you it was in March, but I do know that we discussed these with the City of Flint shortly after this report was received.

Q. When you say "shortly," would you say within a matter of weeks, sir?

A. Yes.

Q. And what -- with whom was your discussion, sir?

A. Primarily, Howard Croft and Brent Wright. Specifically, the City asked us to install the GAC, which eventually became a project that LAN performed. After we started the design of the GAC, we approached Howard Croft after a

they were not feeding enough to get the TOC out.

Q. So you were recommending increasing and/or being consistent in the usage of ferric chloride, sir?

A. I think sometime after this document that you have up here, which is dated December 1st, 2014, I think in a later document in early '15, we did indicate that they should be feeding about 60 milligrams per liter of ferric, maybe 65; I don't remember exactly.

And so I can't say that was an increase or not. It may have been an increase over some times. It could be the same as other times. So there's -- there's just not one dose. There were -- the dose was bouncing up and down, if that makes sense.

Q. Do you know if the City of Flint ever followed your recommendation regarding the ferric chloride?

A. They still fed it in variable levels. They never really increased it after our recommendation on a consistent basis. It would go up for a while and then down for a while and, et cetera.

Q. So is the answer, no, they did not follow your recommendation for a consistent dosage of ferric, sir?

A. No, they didn't.

Q. Okay.

MR. McELVAINE: Sir, we've reached the point again where I've used up more time, and I think I will pass on to the next attorney just so I can have a little bit of time reserved for further discussion tomorrow or Monday.

So thank you very much, sir. I appreciate your time.

THE WITNESS: Thank you.

VIDEOGRAPHER: The time is 10:38 a.m., and we're off the record.

(Discussion held off the record.)

(Recess taken.)

VIDEOGRAPHER: The time is 10:47 a.m., and we're on the record.

EXAMINATION

BY MR. BERG:

Q. Good morning, Mr. Green. My name is Rick Berg, and I represent the City of Flint. Thank you for attending today.

CERTIFICATE

I, Sara S. Clark, RPR/RMR/CRR/CRC, a Notary Public, duly commissioned and qualified, certify that the within named WARREN GREEN was by me duly sworn to testify to the whole truth in the cause aforesaid; that the testimony was taken down by me in stenotypy in the presence of said witness, afterwards transcribed upon a computer; that the foregoing is a true and correct transcript of the testimony given by said witness taken at the time and place in the foregoing caption specified.

I certify that I am not a relative, employee, or attorney of any of the parties hereto, or of any attorney employed by the parties, or financially interested in the action.

IN WITNESS WHEREOF, I have set my hand and affixed my seal on this 11th day of July, 2020.

Sara S. Clark

Sara S. Clark, RPR/RMR/CRR/CRC

Notary Public

My commission expires: March 10, 2023

EXHIBIT 9

* financial projections - aiming for Fri 2/13
  revenue projections
  Status quo spending going forward
  inform budget priorities at spending plan

Planning + Dev — good EDC meeting

* communications - dept newsletter + constant contact
* steering cmte for Atwrtn Choice grant

DPW — BioWork

⇒ ☐ monthly metrics — Swedish BioGas: Chevy, RRS

public information campaign

Finance

* budget process

OFFICE OF THE CITY COUNCIL PRESIDENT

JOSHUA M. FREEMAN
COUNCILMAN - WARD 4

February 3, 2015

Ms. Sue F McCormick, Director
City of Detroit
Water and Sewerage Department
735 Randolph St
Detroit MI 48226-2830

Ms. McCormick

I wanted to thank you for attending our City Council meeting on January 26th and again expressing your willingness to work with the City of Flint to provide a possible alternative source for drinking water.

As your letter dated January 12th indicated, you have proposed a specific rate for providing water should the City of Flint be interested in a "long term arrangement with DWSD."

While I fully understand the rates you provided for actual use of the system ($846,700 fixed fee and $14.92/Mcf), I do have a few questions as it relates to your offer.

First, how do the recent rate increases that you are proposing affect this proposal?

Second, are the rates that you have proposed for the City of Flint or are they for Genesee County? As you may or may not know, we sold a portion of the pipeline that was previously used by us to conduct water from your system to ours. As a result, we may now have to purchase water from Genesee County as we have no direct connection to your system. Are you proposing these rates to them as well?

Third, is this rate good for a short term use? Again, as you know, we are scheduled to start receiving water from the KWA sometime next June and it is anticipated, should we choose to return to your system, that we would no longer need to purchase water from DWSD. So what is the shortest period that you would consider when making this offer?

Fourth, what are the specific requirements or steps that you would demand the City of Flint accomplish prior to reconnecting to your system? It seems overly simplistic to say

MUNICIPAL CENTER
1101 S. SAGINAW STREET FLINT, MICHIGAN 48502 (810) 766-7418 FAX (810) 766-7032 TDD 766-7120

2/5/15 DPW

- Quarterly Report + Notice mailing recommendation

- Customer Satisfaction
  FTE + prof services
  public info + customer support

- Snow Removal
  areas for improvement

☐ Citywide call center, status?

⇒ ☐ data on billing + treating

2/6/15 EM

- Water Advisory Board
  20 approx

- GM requested ~~refund~~ credit adjustment
  EM, look at it

- Council - Dept Process
  and resolutions
  Thurs or Fri prior to Council
  Mar test run

- Scarves
  is there a legal precdnt ?
  can we reiterate case by case

- Legal
  ordinance on streets/ safety emergency
  board + commissioner appointment

☐ recommendation on DDA

- HR : MML, Joyce Parker is lead
  open ~~around~~ in March

  Fire
  Treasurer
  Finance

2/9/15 Exec

- Council issues master planning steering cmte
  MTA, EDC 'appointments Council
  special order - EM on water consultants
- considering ordinance list
- Strategic Plan
  also collect performance metrics
- SAFER?
- Meetings
  * efficient use of time * dates + next steps
  * email notes
- Water
  * DHS / Headstart
  * Burton, water customer of City
- Legal
  * CA order
  * Council cmte structure order + Council presidt authority
    (consolidates ~~in concert w/~~ prior orders)
    public comment before agenda (3 min ea.)
    drop 5 min. at end of mtg
  * DDA boundaries
  → incl Megan
  → Mar, Planning & Development
  * Charter Commission costs $100K+ in 1974
  → email from Pete
  * CFGF, ways to help

Flint Emergency Manager Task Chart

9-Feb

	Item	Who	7 Pt. Plan	Completion Date	
Planning	Conduct Historic District Public Hearing	mh		1/16/2015	Complete
Finance	Present FY15 2nd Qtr Report to City Council	ds	7	1/21/2015	Complete
Public Safety	ICMA Study - Presentation to PS Cmte. and Implementation Plan	jt dc	7	1/22/2015	Complete
Admin	Begin Executive search (HR, Tr, Fin)			1/22/2015	Complete
Finance	Present FY14 Audit to City Council	ds	7	1/26/2015	Complete
Admin	Conduct Strategic Planning Workshop (staff)			1/26/2015	Complete
Planning	Adopt CIP	mh		1/26/2015	Complete
Council	Approval of Financial Ordinances		7	1/26/2015	Complete
Admin	Conduct Strategic Planning Wkshop (Council)	ja		1/28/2015	Complete
Admin	Provide a Letter on Council Training Plan	ja	7	1/28/2015	
Finance	Complete Single Audit	ds	7	1/28/2015	Complete
Personnel	Make Interim Assignments HR, Finance	ja		1/30/2015	Complete
Admin	Enact Council Organizational Order	pb,ja		2/1/2015	Complete
Finance	Enact FY15 Budget Amendment	ds,ja		2/1/2015	Complete
Admin	Select Consultant for water issues	ja/em/dw		2/3/2015	Complete
Admin	Identify issues to go before Council	exec team		2/9/2015	
Admin	Decide which ordinances need to be completed	ja pb jf		2/9/2015	
Admin	Depts submit Strategic Plan Objectives	ja		2/9/2015	
Finance	Complete Strategic Plan Update	ja	7	2/10/2015	
Fire	Decide on applying for SAFER Grant	dc lm		2/10/2015	
IT	Implement IT Governance Model	pk		2/10/2015	
Finance	Complete Five year Financial Projections	ja		2/13/2015	
Communic	Complete Website Punch-list	jl		2/15/2015	
Facilities	Complete Purchasing Relocation	hc		2/15/2015	
Admin	Enact Organizational Reporting Order	pb,ja		2/16/2015	
Admin	Extend Cornerstone Contract	ja		2/16/2015	
DPW	Define specific Infrastructure projects	hc		2/16/2015	
Finance	Establish Budget Prep Timeline	ds		2/16/2015	
Police/IT	Complete SRMS Implementation Charter	jt pk		2/16/2015	
MML	Complete Profiles for FD, TR, HR, (Fire?)			2/20/2015	
DPW/Fin	Complete RFC analysis of utility revenues	ja		2/18/2015	
Admin	Enact Purchasing Ordinance	ja	7	2/20/2015	
Finance	Council to Adopt budget priorities	ja		2/23/2015	
Admin	Evaluate Alternate DEP structure	ja		2/23/2015	
Admin	Decide Council Pay / Mayoral Pay	ja		2/23/2015	
Admin	City Administrator Starts	ja		2/23/2015	
Finance	Update financial projections to Council	ds	7	2/23/2015	

	Item	Who	7 Pt. Plan	Completion Date
Finance	Complete Court Consolidation MOU	ja		2/28/2015
Finance	Finalize MERS transition	ds		3/1/2015
Admin	Begin drafing Final Order	pb,ja		3/1/2015
Facilities	Complete Law Office Renovation	hc		3/1/2015
Legal	Complete Tower Transfer to GC 9-1-1	lm		3/10/2015
Legal	Complete Tower Property Lease	pb		3/10/2015
HR/Legal	Complete MOU for 9-1-1 Personnel	dj jc		3/10/2015
Legal	Complete MOU for 9-1-1	pb		3/10/2015
Admin	Adopt other Final Ordinances	ja jf pd	7	3/15/2015
Admin	Complete RTAB Confirmation	ja ww		3/15/2015
IT/ Clerk	Update City Council Chamber's technology	ib jf pk		3/15/2015
MML	Complete Advertisements for Positions			3/20/2015
MML	Selct finalists			4/3/2015
Finance	Provide 3rd qtr Strategic Plan Update	em		4/6/2015
Finance	Provide 3rd qtr Budget Update	ds		4/6/2015
Finance	Present FY16 Budget Update To City Council	ds	7	4/6/2015
Finance	Present FY17 Budget to City Council	ds	7	4/6/2015
Public Safety	Develop Public Safety Implementation Plan	jt dc		4/6/2015
Econ Dev	Complete Smith Village Development	ta		4/6/2015
Admin	Enact Final Order	ja pb lm	7	4/8/2015
Admin	Tell the Story of the Flint EM Period	ja lm eric s		4/10/2015
Finance	Present FY15 3rd Qtr Report to City Council	ds	7	4/15/2015
MML/Admin	Complete Reference Checks and Interviews			4/24/2015
MML/Admin	Make Appointments			5/1/2015
Clerk	Plan for Charter Commission Support	ib pb		5/1/2015
Clerk	Hold Charter Commission Election	ib pb		5/12/2015
MML/Admin	New Appointees (FD,TR,HR) start			5/15/2015
Personnel	Complete Executive Search	ja nh		5/15/2015
Police	Manage 911 Move	jt		7/1/2015
Finance	Present FY15 4th Qtr Report to City Council	ds		7/15/2015
HR	Participate in SEI 3-Day Workshop	hc		4/6-8/15
Utilities	Progress on Water Quality issues, inlcuding prep. for additional notifications	hc,dw,lm,ja,pb		Monitor
Legal/ Util	Monitor Chevy in the Hole Grant Contract	pb ja dj		Monitor
Treasury	Progress on Water Theft investigation	am		Monitor
Planning	Complete CSX transfer for trail	mh		Monitor

	Item	Who	7 Pt. Plan	Completion Date
Finance	MERS to complete pension valuations	ds		Monitor
Planning/Clerk	Complete Business Lic. Plan and Implementation	pb mh ib		Monitor
Admin	Implementation of Public Safety Rec.	ja em		Monitor
Admin	Progress of executive recruitment	ja em		Monitor
Admin	Progress of P&M finance projects	ja ds		Monitor
Admin	Progress of Council Training	ja		Monitor

Gerald Ambrose
Emergency Manager

Dayne Walling
Mayor

Jason Lorenz
Public Information Officer
(810) 237-2039
jlorenz@cityofflint.com

For Immediate Release

Flint Hires International Urban Water Experts of Veolia North America to Assess City's Water Issues

Flint, Michigan – February 10, 2015 – The City of Flint has retained a team of urban water experts from Veolia North America to conduct an analysis of the city's water system. Veolia, which is the world's largest water services and technology company, will assess how Flint's water is tested and distributed, including reviewing water treatment processes and operations, laboratory testing and analysis, and engineering reports that detail the city's treatment and distribution systems.

"We understand the frustration and urgency in Flint," said David Gadis, vice president of Veolia North America's Municipal & Commercial Business. "We are honored to support your community with our technical expertise so that together we can ensure water quality for the people of the city of Flint."

Veolia anticipates its analysis to take less than two weeks, at which time they will present findings to City officials, including the Mayor, City Council and the Emergency Manager. Once the findings are presented, city officials will determine how to move forward.

"Addressing the City's water challenges are the top priority right now and it is important to bring in an independent, highly qualified team to work with us to address the safety and quality issues," said Mayor Dayne Walling.

–CONTINUE–

Gerald Ambrose
Emergency Manager

Dayne Walling
Mayor

"Until we have completed our analysis, we cannot say for certain how long it will take to provide solutions to Flint's current water situation," said Gadis. "We have extensive experience handling challenging river water sources, reducing leaks and contaminants and in managing discolored water."

"Veolia worked diligently to respond to our Request For Proposal in a thorough, professional way and demonstrated the ability to immediately support us as we ensure safe, clean water for our residents," said Emergency Manager Jerry Ambrose.

The Veolia team hit the ground running Tuesday morning, meeting with water officials to provide an overview of the work to be conducted. "We look forward to helping Flint's team find ways to address and improve the city's drinking water operation," Gadis said.

The company designs and provides water, waste and energy management solutions to communities and industries across the country, including providing water and wastewater services to 530 communities in North America. More information is available at www.veolianorthamerica.com.

–END–

2/10/15 Veolia

public, no confidence
notice garnered attention
is problem solvable in the short term?
extraordinarily high rates

2 at plant
equipment, maintenance
water process
Standard operating procedures
distribution + lines
(also employee training)

also customer service, public info

need budget + org chart
~~customer feedback~~
advisory group

water hotline
customer service rep.
meet and discuss first
produce draft report for review
take a holistic look
components need to talk
sequence

initial ideas

Cedar St offline

test water upstream

meter replacement

meter storm sewer

split test samples

2/10/15 Water

Veolia
issues & challenges are not unlike other commities
appreciation for tough job

question about LAN
Veolia, we're operators, develop resiliency
will review LAN report
bring worldwide knowledge + experience

timeframe
individuals at plant today
will come back in next week for discussion
following week will provide report
resume
work in 900 communities per year
used to day to day problems
cost of solutions
committed to delivering quality water
range of problems - confidence in fix
problems are fixable
issue is timing
Scope of work
limited engagement, 2 weeks $40,000
talk about implementation
river and future transition
look at both

Customer engagmt
will recommd citiza advisory grop
citizen involved at informl
also technical advisory group
need to call at gt citizn complaints
upset citizens
yes, experienced it
dealt with thousals of complaints
taste, odor, businesses
cost concerns
Common expectation to reduce costs
not at trading off quality
focus not on efficiency, starting w/ clean good water
citizens to know
we take water seriously, its essential
Council Feb 18 presentation

2/12 draft

Potential Water Advisory Committee Members	
Josh Freeman	City Council President
Jackie Popular	Chair Public Works Cmte.
	Rep. Concerned Pastors
Tim Herman	CEO Chamber of Commerce
Melanie Gavulic	CEO Hurley Medical Center
Jamie Gaskin	Executive Director United Way
Reta Stanley	Executive Director Big Brothers/Big Sisters
	Flint Community Schools rep.
	GC Health Dept. rep
Bryant Nolden	GC Commissioner
Dr. Sam Dismond	Local Phsicina, Former Hurley Chief of Staff
	U of M Flint rep
Kevin Keane	Consumers Energy
→ Jack Minore	Flint River Watershed Coalition, former State Rep and City Council Mbr
Clarence Pierce	CEO Hamilton Community Health Network
Jason Caya	Downtown resident, owner downtown brewery
	Master Plan Infrasructure team: V.Morckel, B. Hill, S. Severn
	Kettering Scientist - Dr. Stacy Seeley - Dept Head Chem and Biochem
Jeff Wright	GC Drain Commissioner
Mike Melenbrink	The Torch restaurant owner/ city resident
Fr. Phil Schmitter	Community Activist – FACT
Joe King	Flint MTA appointee – President Flint Neighborhoods United (executive committee)

Genesee GOGIC

Technical – GM
Co. Health Dept.
MDEQ
EPA
Drain Commissioner

MSU/Rose
GFHC
MCC
Kettering

when is best time

reach out to IGA ←

City of Flint Email

Dayne Walling <dwalling@cityofflint.com>

Fwd: Draft of Water Quality Advisory Group List

Dayne Walling <dwalling@cityofflint.com>
To: Gerald Ambrose <gambrose@cityofflint.com>
Cc: Howard Croft <hcroft@cityofflint.com>, Kelly Rossman-McKinney <krossman@truscottrossman.com>, Elizabeth Murphy <emurphy@cityofflint.com>
Fri, Feb 6, 2015 at 5:20 PM

I would suggest a 20 member group with a majority of Flint residents. This will add a great deal of credibility to the board. The group should also have technical expertise. This balance of community leadership and expertise worked well in the master planning process. I also strongly urge that the group operate under the open meetings act.

Here are some names/sectors that I would recommend be included
person chairing the master plan implementation team on infrastructure
Kettering scientist
instead of Jim Henry from Health Department I would want Health Dept Director
suggest Rev. Fuller as faith representative. he is a city resident and president of the statewide baptist convention
Drain Commissioner Jeff Wright
GM engineer
restaurant owner

On Fri, Feb 6, 2015 at 10:18 AM, Gerald Ambrose <gambrose@cityofflint.com> wrote:
[Quoted text hidden]

—
Dayne Walling
Mayor, City of Flint
City Hall, 1101 S. Saginaw St.
Flint, MI 48502
810-766-7346
mayor@cityofflint.com

City of Flint Email

Dayne Walling <dwalling@cityofflint.com>

Fwd: Draft of Water Quality Advisory Group List

Dayne Walling <dwalling@cityofflint.com> Sun, Feb 8, 2015 at 10:26 PM
To: Gerald Ambrose <gambrose@cityofflint.com>
Cc: Howard Croft <hcroft@cityofflint.com>, Kelly Rossman-McKinney <krossman@truscottrossman.com>, Elizabeth Murphy <emurphy@cityofflint.com>

I have been giving this more thought this weekend. My primary concern is that the group as we are considering constituting it now is unlikely to be able to fundamentally change the confidence level of the wider public, especially the large number of lower income individuals who are not trusting of large stakeholder organizations. I believe that this group would respond better to an effort that included the White House, SC2, Congressman Kildee, etc.

Therefore, I am recommending that we actually convene 2 groups. One would be an Expert Review Board headed by a federal official representing President Obama. The second would be the Community Advisory Committee, largely the group we have been discussing.

Expert Review Board could include: EPA, US Dept of Health and Human Services, CDC, White House/SC2 along with State DEQ, County Drain Commission, State/County Health Department

Community Advisory Committee would be the list we have been working on with a few additional pastors, business leaders, and neighborhood leaders such as Father Schmitter (Christ the King and FACT), Joe King (president of Flint Neighborhoods United, MTA board member), member of Democracy Defense League. I think making it more community based will add legitimacy too

I would think we could put these in place by the end of the week and be a good complement to the announcment of the consultants coming on board and starting their work

[Quoted text hidden]

List of Potential Water Quality Advisory Committee Members **February 6, 2015**

Josh Freeman – Council President

Jackie Poplar – Chair Public Works Cmte.

Pastor Al Harris – Community Water Activist

Tim Herman – CEO Chamber of Commerce

Melanie Gavulic – CEO Hurley Medical Center

Jamie Gaskin – Exec. Director United Way

Reta Stanley – Exec. Director Big Brothers/Big Sisters

Larry Watkins – Supt Flint Community Schools

Jim Henry – GC Health Dept

Byant Nolden – County Commissioner

Dr. Sam Dismond – Local Physician, Former Hurley Chief of Staff

Dr. Susan Borrego Chancellor U of M Flint

Jack Minore

Consumers Energy

2/13/15 Veolia, update

- Veolia, Rob perspective
* preliminary review
  changes in chemicals
  filters mai
  ongoing testing w/i procer.
  looking at actual specific chemical levels + changes
* relative to Bowcock
  already looking at issues he has raised
* back Mon am
  bring in additional testing equipment
  forecast out in distribution system
  optimize each aspect of plant treatment
  model costs for new treatmt recommendations
* implementation timeline
  2-3 weeks to get to households after treatmt
  speed up valve testing
* 2 issues
  security is lapsed, lock front gate
  cleaning crew, it is not clean
  looks uncared for
* presentation for next week
  100s of communities have TTHM
  chlorine + color, explanation + quick actions
  policies and procedures
* feasibility of the whole package
  schedule, sequence + time to implmt
  recommendations for highest impact
  costs, operational + capital

still address TTHM bacteriological chlorine red water

"you made corrosive water"
water changes in the distribution system

- advisory committees
  sooner than later
  tech + community need to know what you are doing
  get okays before public works cmte
  name invitees, information
  explain roles + responsibilities
  tech cmte
  meet week of 2/23 at plant

- LAN role
  pretty helpful, gave good advice
  investment there has been fine

- general issue: haven't had seasoned people in place

Tues 2/17 9am next call

- four
  not open to media
  don't take pictures + post

2/16/15 Exec

- budget
  - ✓ incentive pay for MML training
  - ✓ water advisory focus on quality in feb; budget mar
    - Mayor's budget will incorporate committees recomendatns
    - expand public role
  - water, churches pick up this Fri

quote: on water board
○ water email

however they want to do it

- email soliciting input on ~~strategic~~ quarterly plan
  - planning year in review
  - draft joint letter

- budget
  - * adjustments
    - · retiree health judg's order
    - · 911
  - * pending
    - · courts consolidation (next month)
  - * MSP role (City participation in FANG)
  - * will have structural budget deficit going forward
  - * SAFER, look at FY17

parks
fire region
region detective

- ordinances
  - IT Governance
  - Compensation

Don Mandeville
4085 Four Lakes Avenue
Linden, MI 48451

February 16, 2015

Dayne Walling
Mayor
City of Flint
Municipal Center
1101 S. Saginaw Street
Flint, MI 48502

Dear Dayne Walling

Thank you for the opportunity to be included in the Flint Water Fair that was held at the Center of Hope facility. We received great comments from the citizens of the Flint community for both the response from the city and the information on the different filtration options available at The Home Depot.

We have several solutions that will assist in solving the communities concern over the quality of drinking water and the removal of chlorine. The below filtration systems will also be advantageous for an aging population and citizens with chronic illnesses:

> Home Master 2-stage whole house filter (sku # 203515356)-This system treats chlorine, sediment, turbidity, pesticides, herbicides, and other chemicals. The main purpose of the Home Master whole house water filter is to deliver clean, clear water to every faucet and bath in your home without drawing down water pressure.
>
> RT-200 Whole House Water Filtration System (sku # 204352514)-This system is NSF Certified to remove over 97% of chlorine present in tap water in addition to reducing other harmful contaminants such as pesticides, herbicides, rust, sediment, water soluble metals and industrial solvents.

My team and I are dedicated to assisting the Flint area with the water issues that are affecting the community. We have several resources and options that can be leveraged to impact the water quality concern. Through partnership and communication, I'm confident that we can assist you with solving this issue. If my team or I can be of further assistance please do not hesitate to reach out.

Sincerely,

Don Mandeville
District Manager

CC: Gerald Ambrose

M Love Your City to Maggie + Jason for column

☐ Council logos

☑ KWA Mtg
☑ CANUSA fwlin

2/17/15 Core Staff

- EM: CA starts Mon; "another new beginning"; City Council budget workshop, roles of governing body; Strategic plan objectives translate into budget and critical tasks; updating 5 year projection; last years projection showed -$5 M in FY17, may be better now; timeframe for resos - change in mindset; COW deadline was yesterday 2/16
- Finance: considering enactment of purchasing ordinance; few BS+A items remaining; kiosk vendor coming in for meeting; communication w/ franchise customers; next water notice 3/15;
- EM+Mayor > dept budget teams Thurs Feb 26 9-11 am; leak detection RFP to purchasing by end of week; university interests in interns
- SRMS - ~~finalization~~ of charter
- Public Safety
  Police - focus on robberies w/ federal Hobbs Act
  114 total staffing; 99 sworn officers
  Fire - ICMA, ISO rating w/ DPW; dirt street w/o hydrant, fires down
  Courts consolidation mtg this afternoon
- Legal: status conference on Welch, trending in our direction Bade
- Clerk: election training; minimal charter commission campaign activity; petitions 11 for Mayor
- Planning/Dev: Monitoring starting for 2011-2013
- DPW: pipeline for KWA; kudos for KGCB; quarterly recycling letters (to non participating households)? Add recycling to Council agenda

J thank you notes

- Public Info
website - is it being updated, by depts? calendar?
water advisory committee - two process on concerns
looking for individuals to nominate
also technical advisory cmte
facilitation?
participant expectation? } guidance from Veolia

2/17/15 Veolia

Solutions

- purpose
  * layman, short, cover important topics
- review
  * "unbelievably transparent", releasing data
  * promote website
  * red/yellow water is iron and air
  * discolored water
    - higher volume of main breaks
    - hydrant flushing
  * rashes - over chlorination
    isolated incidents
  * TTHM - relation to chlorine, byproduct
- recommendations
  * 3: water plant, distribution system, better communication
  * double in capital plan + budget

keep it simple for presentation

City of Flint

Dayne Walling
Mayor

Utilities Division

Gerald Ambrose
Emergency Manager

To: Howard Croft, DPW Director

From: Daugherty Johnson, Utilities Administrator

Date: February 17, 2015

RE: FY 14/15 projects underway or upcoming

Leak Detection: State of MI grant has allowed for extensive leak detection activities to begin this spring. The plan is to begin after Main break season. Requisition and RFP will be in Purchasing by February 20, 2015.

Cedar Street reservoir electrical upgrades: The electrical upgrades to this 20 MG clean water storage facility are currently under way. This will replace 1950 technology for improved reliability as well as capacity for a generator hook up.

Hamilton Dam planning & design work: The preliminary design work needs to be updated to reflect the reduced project scope. We will be submitting a $500k grant application Feb 18th 2015.

Torrey Rd booster station: This drinking water pressure boosting station will have electrical as well as pump replacement for improved reliability and efficiency. All the parts are in and work will be completed by end of the fiscal year

Create GIS maps of the Utilities assets: Consensus has been achieved within DPW to used CityWorks as our platform. Funding is available for implementation with an approved SAW grant reimbursement available likely in FY15/16.

Residential Meter replacement: Requisition and Bid specifications have been submitted to Purchasing. Scope of the overall project will require Fund Balance. There was $750k budgeted this fiscal year to fund the ongoing work.

Comprehensive Energy and Efficiency performance contract: This project will improve efficiency and reliability throughout the Utilities division. The right vendor will also be able to fund the project through guaranteed savings. The requisition has been submitted but the RFP has yet to be approved by Purchasing.

Decommission Incinerator: The design work is completed and process piping is underway. Most parts are onsite or ordered. Major construction on the Load out Facility will begin in early spring 2015.

Convert biogas to energy: All necessary contract amendments have been completed and Bioworks Inc. has completed design work for generator installation. Site preparation has begun and financing is in place to complete the project.

Complete Hardest Hit Cut and Plugs: Work is ongoing with 1600 out of 1700 completed. The remaining uncompleted cuts were added to our workload recently as new funding became available for the Civic Park area.

Chevy Commons Infrastructure abandonment: Contracts have been signed for the slip lining of the 30" storm sewer on site. LA construction will abandon in Phase 1 area and the City will abandon structures outside of Phase 1.

Chevy Commons Green Cap: All necessary Agreements have been completed with the Land Bank for work to proceed with Phase 1 of the Green Cap. LA construction was selected as the vendor for the project at a cost of $1.9 million

Chevy Commons Phytoremediation: All documents have been signed and our vendor ECT has been authorized to begin design work with planting scheduled to begin as soon as the weather breaks. This is a $400k grant for use throughout the site.

Chevy Commons compost Consent Decree: All preliminary steps have been completed in accordance with the Consent Decree. Our vendor RRS has failed to meet the deadlines in the contract which has increase City's liability by $105k held in escrow if the job isn't completed. We'll need to procure a backup vendor to prevent escrow loss.

☑ water sources fact sheet

Wright initiated +

- franchises- all agreed to by property owners
  his office has all copies
- noticing- what exactly does state require, billing or property address
- Detroit rates- 17% for Flint / Genesee
- December- ~~O'Brian at water forum~~
  ~~December~~
  perfect weather + supplies
  Jan/Feb 2016
  June 2016 Flint
  pipe to property County at same time
  Dec 2016 treatment ready
  correction letter to us, shut + finger

Council engagement?

DPW Committee agenda?

4:45

~~Plaintiffs DOJ~~ DPW

Mark Rupp
202-564-6074
Letter to ~~Administrator~~

2/18/15 Council Cmte

- preliminary report Veolia
great staff in water dept
water testing safe
all sites in compliance for TTHM
discoloration, worst w/ cast iron pipes
tracking customer complaints is important

best management practices
process control
lab quality assurance
computerized maintenance model
asset management
training
vulnerability plan (contigency)
distribution systems
2 weeks plant to house - goal
track customer complaints
Customer service + communication
reactive to proactive
training for staff
billing from card to envelope
doorhangers
simplify info on web

timelines

changes for chemicals (input), type and place in process

needs to state approved

report next week then another to finalize

discussion

* are we using ammonia? no and not recommended
* compare recommendations w/ Bowcock
* when will we have "good water"?
* already know what you are finding out now
* operator needs to be Michael Jordan of mixing wate
* water is not safe because we are getting another notic
* harsh chemical mixture adds to discoloration
* can it be fixed while it is off?
* concern about summer months
* air TTHM issues
* do need better communication + public presentation
* adjust existing budgets to match recommendations
* lives are on the line, it is not safe
* concern about chlorine levels
* what about a toxicologist? - EPA
* "money shouldn't be a thang" Mays
* allegations against Veolia
* upset, where do we go? can't drink or use water

→ when will next meeting be with Council?

need to see plan to get people back

- DPW: Snow Removal
  questions about
    policy on outfitting trucks w/ plows
    policy on fleet turnover (plows 8+ yrs now)
  need timelines and accomplishments
    how did we do?
  issue with blades on tractors [?]
  [problem w/ antagonistic attitude]
  limited equipment and manpower
  did we have equipment in place required by plan
    15 trucks?
  Snow plowing is a basic servie, we have
  to be able to provide it

- Water Ordinances
  additional leak adjustments
  expand poverty exemption on water costs service to renters
    tie to water affadavit
  reduce water deposit

2/12/15 EM

- Public Works
major projects, carbon filters, need to set direction
purchasing timeline
advisory boards – scope process
Veolia - customer perceptions

CA – next week

water improvements timeline

→ budget + strategic plan presented together

purchasing
roads
fire

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
OFFICE OF THE DIRECTOR

735 RANDOLPH STREET
DETROIT, MICHIGAN 48226-2830
WWW.DETROITMI.GOV

February 19, 2015

The Honorable Joshua M. Freeman, Councilmember
City of Flint, Michigan
1101 S. Saginaw Street
Flint, Michigan 48502

Dear Councilman Freeman:

Regarding: Your letter of February 3, 2015

Thank you for your letter of February 3, 2015 in which you seek additional information related to the Detroit Water and Sewerage Department's ("DWSD") offer to resume supplying drinking water to the City of Flint. Specifically, you have asked several follow-up questions related to the nature of the long-term arrangement I referenced within my letter, as well as some technical questions regarding rates and the method for reconnection in light of changes Flint has made to its system in the interim timeframe.

I will attempt to provide as much clarity as possible through this response. For starters, the rate quoted in my January 12, 2015 letter is related to the current rate year ending June 30, 2015. As new rates are adopted each year, the relative methodology as is applied to current DWSD wholesale customers would also be applied to Flint (and Genesee County) and will impact your rates, accordingly. In other words, rates will change in accordance with DWSD revenue requirements each year that Flint (and Genesee County) receives water from DWSD. That is why my prior letter only quoted a specific rate through June 30, 2015. Our Board of Water Commissioners has not yet adopted rates for the 2015-2016 rate year.

Secondly, you have asked if the rates described in the January 12, 2015 letter are exclusive to Flint or if they also would cover the Genesee County Drain Commissioner ("GCDC"). I certainly envision that the rates associated with Flint would also be available to the GCDC, as the two entities have utilized service pursuant to a single contractual arrangement in the past. To that end, DWSD is open to the possibility for a contract to be entered into by either Flint or GCDC on behalf of both customers, depending on the intricacies of the connections that you referenced with respect to Flint's recent sale of pipeline to GCDC. As noted previously, entering into a contract is not required to reinstitute service to Flint during the current emergency situation, in anticipation of further discussions toward a future service relationship.

Additionally, you have asked about short-term as compared to a long-term contractual relationship in light of Flint and GCDC's combined intent to utilize KWA for long-term service as early as 2016. DWSD operates pursuant to long-term contracts with its customers. As you may be aware, our model contracts are for a period of thirty years.

However, in light of the work already done by Flint and GCDC in preparation to receive raw water from KWA, DWSD is open to exploring a long-term contractual arrangement in which DWSD provides full service to Flint (and GCDC) until such time as KWA is operational, and then a back-up service arrangement, thereafter. The specific terms of that back-up service arrangement would require some further negotiation, but I would assume that such an arrangement would be mutually beneficial in light of the concerns with utilization of the Flint River as a primary or secondary water source.

You have also asked a technical question about the steps necessary in order for Flint to convert back to DWSD for receipt of water service. While I agree that it is not as simple as flipping a switch, I do not believe that this conversion would be a significant obstacle for Flint and GCDC to overcome. In fact, there should not be any actions required of DWSD in order to resume service, since we are currently providing full service to GCDC through the GN-01 meter (formerly the FL-01 meter).

Finally, you have asked if the anticipated assumption of DWSD's wholesale operations by the Great Lakes Water Authority ("GLWA") will impact the proposal that has been made. In short, the answer to your question is that it would not, depending on the timing of the signing of a new contract between the parties. Under the terms of the GLWA Memorandum of Understanding and Articles of Incorporation, it is envisioned that the GLWA would assume all wholesale contracts of DWSD. Therefore, the GLWA would be bound by the contractual terms that are agreed upon between DWSD and the City of Flint and/or GCDC. Nevertheless, as the GLWA Board has now been seated and has a regular schedule of meetings, I would certainly anticipate advising the GLWA Board of the terms of any proposed contract between the parties, and to seek their input or listen to any concerns or suggestions that they might have. In any event, resumption of service in the short term to address Flint's current needs, remains available immediately under existing published rates, and requires no action by either Board.

I look forward to the continued discussions, and hope that there is a viable solution that can be reached for the benefit of all parties.

Sincerely yours,

Sue F. McCormick
Director, Detroit Water and Sewerage Department
Interim CEO, Great Lakes Water Authority

Cc: The Honorable Dayne Walling, Mayor, City of Flint
Gerald Ambrose, Emergency Manager, City of Flint
Flint City Council
The Honorable Michael E. Duggan, Mayor, City of Detroit
Mr. Jim Fausone, Chairman, Board of Water Commissioners
Mr. Robert Daddow, Chairman, Great Lakes Water Authority

Water Advisory Committee, Members

~~Public Works & Utilities~~ / Water

Initial group and offering citizen opportunity

Democracy Defense League

location

technical committee by ~~Mon~~ Tues

first meeting Water Advisory Committee

5

Mon or Thurs

first week of Mar

Feb 23 samples to DEQ

Mar 7 expected City notification requiring ITHN

Notice out to customers in March mid

Quarterly report format

odor
color
rash
taste

See a doctor – go to the doctor
allergic reaction

Medical
costs of
filter

Customer
call back
city will test for free

2/19/15 Water Improvements

EM and Mayor
top priority
implementing improvements now
need to hear from customers

good, clean, fresh water that is 100% safe
no exceptions
~~none~~

getting the right balance

defining water quality
softer
further reduce THM
pH balance, lower

Rob
water testing being done, incl households
safety, in compliance with laws + standards
posting monthly operating reports (transparent)

will be useful for future water too

TTHMs have been reduced
discolored water — optimize chemicals
water quality improvements, "tune up the plant"
SCADA upgrade – latest w/ update continuous data | carbon filters get carbon out
valve openings
"more avenues to talk to customers"
"fresh water", speed it through system
reprioritize capital, instrumentation + valve exercising

concerned people are upset

timing < State approvals + engineering
Weather complications
Vulnerability plan
provide additional info to employees
moving fast
TU w/ r poupon

additional testing for chemicals not part of standards now – ordinance

Caught Mays sleeping on water

Liz Mays
~~[illegible]~~ Lorenz
Ambrosi
Nichols
myself
Howard
Duffy

Kinger
> 25
> 5
> 12
Jessica 12
Dupnack

envelope – cost?

water has improved, more that can be done
weeks + months

CITY OF FLINT

Dayne Walling
Mayor

Mr. Jerry Abramson
White House, Executive Office of the President
Director of Intergovernmental Affairs
1600 Pennsylvania Ave. NW
Washington, DC 20500

February 23, 2015

Dear Mr. Abramson

I am writing to request the support of the White House for improving the City of Flint's water quality and infrastructure. The President, Vice-President and White House have been highly engaged in seeking solutions for Flint challenges around public safety, neighborhood stabilization and economic development. We are very thankful for President Obama's leadership and dedicated support being provided through the Sustainable Communities, Choice Neighborhoods, Justice Innovation, and Strong Cities Strong Communities initiatives.

Now residents are most concerned about the safety and quality of the drinking water that is being treated from the Flint River. This is my top priority and work is being done every day to secure drinking water that is 100% safe according to the standards. As with other challenges, it is essential that we have a coordinated effort among Local, State and Federal agencies. To this end, I am requesting participation from the White House and Environmental Protection Agency on a City of Flint Technical Advisory Water Committee. The committee is expected to meet regularly through the transition to the new Karegnondi Water Pipeline and will include governmental, hospital, university and business sectors.

I welcome any technical assistance you are able to coordinate including expertise on water quality and public health, best practices with water treatment, and improving distribution system infrastructure. Thank you again for the valuable partnership. I look forward to working with you and Federal partners as we transform Flint into a sustainable 21st Century city with new jobs, safe neighborhoods, strong infrastructure and great schools.

Sincerely,

Dayne Walling
Mayor, City of Flint

CC: Mark Linton, Director, Strong Cities Strong Communities, White House Domestic Policy Council
Dr. Susan Hedman, Great Lakes Regional Administrator, U.S. Environmental Protection Agency
Mark Rupp, Deputy Associate Administrator for Intergovernmental Relations, U.S. EPA
U.S. Congressman Daniel T. Kildee
Paul Joice, Strong Cities Strong Communities, U.S. Department of Housing and Development

CA- Community Mtgs

2/23/15 Exec

Council Leadership
Water Advisory ~~Board~~ Cmte
Technical ~~Board~~ Cmte

Schedule:
Mon- Council
Tues 2/24 Digital Indics 11am
Thurs- Budget Review?
Fri- CMU Talk

- Council
  * 911 tower asset transfer notification
    looking at 10 day initial timeframe + meetings
  * budget priorities (Council this year)
- Orders
  * organizational reporting
  * Council + mayor compensation
  * purchasing ordinance (not an order)
- Intro CA
- Veolia
  * timelines?
- Budget
  * dept heads focusing on cost reductions + restructuring going forward
- Staff Meetings, discussion
  * size of core team
  * all-staff larger info mtg
  * and individual meetings w/ dept Leads
    EM, Mayor, CA ongoing!
    budget, Strategic objectives, annual services, performance metrics Key contracts

dept profile

Flint Emergency Manager Task Chart

23-Feb

	Item	Who	7 Pt. Plan	Completion Date	
Planning	Conduct Historic District Public Hearing	mh		1/16/2015	Complete
Finance	Present FY15 2nd Qtr Report to City Council	ds	7	1/21/2015	Complete
Public Safety	ICMA Study - Presentation to PS Cmte. and Implementation Plan	jt dc	7	1/22/2015	Complete
Admin	Begin Executive search (HR, Tr, Fin)			1/22/2015	Complete
Finance	Present FY14 Audit to City Council	ds	7	1/26/2015	Complete
Admin	Conduct Strategic Planning Workshop (staff)			1/26/2015	Complete
Planning	Adopt CIP	mh		1/26/2015	Complete
Council	Approval of Financial Ordinances		7	1/26/2015	Complete
Admin	Conduct Strategic Planning Wkshop (Council)	ja		1/28/2015	Complete
Admin	Provide a Letter on Council Training Plan	ja	7	1/28/2015	
Finance	Complete Single Audit	ds	7	1/28/2015	Complete
Personnel	Make Interim Assignments HR, Finance	ja		1/30/2015	Complete
Admin	Enact Council Organizational Order	pb,ja		2/1/2015	Complete
Finance	Enact FY15 Budget Amendment	ds,ja		2/1/2015	Complete
Admin	Select Consultant for water issues	ja/em/dw		2/3/2015	Complete
Admin	Depts submit Strategic Plan Objectives	ja		2/9/2015	Complete
MML	Complete Profiles for FD, TR, HR			2/13/2015	Complete
Finance	Complete Strategic Plan Update	ja	7	2/18/2015	Complete
Fire	Decide on applying for SAFER Grant	dc lm		2/21/2015	Complete
Admin	City Administrator Starts	ja		2/23/2015	Complete
Admin	Extend Cornerstone Contract	ja		2/23/2015	Complete
IT	Implement IT Governance Model	pk		2/27/2015	
Admin	Enact Organizational Reporting Order	pb,ja		2/27/2015	
Finance	Complete Five Year Financial Projections	ja		2/27/2015	
Communic	Complete Website Punch-list	jl		2/27/2015	
Facilities	Complete Purchasing Relocation	hc		2/27/2015	
DPW/Fin	Complete RFC analysis of utility revenues	ja		2/27/2015	
Admin	Enact Purchasing Ordinance	ja	7	2/27/2015	
Admin	Decide Council Pay / Mayoral Pay	ja		2/27/2015	
DPW	Define specific Infrastructure projects	hc		2/27/2015	
Finance	Establish Budget Prep Timeline	ds		2/27/2015	
Admin	Receive priorities from Veolia	ja		2/27/2015	
Finance	Update financial projections to Council	ds	7	3/4/2015	
Admin	Enact business ; water collections; and general criminal ordinances	ja pb jf		3/6/2015	
Admin	Evaluate Alternate DEP structure	ja		3/6/2015	
Finance	Complete Court Consolidation MOU	ja		3/6/2015	
Finance	Finalize MERS transition	ds		3/6/2015	

	Item	Who	7 Pt. Plan	Completion Date
Admin	Begin drafing Final Order/set transition date	pb,ja		3/6/2015
Facilities	Complete Law Office Renovation	hc		3/6/2015
Finance	Council to Adopt budget priorities	ja		3/9/2015
Legal	Complete Tower Transfer to GC 9-1-1	lm		3/10/2015
Legal	Complete Tower Property Lease	pb		3/10/2015
HR/Legal	Complete MOU for 9-1-1 Personnel	dj jc		3/10/2015
Legal	Complete MOU for 9-1-1	pb		3/10/2015
Admin	Adopt other Final Ordinances	ja jf pd	7	3/15/2015
Admin	Complete RTAB Confirmation	ja ww		3/15/2015
IT/ Clerk	Update City Council Chamber's technology	ib jf pk		3/15/2015
MML	Complete Advertisements for Positions			3/20/2015
Police/IT	Complete SRMS Implementation Charter	jt pk		4/2/2015
MML	Selct finalists			4/3/2015
Finance	Provide 3rd qtr Strategic Plan Update	em		4/6/2015
Finance	Provide 3rd qtr Budget Update	ds		4/6/2015
Finance	Present FY16 Budget Update To City Council	ds	7	4/6/2015
Finance	Present FY17 Budget to City Council	ds	7	4/6/2015
Public Safety	Develop Public Safety Implementation Plan	jt dc		4/6/2015
Econ Dev	Complete Smith Village Development	ta		4/6/2015
Admin	Enact Final Order	ja pb lm	7	4/8/2015
Admin	Tell the Story of the Flint EM Period	ja lm eric s		4/10/2015
Finance	Present FY15 3rd Qtr Report to City Council	ds	7	4/15/2015
MML/Admin	Complete Reference Checks and Interviews			4/24/2015
MML/Admin	Make Appointments			5/1/2015
Clerk	Plan for Charter Commission Support	ib pb		5/1/2015
Clerk	Hold Charter Commission Election	ib pb		5/12/2015
MML/Admin	New Appointees (FD,TR,HR) start			5/15/2015
Personnel	Complete Executive Search	ja nh		5/15/2015
Police	Manage 911 Move	jt		7/1/2015
Finance	Present FY15 4th Qtr Report to City Council	ds		7/15/2015
HR	Participate in SEI 3-Day Workshop	hc		4/6-8/15
Utilities	Progress on Water Quality issues, inlcuding prep. for additional notifications	hc,dw,lm,ja,pb		Monitor
Legal/ Util	Monitor Chevy in the Hole Grant Contract	pb ja dj		Monitor
Treasury	Progress on Water Theft investigation	am		Monitor

	Item	Who	7 Pt. Plan	Completion Date
Planning	Complete CSX transfer for trail	mh		Monitor
Finance	MERS to complete pension valuations	ds		Monitor
Planning/Clerk	Complete Business Lic. Plan and Implementation	pb mh ib		Monitor
Admin	Implementation of Public Safety Rec.	ja em		Monitor
Admin	Progress of executive recruitment	ja em		Monitor
Admin	Progress of P&M finance projects	ja ds		Monitor
Admin	Progress of Council Training	ja		Monitor

2/23/15 Exec

- facilities
  * options for city facility
  * north bldg usage
  ☐ draft response to Curtis

- CA role, internal and external

- water advisory committees
  * community
    · 2 goals: communicate about water system
      input on concerns + questions
    · at least monthly
    · Thurs Mar 5
    · chair, Jack Minore
    · facilitator
  * technical
    · open to public

* get Veolia's input on ~~contract~~ committees

→ ☐ public hearing for OPRA?
check w/ Megan

2/24/15 Core Staff

EM
* Council, moving business forward, think ahead 30 days;
* Staff: mtg will be CAs going forward largely
* personal attention: final order, coordinating w/ CA, budget

CA
* dept heads: Upcoming mtgs w/ dept heads; open door policy;
Community, neighborhood areas; see City through your eyes

ecommand same + council →

DPW: problem w/ main breaks; need better outreach;
data on breaks and other stats; Veolia interim
report tomorrow possibly w/ timeframes + costs;
new ferric feed rates, reduced storage capacity,
may be seasonal; more than 25 requests for tests;
staff capacity or vendors for main breaks repairs
March 15 next letter incl violation;
polling taking place incl rates
⇒ options explored prior to budget preparation
small, medium or large infrastructure packages

2/24/15 Susan Hedman – EPA

Cincinnati Water Lab

Drinking Water Program

time commitment
monthly (w/ call in)
for approx year

3/4 2pm Weds
"someone will be on call"
Hedman "EPA will have a high level expert participating throughout the process"
name by end of week

February 27, 2015

To: Wayne Workman,

From: Jerry Ambrose, Emergency Manager, City of Flint

As the Emergency Manager for the City of Flint, I am charged with restoring the City government to financial solvency, and working to assure that the City moves forward on a financially sustainable basis. The steps taken over the past three years have been difficult. Taxes and fees have been raised, services and workforce reduced, and ongoing costs, including legacy costs, have been constrained.

The current controversy surrounding the provision of water, and the path for resolution, has a potentially significant impact on the progress that is being made. I am satisfied that the water provided to Flint users today is within all MDEQ and EPA guidelines, as evidenced by the most recent water quality results conducted for MDEQ. We have a continuing commitment to maintaining water safety and to improve water quality, and have dedicated resources to assure this commitment will be made.

The oft-repeated suggestion that the City should return to DWSD, even for a short period of time, would, in my judgment, have extremely negative financial consequences to the water system, and consequently to the rate payers. By the most conservative estimates, such a move would increase costs by at least $12 million annually, with that amount achieved only by eliminating virtually all budgeted improvements in the system. For a system with Unrestricted Assets of only $740,745, according to the June 30, 2014 audited financial statements, the only recourse within the City's control would be to raise rates. And in my judgment, such a rate increase would minimally be in the 30% range.

This direction of discussion also deviates from what, in my judgment, should be the focus: How can we not only operate and maintain a system to assure the delivery of safe and quality water dependably, but significantly reduce the cost of water and sewer to the users? At an average of $149 per month for a residential user, the cost for this service is extremely high in comparison to surrounding areas, as well as most areas across the state, and creates a significant financial burden for many users. In my judgment, we should all be concentrating on how to reduce rates by 50% or more! Unfortunately, there are no easy or evident answers, and continuation of the status will be an impediment to the sustainable recovery of the City of Flint. It is a conversation that we will have with the recently created Water Quality Advisory Committee.

My reasoning for this conclusion is as follows:

One of the decisions made in the context of beginning to eliminate deficits and to restore financial stability to the City of Flint was to increase water and sewer rates significantly – the only choice available to financially stabilize a system that as of June 30, 2012, had a deficit of $8,758,091. Another was to leave DWDS for the KWA because it offered the opportunity to lower future rate increases. A third decision was to utilize the Flint River on an interim basis when DWSD unilaterally terminated the City's contract for water purchase. That decision was made because it also offered an immediate cost savings opportunity which translated into the ability to upgrade the Water Treatment Plant without having to seek financing. It was a reasonable decision because of our experience in using the river in a back-up capacity, including test runs on a quarterly basis for several decades.

Unfortunately, the switch to the river as a primary source was more challenging than anticipated, and the harsh winter of 2013-2014 resulted in much more damage to the aging water infrastructure than in previous years. The result was the issuance of required notices that water exceeded established guidelines for safety as it could affect certain vulnerable populations, and some users of the system experienced unpleasant odors and discoloration. Some users appeared to have had some negative reactions to the new source of water. However, as soon as the test results were known, City staff took immediate actions to address the concerns. These actions are evidenced today by the fact that MDEQ has certified that our most recent testing shows water from all testing sites to be within acceptable guidelines. Additionally, the City is continuing to taking the necessary actions to assure that the water supply remains safe and that water quality continues to improve.

As the City has moved to address the situation, the suggestion has been made that the City should re-engage with DWSD and purchase water at least until the KWA pipeline Is supplying water. As evidenced by the most recent letter from DWSD, such a decision would immediately increase the City's cost by $846,700 per month, or $10,160,400 per year, just for the fixed cost portion of the price. The actual purchase of water would be in addition, and dependent upon the quantity purchased. We estimate the actual water purchase cost to average more than $1 million per month, for a grand total of approximately $22 million. Finally, the DWSD offer is conditioned upon the City (or presumable its partners in KWA) agreeing to negotiate a long term contract (30 years) for back-up.

The $22 million annual estimate of increased costs to purchase water from DWSD would be minimally offset by an approximate $3 million in reduced operating costs, and could be further offset by an additional $9 million, but only if all funding for capital improvements to the system are eliminated. To eliminate all funding dedicated to repairing, stabilizing, and improving the system would be totally irresponsible and would have long term negative consequences to the City and to future rate payers.

As you are aware we have recently brought in outside expert assistance to evaluate the steps we have taken to assure that the water is safe and to continue to improve water quality. We are expecting specific recommendations within the next few weeks, and are committed to implementing those recommendations in a timely manner. Many steps have already been taken. I am confident that implementing their recommendations will assure a continuing supply of safe water as well as improved quality, and at far less cost than re-engaging DWSD.

We have also created a 40 member Water Advisory Committee and a 13 member Technical Advisory Committee to assure two-way communication with the public and users of the system. Those committees will begin to meet within the next week, and we look forward to answering their questions and receiving their input.

It is unfortunate that problems and concerns with quality have arisen, and we are working every day to address the issues created them. Maintaining safe water and improving quality is a top priority as we work to make the City of Flint an attractive place to live, work, study, and play.

○ Liz for communications

3/2/15 Exec

- DPW/ Water: rates, safety/quality, DWSD; consultants v. staff, costs + responsibilities + experience; pushing too many infrastructure projects, need for IT / efficiencies

under-utilized software: # across City, CA getting list from IT
Organizational reform / vision
budget process
water safety
reasonable rates

- Council committees — CA owns going forward resos format
  Finance
  Public Safety
- Council budget priorities
- Budget meetings w/ depts
- Budget picture, mid-March

- Lead Tests

- 5 Year Forecast
- EM Orders: Compensation, Council Meetings, Org

CITY OF FLINT

OFFICE OF THE EMERGENCY MANAGER

Gerald Ambrose
Emergency Manager

TO: Wayne Workman, Deputy Treasurer
Treasury Department
State of Michigan

FROM: Jerry Ambrose, Emergency Manager
City of Flint

DATE: March 3, 2015

As the Emergency Manager for the City of Flint, I am charged with restoring the City government to financial solvency, and working to assure that the City moves forward on a financially sustainable basis. The steps taken over the past three years have been difficult. Taxes and fees have been raised, services and workforce reduced, and ongoing costs, including legacy costs, have been constrained.

The current controversy surrounding the provision of water, and the path for resolution, has a potentially significant impact on the progress that is being made. I am satisfied that the water provided to Flint users today is within all MDEQ and EPA guidelines, as evidenced by the most recent water quality results conducted for MDEQ. We have a continuing commitment to maintain water safety and to improve water quality, and have dedicated resources to assure this commitment will be made.

The oft-repeated suggestion that the City should return to DWSD, even for a short period of time, would, in my judgment, have extremely negative financial consequences to the water system, and consequently to the rate payers. By the most conservative estimates, such a move would increase costs by at least $12 million annually, with that amount achieved only by eliminating virtually all budgeted improvements in the system. For a system with Unrestricted Assets of only $740,745, according to the June 30, 2014 audited financial statements, the only recourse within the City's control would be to increase revenues significantly. And in my judgment, that would come from raising rates for water by 30% or more . Further, changing the *source* of the city's water would not necessarily change any of the *aesthetics* of the water, including odor and discoloration, since those appear to be directly related to the aging pipes and other infrastructure that carry water from the treatment facility to our customers.

EXHIBIT 10

From: Michael Glasgow <mglasgow@cityofflint.com>
Sent: Thursday, April 17, 2014 11:05 AM
To: Rosenthal, Adam (DEQ)
Cc: Prysby, Mike (DEQ);Busch, Stephen (DEQ)
Subject: Re: Proposed Water Monitoring - City of Flint

Adam,

Thank you for the quick response. I assumed there would be dramatic changes to our monitoring. I have people above me making plans to distribute water ASAP. I was reluctant before, but after looking at the monitoring schedule and our current staffing, I do not anticipate giving the OK to begin sending water out anytime soon. If water is distributed from this plant in the next couple weeks, it will be against my direction. I need time to adequately train additional staff and to update our monitoring plans before I will feel we are ready. I will reiterate this to management above me, but they seem to have their own agenda.

Thank you,

Mike Glasgow
Laboratory & Water Quality Supervisor
City of Flint Water Plant

On Wed, Apr 16, 2014 at 2:49 PM, Rosenthal, Adam (DEQ) <ROSENTHALA@michigan.gov> wrote:

Mike, we have been working on a revised schedule for the City of Flint, which is being sent out today in response to your email indicating the plant startup. Mike Prysby must have been the one in contact with Mr. Croft, not sure what was discussed. Mike is out and will return 4/21/14. Until then our supervisor, Steve Bush, can be contacted at 517-643-2314 for plant operation questions.

see attached schedule.

Adam Rosenthal, EQA

MDEQ – Office of Drinking Water and Municipal Assistance

Lansing District – Constitution Hall 1SW

PO Box 30242

Lansing, MI 48909

517-284-6644

fax: 517-241-3571

From: Michael Glasgow [mailto:mglasgow@cityofflint.com]
Sent: Wednesday, April 16, 2014 12:59 PM
To: Rosenthal, Adam (DEQ)
Subject: Proposed Water Monitoring - City of Flint

Adam,

Good afternoon, I am contacting you in regards to possible changes in our monitoring for our change to full time operation out of the Flint river. I am expecting changes to our Water Quality Monitoring parameters, and possibly our DBP and lead & copper monitoring plan. Also, I am wondering about our MOR required testing. I know you have probably been in contact with Howard Croft, however I have not seen anything except the notes you or Prysby made on the last page of our 2014 monitoring schedule "that things were subject to change". Any information would be greatly appreciated, because it looks as if we will be starting the plant up tomorrow and are being pushed to start distributing water as soon as possible. As the acting F-1, I would like to make sure we are monitoring, reporting and meeting our requirements before I give the O.K to start distributing water.

Thanks,

Mike Glasgow

Laboratory & Water Quality Supervisor

City of Flint Water Plant

(810)787-6537 ext. 3512

EXHIBIT 11

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

In re: FLINT WATER CASES	Civil Action No. 5:16-cv-10444-JEL-MKM (consolidated)
	Hon. Judith E. Levy
	Mag. Mona K. Majzoub

HIGHLY CONFIDENTIAL

VIDEOTAPED DEPOSITION OF MICHAEL B. GLASGOW

VOLUME I

Monday, February 24, 2020
at 9:05 a.m.

Taken at: Butzel Long
41000 Woodward Avenue
Bloomfield Hills, Michigan 48304

REPORTED BY: CAROL A. KIRK, RMR/CSR-9139
GOLKOW LITIGATION SERVICES
877.370.3377 ph | 917.591.5672 fax
deps@golkow.com

that subparagraph C it says -- it reads, "If the water quality and characteristics of the new source are similar to the supply's existing sources, then field staff may consider the new source as not adversely affecting the supply of corrosion control treatment and no further action is needed."

Do you see that?

A. I do, yes.

Q. Who made the evaluation that the new source, the Flint River, had similar characteristics to Lake Huron water being treated by the Detroit Water & Sewer Department?

MS. COLLINS: Objection; foundation.

MR. MARKER: Objection; form and foundation.

Q. Who made that determinations?

A. I'm not sure who made that determination.

Q. The truth is nobody made that determination, right?

MR. KIM: Objection.

A. Like I said, I'm not sure who made

that decision or who determined that.

Q. You understood that as a large system delivering drinking water to more than 50,000 residents, the city of Flint had an obligation to have optimal corrosion control treatment, right?

MR. KUHL: Objection to form.

A. According to the Safe Drinking Water Act, yes, when you read that.

Q. Okay. And I will get to this as we move along here at a glacial pace.

The truth is, that on day one in April of 2014, and not until October, maybe November, of 2015, there was no corrosion control treatment utilized at the plant, right?

A. Correct.

MS. COLLINS: Objection to form.

Q. Who made the decision as to whether or not there would be no optimized corrosion control treatment as required by federal law? Who made decision?

MR. KUHL: Objection as to form.

MR. KIM: Objection as to foundation.

A. I recall the meeting with myself, Mr. Prysby, and maybe one or two other gentlemen. Like I say, all these meetings kind of blend together. But I remember Mr. Prysby telling us that we didn't need to add any corrosion control, that they were going to wait and do two six-months' rounds of monitoring before it would be decided.

Q. Okay.

A. And it wasn't a specific question. I asked him in regards to some of the testing that my lab was going to have to perform, and I was inquiring about phosphate, if we needed to test for phosphate. And that's when I was told, "No, because you won't be adding any phosphate."

Q. I'm glad you brought that up.

Prior to April of 2014, you knew what orthophosphate was, correct?

A. Correct, yes.

Q. You knew what polyphosphate was; did you not?

A. Correct. Yes.

Q. Did you know the water treatment plant before 1967 had been run utilizing Flint

River as a raw water source for drinking water in the city of Flint? Did you know that?

A. Yes, I did know that.

Q. Did you know that the Flint water treatment plant utilized a polyphosphate for corrosion control treatment prior to 1967?

A. To be honest, I wasn't aware of that, no.

Q. Did you or did anybody, to your knowledge, at DEQ evaluate the means and methods by which the water treatment plant actually engaged in corrosion control treatment back when it was running full time prior to 1967?

A. Not --

MR. MARKER: Objection to form.

A. Not that I'm aware of.

Q. Did you come to learn that Warren Green of LAN objected to the city and to DEQ about the failure to use corrosion control treatment?

MR. SCHNATZ: Object to form.

A. No.

Q. Did you learn that Mr. Green explicitly told your boss, Duffy Johnson, that

Q. Are you familiar with the term "primacy"?
A. Yes.
Q. And what does that mean to you?
A. Well, let me think how I would describe it. If they have -- whoever has primacy has, in effect, to me, the power to enforce some rules or dictate power and make decisions, I guess. That's kind of a broad definition, but they're the ones to enforce things.
Q. And did you understand that the DEQ was the primacy agent with regard to the water treatment decisions that related to the Flint water treatment plant?
A. Yes.
MR. KUHL: Objection to form.
MR. SCHNATZ: Objection to form.
MS. COLLINS: Objection to form.
Q. I think you previously described in your testimony that the DEQ was kind of like a coach and a cop; is that fair enough?
A. Yeah, that's fair.
Q. What did that exactly mean?

A. Well, they're there to help you when you need it, but if you're not following the procedure, they're there to slap you on the hand if not.

Q. Is it fair to say that the DEQ was your primary resource when you had questions about how to treat the water and the Flint water treatment plant when you went online in April of 2014?

A. Yes.

Q. If you had disagreed with something that the DEQ had instructed you to do or not do, did you have any recourse or any ability to appeal that type of a decision?

MS. COLLINS: Objection; form.

MR. MORRISSEY: Object to form.

A. Not to my knowledge.

Q. You just testified previously that you always thought under the Lead and Copper Rule phosphates or some form of corrosion control would need to be included in the finished water treatment process, correct?

A. Correct, yes.

Q. And if you disagreed -- well,

necessarily do anything in particular with staffing. I was hoping they would just delay our switch. And showing them my concerns, thought, you know, they could help me with that.

Q. To the best of your knowledge, what authority did the MDEQ have to delay the switch?

MR. MARKER: Objection; form, foundation.

A. I'm going to err on what I said before. They kind of have a dual role for me, a coach and a cop, and I -- it was under my assumption that they could stop or start us any time they wanted. They could say yes or no.

Q. But you don't have any specific knowledge of that authority, correct?

A. Correct.

MR. MARKER: Objection; form.

A. Correct.

Q. And I believe you stated that you had expressed your concerns about staffing with Mr. Daugherty -- I'm sorry -- Mr. Johnson or Mr. Croft?

A. Correct. Yes.

Q. And that essentially those concerns were ignored?

A. I could say they were ignored. I know they were -- I would hear the thing "We're working on it." But I felt like they were ignored.

Q. Did you feel as though in your role operator in charge, you could have stopped the water treatment plant from going operational on April 24?

MR. KIM: Objection as to form.

A. No, I did not.

Q. And was that due to politics or a situation unique to Flint, or did you not believe that was your -- that was a role that an operator in charge had under the Safe Drinking Water Act?

MR. MARKER: Objection; form, foundation.

A. I'm going to say in my eyes, it was more of a -- well, I don't want to say political.

I don't believe that I had the power in the Safe Drinking Water Act to do that.

But I would just reiterate what was told to me from my supervisors, Mr. Johnson, Mr. Croft, and I'm going to specifically say Mr. Croft, says, "We have approval from the DEQ. This is going to happen."

Q. And regardless of your concerns at all times, the Flint water treatment plant met those staffing requirements under the Safe Drinking Water Act, correct?

A. Yes. To the best of my knowledge, yes.

Q. And the MDEQ did not set April 24 as a date on which the switch needed to occur; is that correct --

MR. MARKER: Objection; lack of foundation.

Q. -- is that correct?

A. Yeah. I don't believe they had any -- yeah, any input into what date the switch was going to occur.

Q. Didn't you review or discuss your e-mail that is Exhibit 24 with any of the other employees at the Flint water treatment plant prior to sending it?

instructions?

MR. MARKER: Objection; form, foundation.

A. I did not personally, no.

Q. Did you ever discuss the instructions that Mr. Wright was given in that respect with him?

A. I wouldn't say I discussed it with him. He briefly discussed it with me.

Q. Okay. Do you know who that instruction came from?

MR. KIM: Objection as to foundation.

A. Yeah, I don't recall exactly where that come from.

Q. After the water switch, the water treatment plant started getting complaints regarding the water; is that correct?

A. Yeah, fairly soon after. I'd say within a month or two.

Q. And did you -- when these complaints started coming in, did you have contact with the MDEQ with respect to these complaints?

the Flint water treatment plant was creating a substantial risk to the public health in Flint?

MR. MARKER: Objection; form.

MR. CAMPBELL: Objection.

A. No, I did not.

Q. Now, it's correct after the switch in April 2014 that the city received a fair number of complaints about the drinking water; isn't that correct?

A. That is correct. Yes.

Q. And some of those residents expressed a belief that the drinking water was responsible for rashes, hair loss, or other physical ailments, correct?

A. Correct. Yes.

Q. Did you at any time come to the conclusion between April 2014 and September 1, 2015 that the drinking water was responsible for those complaints?

MR. MARKER: Objection; form.

A. I did not, no.

Q. Now, when you got these complaints in, did the city have a process or procedure for responding to these complaints?

Right?

MR. CAMPBELL: Object to the form.

A. Right. No.

Q. If you move forward in this March 12 presentation, there's again on page 5 under "Corrosion Control" -- the only reference to corrosion control -- this says "The water system could add a polyphosphate to the water as a way to minimize the amount of discolored water."

Again, they didn't tell you that you needed to have corrosion control, did they?

A. No.

MR. MARKER: Object to the form.

Q. They told you you could add a polyphosphate. They didn't say anything about orthophosphates, did they?

A. No.

Q. And they said it would minimize discolored water. They didn't say it would have anything to do with lead, did they?

A. They did not, no.

MR. CAMPBELL: Object to the form.

Q. And then Mr. -- or counsel for

Veolia yesterday walked through one of these suggested next steps, which was in one of the Tier 2 priority items, the third one down that begins on the second page of "Recommended Actions," on the page Bates-numbered 628060. This says you could "Contract with your engineer and initiate discussions with the state on the addition of a corrosion control chemical."

Right?

A. Yes.

Q. And, again, it suggests phosphates, right?

A. Yes.

Q. Doesn't specify ortho?

A. No. Just says phosphates.

Q. Doesn't say anything about lead, right?

A. Right.

Q. And doesn't say this is something you need to do immediately to protect public health?

A. No, it does not.

Q. Then the next recommendation is to increase ferric, right?

A. Yes.
Q. And that's something you all did in the ensuing months, right?
MR. CAMPBELL: Object to the form.
A. Yeah, to -- not quite to the level they were requesting, but yes.
Q. Right.
A. It was increased at the plant.
Q. From the summary that counsel for the state showed you earlier, you could see increasing from March when you got this report to May and June increased by more than four points, which is over 25 percent, right?
A. Correct. Yes.
Q. And the impact of adding ferric chloride to the water is that it would increase the amount of chlorides in the water, increase the CSMR and increase corrosivity, right?
MR. MARKER: Objection; form.
A. Yes. It could, yes.
Q. The next Exhibit 79 is the technical memorandum. This is -- it starts with Bates number COF_FED_0016290. It's addressed to Mr. Croft with a copy to Mr. Ambrose and others,

water could present serious health risks --

MR. MARKER: Form, foundation.

MR. KUHL: Object to form and foundation.

Q. -- as described in this paragraph?

MR. KUHL: Sorry. Object to form and foundation.

A. I will say I hope they understood that issue.

Q. Okay.

A. I can't speak for them, though.

Q. And you were asked a series of questions on Monday about the specific duties of the city of Flint, specifically the duty and obligation of the city and its officials to inform its citizens to protect themselves from lead in the drinking water.

Do you remember that series of questions?

A. I do, yes.

Q. And that applies not only to you, but also to Mr. Croft who was the director of public works at the time, Mr. Johnson who was the utilities director at the time, Mr. Bincsik

who was in charge of the distribution system, and Mr. Wright who was the water treatment supervisor; is that correct?

MR. KUHL: Objection; form and foundation.

A. Yes, that's correct.

Q. I'd ask you to look at Exhibit 10. We showed you this exhibit on Monday. And at that time, we discussed that this was an e-mail chain discussing the context of the LeeAnne Walters' lead testing results in February of 2015.

Do you remember that?

A. I do, yes.

Q. Okay. And this first e-mail here that you sent on February 24, 2015 at 1:48 p.m., that was sent to Mr. Croft; is that correct?

A. Yes.

Q. And he's the director of public works in the city of Flint?

A. Yes. He was at that time.

Q. And Mr. Johnson who was the utilities director at that time?

A. Yes.

Q. And Mr. Croft was Mr. Johnson's supervisor; is that fair to say?

A. That is correct.

Q. Okay. Mr. Bincsik who is in charge of the distribution system, and Mr. Johnson was Mr. Bincsik's supervisor; is that fair to say?

A. That is fair to say, yes.

Q. And Mr. Wright who at the time was the supervisor, at least on the administrative side of things, at the water treatment plant, correct?

A. Correct.

Q. So you're sending this e-mail to your supervisors and their supervisors; is that right?

A. That is correct, yes.

Q. And in this e-mail, you're specifically discussing the lead testing results at the Walters' residence, specifically the 104 parts per billion test result that you discovered at that time; is that right?

A. That is correct.

Q. And you write in this paragraph,

"Definitely a pressing issue here."

Mr. Glasgow, were you specifically speaking to the high lead content in the water at that time?

MR. KUHL: Objection to form, foundation.

A. Yes. That is what this e-mail is revolving around.

Q. Okay. So at that time, you're expressing to your supervisors and their supervisors at the city of Flint that this is a pressing issue, the fact that there's high lead content in the water as evidenced by this test result is a pressing issue; is that correct?

MR. KUHL: Objection to form and foundation, misstating testimony.

A. Yeah, I'll say there's a pressing issue at this residence. Yes.

Q. Okay. If you --

MR. KIM: What's the exhibit number?

MS. DEVINE: This is Exhibit 10. It's CROFT-000000125.

BY MS. DEVINE:

Q. If you look at the next e-mail in the chain, this is Mr. Bincsik. And as I just asked you, he's in charge of the distribution system; is that correct?

A. That is correct. Yes.

Q. Okay. And Mr. Bincsik responds to your e-mail stating that "The majority of the service lines in Flint are lead." He goes to say that "Marvin from Veolia mentioned to me that he thought we needed to add phosphates to prevent this" -- this being lead. "Perhaps we need to move on this sooner rather than later."

Did I read that correctly?

A. Yes, you did.

Q. And this is Mr. Bincsik who's in charge of the distribution system sending this e-mail to his supervisors and his supervisors' supervisors, again Mr. Croft, correct?

A. Correct. Yes.

Q. And you received this e-mail as well, correct?

A. Yes.

Q. And this e-mail, again, is made in

CERTIFICATE

I, Carol A. Kirk, a Registered Merit Reporter and Notary Public in and for the State of Michigan, duly commissioned and qualified, do hereby certify that the within-named MICHAEL B. GLASGOW was by me first duly sworn to testify to the truth, the whole truth, and nothing but the truth in the cause aforesaid; that the deposition then given by him was by me reduced to stenotype in the presence of said witness; that the foregoing is a true and correct transcript of the deposition so given by him; that the deposition was taken at the time and place in the caption specified and was completed without adjournment; and that I am in no way related to or employed by any attorney or party hereto or financially interested in the action; and I am not, nor is the court reporting firm with which I am affiliated, under a contract as defined in Civil Rule 28(D).

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office at Dexter, Michigan on this 9th day of March 2020.

Carol A Kirk

CAROL A. KIRK, RMR, CSR-9139
NOTARY PUBLIC - STATE OF MICHIGAN

My Commission Expires: August 19, 2022.

- - -

EXHIBIT 12

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

IN RE: FLINT WATER CASES	No. 5:16-cv-10444 Hon. Judith E. Levy Mag. Mona K. Majzoub

Elnora Carthan, et al.,

Plaintiffs,

vs. Civil Action No. 5:16-cv-10444-JEL-MKM

Governor Rick Snyder, et al.,

Defendants.

HIGHLY CONFIDENTIAL

VIDEOTAPED DEPOSITION OF DAUGHERTY JOHNSON

VOLUME I

Tuesday, December 17, 2019

at 9:09 a.m.

Taken at: Butzel Long
41000 Woodward Avenue
Bloomfield Hills, Michigan 48304

REPORTED BY: CAROL A. KIRK, RMR/CSR-9139

GOLKOW LITIGATION SERVICES
877.370.3377 ph | 917.591.5672 fax
deps@golkow.com

Q. Do you know when bench scale jar testing was done for TTHMs?

A. As I recall, it was part of our -- the response plan when we had the TTHM violation.

Q. Okay. So that was done at a subsequent point in time?

A. That's my recollection, yes.

Q. All right. Now, when the plant was first operational, did complaints come in from city residents at a higher rate of frequency than before the use of Flint River water?

A. Yes.

Q. And those early complaints, what types of issues did they relate to?

A. Discoloration and odor.

Q. Did anyone complain in those early days about lead?

A. Not that I know of.

Q. What is the process by which complaints with respect to water quality are lodged with the city of Flint?

A. I don't know all the processes.

CERTIFICATE

I, Carol A. Kirk, a Registered Merit Reporter and Notary Public in and for the State of Michigan, duly commissioned and qualified, do hereby certify that the within-named DAUGHERTY JOHNSON was by me first duly sworn to testify to the truth, the whole truth, and nothing but the truth in the cause aforesaid; that the deposition then given by him was by me reduced to stenotype in the presence of said witness; that the foregoing is a true and correct transcript of the deposition so given by him; that the deposition was taken at the time and place in the caption specified and was completed without adjournment; and that I am in no way related to or employed by any attorney or party hereto or financially interested in the action; and I am not, nor is the court reporting firm with which I am affiliated, under a contract as defined in Civil Rule 28(D).

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office at Dexter, Michigan on this 2nd day of January 2020.

Carol A Kirk

CAROL A. KIRK, RMR, CSR-9139
NOTARY PUBLIC - STATE OF MICHIGAN

My Commission Expires: August 19, 2022.

- - -

EXHIBIT 13

From: Lasher, Geralyn (DHHS)
Sent: Saturday, February 06, 2016 2:46 PM
To: Lyon, Nick (DHHS);Becker, Timothy (DHHS)
Cc: Eisner, Jennifer (DHHS);Minicuci, Angela (DHHS)
Subject: FW: [CD Response #1] Genesee Co. Legionnaire's outbreak

Sending all 14 emails Jay sent this morning giving us background on what the communication was between our folks and GCHD early in this process.

From: Fiedler, Jay (DHHS)
Sent: Saturday, February 06, 2016 8:14 AM
To: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>
Cc: Collins, Jim (DHHS) <CollinsJ12@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Subject: [CD Response #1] Genesee Co. Legionnaire's outbreak

This is the first email we have that documents our knowledge and involvement. Prior to the 10/13/14 email, Shannon Johnson and Tim Bolen had been discussing the increase with GCHD, but it isn't documented. Not uncommon for initial outreach from LHDs to be a phone call to our Regional Epi (Tim) or our SME (Shannon).

From: Johnson, Shannon (DCH)
Sent: Monday, October 13, 2014 12:02 PM
To: Bohm, Susan (DHHS) <bohms@michigan.gov>; Fiedler, Jay (DHHS) <FiedlerJ@michigan.gov>; Collins, Jim (DHHS) <CollinsJ12@michigan.gov>
Cc: Bolen, Timothy (DHHS) <BolenT1@michigan.gov>; Tyndall Snow, Leigh (DHHS) <TyndallSnowL@michigan.gov>; Rudrik, James T. (DHHS) <rudrikj@michigan.gov>
Subject: Genesee Co. Legionnaire's outbreak

Hello,

I spoke with Tim late last week about the ongoing Legionnaire's increase in Genesee County. They've had 30 cases of Legionnaire's Disease reported into the MDSS from June-present this year, where in previous years (2009-2013) they've had a range from 2-9 cases reported during this same timeframe. Genesee initially thought the increase was associated with McLaren Flint Hospital as a source, but after Tim and I both reviewed the preliminary data it was pretty clear that many of the cases did not fit with this hypothesis. In addition, the picture has been clouded by the fact that most cases being reported did not have onset dates recorded. The current hypothesis is that the source of the outbreak may be the Flint municipal water. Tim informed me that Flint switched from the Detroit municipal water system to getting water from the Flint River last year. I ran 5-year epi curves for the 6 counties (Saginaw, Shiawassee, Livingston, Oakland, Lapeer, and Tuscola) surrounding Genesee and none of those counties are experiencing an increase similar to what Genesee is seeing. The other counties are at normal or below-normal levels of case counts for June-present. I spoke with the Genesee Epi, Shurooq, again today and she told me they have mapped their cases and found that nearly all of them are within the city of Flint and on the municipal water. They also found that the majority of cases are not occurring close to the treatment plant, but further down the line. This would not be surprising since chlorination and disinfection levels drop the further away you get from the treatment source. The LHD met with the city's water treatment department and confirmed they do not conduct any Legionella testing at the facility. I let Shurooq know that we could assist with and facilitate environmental testing, whether it be through our lab or DEQ. The LHD is meeting with the water dept. this week so she said she would let me know what their plan is. I also requested, again, that she let the area hospitals know if they see any new cases of illness to collect a respiratory culture in addition to the urine antigen test so that if

environmental testing is done and Legionella is recovered, there is a clinical sample to compare it to. She let me know that McLaren conducted environmental testing on their system and found low levels of legionella bacteria and have since hyper-chlorinated their water to disinfect the system. McLaren receives its water from the Flint municipal system.

Tim and I have both tried to offer our services to Genesee and thus far have gotten very little information and/or willingness to receive assistance. As this very much appears to be confined to Genesee and not a multi-county issue, I'm not sure how much to push as it's solely their jurisdiction. We know it's only a matter of time until this hits the media though…

Tim- Please feel free to correct any details I have wrong, or add any others you might have.

Thanks,
Shannon Andrews Johnson, MPH
Infectious Disease Epidemiologist
Michigan Dept. of Community Health
201 Townsend St., CVB 5th Floor
Lansing, MI 48913
Phone: 517-335-8165
Fax: 517-335-8263

EXHIBIT 14

From: Jason Lorenz <jlorenz@cityofflint.com>
Sent: Monday, August 18, 2014 5:52 PM
To: undisclosed-recipients:
Subject: PRESS RELEASE: Water Advisory Update
Attachments: Water Advisory 8.18.2014.pdf

For Immediate Release

City of Flint Boil Water Advisory Still in Effect for Area Affected by Discovery of Abnormal Water Sample

Flint, Michigan – August 18, 2014 – The City of Flint's Utilities Department has received word today from the Department of Environmental Quality that the boil water advisory issued for a small portion of the city is still in effect although additional testing has shown no signs of E-coli or fecal coliform bacteria in the water. Testing over the last 48 hours has shown that the water tests negative for the presence of fecal coliform bacteria and E-coli, but an abnormal test result triggered the advisory. It is believed that a sampling error is to blame for the abnormal test; however, as a precaution, the advisory will remain in effect until the next citywide sampling has been completed. The next round of routine testing will take place on Tuesday, August 19, 2014 with the possibility that the advisory could be lifted as early as Wednesday, August 20, 2014.

Testing of the drinking water is a part of the routine process for ensuring the quality and safety of the system which happens weekly at nine different sites around the city. Drinking water contamination due to E-coli or coliform bacteria is very rare due to the fact that the bacteria cannot survive in the water for very long. The colder temperature of water in the system coupled with the regular blending of chlorine into the water makes for a hostile environment for these kinds of bacteria. The Flint Water Treatment Plant works diligently to provide water of the highest quality to everyone in the city.

–END–

-Jason Lorenz
Public Information Officer
City of Flint
(810) 237-2039
jlorenz@cityofflint.com

EXHIBIT 15

From: Jason Lorenz <jlorenz@cityofflint.com>
Sent: Friday, September 05, 2014 5:20 PM
To: undisclosed-recipients:
Subject: PRESS RELEASE: Boil Water Advisory
Attachments: Flint-Site5-BWA.pdf; BWA.9.5.14.pdf; Boil Water Advisory 9.5.2014.pdf

For Immediate Release

City of Flint Boil Water Advisory in Effect for Area Affected

Due to Abnormal Water Sample

Flint, Michigan – September 5, 2014 – The City of Flint's Utilities Department in conjunction with the Department of Environmental Quality has issued a boil water advisory for a portion of the city. The boil water advisory is in effect for the area bordered by Dayton Street on the north, DuPont Street on the east, the Flint River on the south, and by Lavelle Road (to the Flint River) on the west. Testing over the last 48 hours has shown that the water in the area above tests positive for the presence of total coliform bacteria. Residents in the area should continue to boil water or use bottled water for drinking, bathing, making ice, brushing teeth, washing dishes, and preparing food until further notice. Boiling the water kills bacteria or other harmful organisms.

Total coliform bacteria are generally not harmful themselves. Coliforms are bacteria which are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria *may be present.* Usually, coliforms are a sign that there could be a problem with the treatment or distribution system (pipes). Whenever we detect coliform bacteria in any sample, we do follow-up testing to see if other bacteria of greater concern, such as fecal coliform or E. coli, are present. We did not find any of these bacteria in our subsequent testing. If we had, we would have notified you immediately. However, we are still finding coliforms in the drinking water.

The City of Flint Utilities Department will be flushing the system in that part of the city and increasing the chlorine added to water in the area. The City anticipates that the problem will be resolved within the next three days, which is the minimum amount of time for a boil water notice. All water testing results at the City of Flint Water Treatment Plant have shown the City's drinking water meets all Safe Water Drinking Standards. Testing of the drinking water is a part of the routine process for ensuring the quality and safety of the system which happens weekly at ten different sites around the city. Anyone with questions about the advisory or any other water issues should call 810-787-6537.

–END–

Public Information Officer
City of Flint
(810) 237-2039
jlorenz@cityofflint.com

EXHIBIT 16

CITY OF FLINT
OFFICE OF EMERGENCY MANAGER
DARNELL EARLEY
ICMA-CM, MPA

Jason Lorenz
Public Information Officer
(810) 237-2039
jlorenz@cityofflint.com

For Immediate Release

City of Flint Boil Water Advisory Remains in Effect for Previously Identified Area

Flint, Michigan – September 8, 2014 – The City of Flint's Utilities Department has extended both of the boil water advisories from Friday and Saturday for a portion of the city. Friday's boil water advisory is in effect for the area bordered by Dayton Street on the north, DuPont Street on the east, the Flint River on the south, and by Lavelle Road (to the Flint River) on the west. Saturday's boil water advisory also covered the area bordered by Stewart Ave. (north), Saginaw (east) Hamilton Ave (south), and Clio Rd (west). This remains a localized issue to those portions of the city.

The Utilities Department believes that due to the low usage and demand of the area, water remains in the system for a longer period of time compared to the rest of the city. The City of Flint Utilities Department is increasing the chlorine added to water in the area, and to improve water circulation, will continue flushing the system in that part of the city. Residents can expect to see open hydrants in the area. The City of Flint will continue to aggressively investigate this issue until it has been corrected.

–CONTINUE–

CITY OF FLINT
OFFICE OF EMERGENCY MANAGER
DARNELL EARLEY
ICMA-CM, MPA

The Utilities Department has opted to keep the advisory in effect until the results of a citywide sampling taken today are known. This advisory is a precautionary measure to ensure the safety of drinking water for city residents. Residents in the area should continue to boil water or use bottled water for drinking, making ice, brushing teeth, washing dishes, and preparing food until further notice. Boiling the water kills bacteria or other harmful organisms.

Total coliform bacteria are generally not harmful themselves. Coliforms are bacteria which are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria *may be present.* Usually, coliforms are a sign that there could be a problem with the treatment or distribution system (pipes).

Whenever we detect coliform bacteria in any sample, we do follow-up testing to see if other bacteria of greater concern, such as fecal coliform or E. coli, are present. We did not find any of these bacteria in our subsequent testing. If we had, we would have notified you immediately. However, we are still finding coliforms in the drinking water.

All water testing results at the City of Flint Water Treatment Plant have shown the City's drinking water meets all Safe Water Drinking Standards and this remains a localized problem. Testing of the drinking water is a part of the routine process for ensuring the quality and safety of the system which happens weekly at ten different sites around the city. Anyone with questions about the advisory or any other water issues should call 810-787-6537.

–END–

City Hall
1101 S. Saginaw Street - Flint, Michigan 48502
810-766-7346 FAX: 810-766-7218 www.cityofflint.com

EXHIBIT 17

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

December 16, 2014

Mr. Brent Wright, Operation Supervisor
City Of Flint - DPW
Flint Water Plant
4500 North Dort Highway
Flint, MI 48505

WSSN: 02310

Dear Mr. Wright:

SUBJECT: Violation Notice – Maximum Contaminant Level for Total Trihalomethanes
Operational Evaluation – Total Trihalomethanes
4th Quarter 2014 Monitoring Period

The Department of Environmental Quality (DEQ), Office of Drinking Water and Municipal Assistance (ODWMA), records show that the City of Flint is in violation of the Safe Drinking Water Act,1976 PA 399, as amended (Act 399); R 325.10610, *Maximum contaminant levels* (MCL) *for disinfection byproducts*, of the 1979 Administrative Code.

In accordance with R.325.10610, *MCLs for disinfection byproducts*, of the 1979 Administrative Code, the MCL for disinfection byproduct total trihalomethanes (TTHM) is 0.080 milligrams per liter (mg/L) as a Locational Running Annual Average (LRAA) at each monitoring location. As listed in the table below, our records show that the City of Flint's highest TTHM locational running annual average (LRAA), based on the last three quarters, ending November 30, 2014, is 0.099 mg/l which exceeds the standard, and that two of the eight sample site locations exceed the standard of 0.080 mg/L.

Further, in accordance with R325.10719l, *Disinfection byproducts: operational evaluation levels*, of the 1979 Administrative Code, when an operational evaluation level (OEL) at a monitoring location for TTHM exceeds 0.080 mg/L, a supply shall conduct an operational evaluation and submit a written report of the evaluation to the department not later than 90 days after being notified of the analytical result that causes the supply to exceed the operational evaluation level. As listed in the table below, our records show that TTHM operational evaluation levels for the City of Flint exceed 0.080 mg/L at four of the City's eight sample site locations.

TTHM Results (mg/L)					
	5/21/14	8/21/14	11/20/14	LRAA	OEL
DBP1 McDonalds 3719 Davison	**0.162**	**0.145**	0.059	**0.092**	**0.106**
DBP2 Liquor Palace 3302 S. Dort Highway	**0.112**	**0.127**	0.033	0.068	0.076
DBP3 North Flint Auto 6204 N. Saginaw St.	**0.097**	**0.118**	0.041	0.064	0.074
DBP4 University Market 2501 Flushing Road	**0.106**	**0.196**	**0.094**	**0.099**	**0.122**
DBP5 Taco Bell 3606 Corunna Road	0.079	**0.181**	0.034	0.074	**0.082**
DBP6 Rite-Aid Pharmacy 5018 Clio Road	**0.088**	**0.144**	0.054	0.072	**0.085**
DBP7 Salem Housing 3216 MLK Boulevard	**0.082**	**0.112**	0.050	0.061	0.074
DBP8 BP Gas Station 822 S. Dort Highway	0.075	**0.112**	0.036	0.056	0.065

Our investigation consisted of a review of ODWMA files for laboratory reports received for compliance monitoring. Our investigation is considered complete. This violation began on December 1, 2014, and will continue until TTHM LRAA is below the MCL at all sample sites.

We acknowledge and appreciate the city's cooperation with our recommendation to preemptively conduct an Operational Evaluation following the City's second quarterly round of monitoring in August. That Operational Evaluation report has identified possible causes and corrective measures for the elevated TTHM levels which we encourage the City continue implementing. These modifications have likely contributed in part to the reduction in TTHM levels reported in the most recent quarter, and suggest the City may be able to achieve compliance with the TTHM standard.

Our office is continuing to review the Operational Evaluation report that was submitted on December 1, 2014, and will provide the City and their consultant comments as needed to help address this MCL violation.

Water systems that exceed the OEL must complete and submit an Operational Evaluation in accordance with Administrative Rule 719l (R325.10719l) within 90 days of being notified of the violation. **An updated Operational Evaluation report, which incorporates the most recent sample results, must now be completed and received by our office by no later than March 1, 2015**.

If you have any other factual information you would like us to consider regarding the violation identified in this Violation Notice (VN), please provide them in a written response by January 16, 2015.

Administrative rule R 325.10403 of Act 399 requires that suppliers provide public notice (PN) as soon as practical, but no later than thirty (30) days after the supplier learns of this type of violation, by mail or direct delivery **and** by any other means reasonably calculated to reach customers not normally reached by mail. Enclosed is a sample PN

which contains the minimum required language. The City is encouraged to include additional information regarding its response to this violation. **Please notify your consumers by January 10, 2015, and send us a signed and dated copy of the notice that you issued within ten (10) days of distributing the public notice.** This violation must also be included in your 2014 Consumer Confidence Report (CCR), due by July 1, 2015. The PN must be repeated every quarter until you no longer exceed the TTHM standard. Failure to issue a PN for this violation will result in a fine of at least $1,000 per event, with a maximum of $5,000 per violation.

We anticipate and appreciate your continued cooperation in resolving this matter. If you have any questions regarding this VN, please contact us at the numbers below.

Sincerely,

Michael F. Prysby, P.E., District Engineer
Lansing District Office
Office of Drinking Water & Municipal Assistance
517-290-8817

Adam Rosenthal, EQA
Lansing District Office
Office of Drinking Water & Municipal Assistance
517-284-6644

mfp/ar/jlr
Enclosure

cc: Mr. Darnell Early, Emergency Manager, City of Flint
Mr. Daughtry Johnson, City of Flint
Mr. Howard Croft, City of Flint
Mr. Robert Bincsik, City of Flint
Ms. Jennifer Crooks, U.S. Environmental Protection Agency, Region 5
Genesee County Health Department
Ms. Liane Shekter Smith, P.E., DEQ
Mr. Richard Benzie, P.E., DEQ
Mr. Stephen Busch, P.E., DEQ

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

City of Flint Did Not Meet Treatment Requirements

Our water system recently violated a drinking water standard. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we are doing to correct this situation.

We routinely monitor for the presence of drinking water contaminants. Samples were collected for total trihalomethanes (TTHM) analysis from eight locations on a quarterly basis (May 21, August 21, and November 20 of 2014). The average of the results at **ANY** of the eight locations must not exceed the maximum contaminant level (MCL) for TTHMs, otherwise our water system exceeds the Maximum Contaminant Level (MCL). The standard for TTHMs is 80 µg/L. The location reporting the highest TTHM level was 99 ug/L; thus, our water system exceeds the TTHM MCL.

What should I do?

- There is nothing you need to do unless you have a severely compromised immune system, have an infant, or are elderly. These people may be at increased risk and should seek advice about drinking water from their health care providers.
- You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours.

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

People who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.

What is being done?

We are currently working on solutions to correct the problem. We anticipate resolving the problem by 2015.

For more information, please contact Mr. Brent Wright at 517-787-6537 or the Flint Water Plant at 4500 North Dort Highway, Flint, MI 48505.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by the City of Flint.

CERTIFICATION: WSSN: 02310

I certify that this water supply has fully complied with the public notification requirements in the Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the administrative rules.

Signature	Title	Date Distributed

Reminder to water supplier: This notice / certification must be sent to the DEQ.

EXHIBIT 18

CITY OF FLINT
OFFICE OF EMERGENCY MANAGER
GERALD AMBROSE

Jason Lorenz
Public Information Officer
(810) 237-2039
jlorenz@cityofflint.com

For Immediate Release

City of Flint Issues Request for Proposals for Water Quality Consultant

Flint, Michigan – January 15, 2015 – Consistent with the plan set forth by former Emergency Manager Darnell Earley to address concerns about drinking water quality, the City of Flint has released a Request for Proposal for an evaluation of the City's efforts to improve the quality of drinking water provided by the City's utility system. The City is seeking a firm with experience in water treatment systems which use river water as a source. The RFP can be found on the City's website at http://flintweb2.cityofflint.com/Purchasing/bids.asp.

In the RFP, The City is seeking a consultant to review and evaluate the water treatment process and distribution system, provide recommendations to maintain compliance with both state and Federal agencies, and assist in implementing accepted recommendations. The City will have the selected vendor provide reports to reflect their findings and provide continual oversight in implementing any approved recommended practices to improve the quality of water until implementation of the KWA project. The bid will remain open until Monday, January 26, 2015 at 12pm.

–END–

EXHIBIT 19

(Proposal #15-573)

EM SUBMISSION NO.: EMA037 2015

PRESENTED: 2-4-15

ADOPTED: 2-4-15

RESOLUTION TO VEOLIA WATER FOR WATER QUALITY CONSULTANT

BY THE EMERGENCY MANAGER

RESOLUTION

The Department of Purchases & Supplies has solicited a proposal to seek a water quality consultant as requested by the Utilities Department/Water Plant Division; and

Veolia Water, 101 West Washington St., Suite 1400 East, Indianapolis, IN was the sole bidder to submit from seven solicitations for said requirements. Funding for said services will come from the following accounts: 591-536.100-801.000; and

IT IS RESOLVED, that the Proper City Officials, upon the Emergency Manager's approval, are hereby authorized to enter into a contract with Veolia Water for water quality consulting in an amount not to exceed $40,000.00 (Water Fund)

APPROVED PURCHASING DEPT:

Derrick Jones, Purchasing Manager

APPROVED AS TO FINANCE:

Dawn Steele

Dawn Steele, Deputy Finance Director

APPROVED AS TO FORM:

Peter M. Bade, City Attorney

EM DISPOSITION:

ENACT ✓ **REFER TO COUNCIL** _____ **FAIL** _____

Gerald Ambrose, Emergency Manager

DATED: 2/4/15

FY15 – DJ

DEPARTMENT OF PURCHASES AND SUPPLIES

Dayne Walling
Mayor

Derrick F. Jones
Purchasing Manager

February 6, 2015

TO: Brent Wright, Supervisor
Water Plant

FROM: Derrick F. Jones
Purchasing Manager

SUBJECT: VEOLIA WATER

Please be advised that the above mentioned vendor has been approved by the Emergency Manager on February 4, 2015. You may now enter a contract with Veolia Water for water quality consulting in an amount not to exceed $40,000.00.

If you have any questions, please call me.

DFJ/krn

Attachment

CITY HALL 1101 S. SAGINAW STREET FLINT, MICHIGAN 48502 (810) 766-7340 FAX (810) 766-7240

CITY OF FLINT CONTRACT
WITH VEOLIA WATER NORTH AMERICA OPERATING SERVICES, LLC

The purpose of this agreement is to enter into a contract to provide consulting services related to the Flint Water Treatment System updates for the City of Flint (hereinafter "City") and Veolia Water North America Operating Services, LLC., (hereinafter "Contractor").

Applicable Law: This contract shall be governed by and interpreted according to the laws of the State of Michigan pertaining to contracts made and to be performed in this state.

Arbitration: Contractor agrees to submit to arbitration all claims, counterclaims, disputes, and other matters in question arising out of or relating to this agreement, Contractor must request consent to arbitrate within 30 days from the date the Contractor knows or should have known the facts giving rise to the claim, dispute or question.

(a) Notice of a request for arbitration must be submitted in writing by certified mail or personal service upon the City Attorney within a reasonable time after the claim; dispute or other matter in question has arisen. A reasonable time is hereby determined to be 14 days from the date the party demanding the arbitration knows or should have known the facts giving rise to his claim, dispute or question. In no event may the demand for arbitration be made after the time when institution of legal or equitable proceedings based on such claim dispute or other matters in question would be barred by the applicable statute of limitation.

(b) Within 60 days from the date a request for arbitration is received by the City, the City shall inform Contractor whether it agrees to arbitrate. If the City does not consent, Contractor may proceed with an action in the appropriate court. If the City does consent, then within 30 days of the consent each party shall submit to the other the name of one person to serve as an arbitrator. The two arbitrators together shall then select a third person, the three together shall then serve as a panel in all proceedings. Any unanimous decision of the three arbitrators shall be a final binding decision. The City's failure to respond to a timely, conforming request for arbitration is deemed consent to arbitration.

(c) The costs of the arbitration shall be spilt and borne equally between the parties and such costs are not subject to shifting by the arbitrator.

(d) Contractor's failure to comply with any portion (including timeliness) of this provision shall be deemed a permanent waiver and forfeiture of the claim, dispute, or question.

City Income Tax Withholding: Contractor and any subcontractor engaged in this contract shall withhold from each payment to his employees the City income tax on all of their compensation subject to tax, after giving effect to exemptions, as follows:

(a) Residents of the City:

At a rate equal to 1% of all compensation paid to the employee who is a resident of the City of Flint.

(b) Non-residents:

At a rate equal to 1/2% of the compensation paid to the employee for work done or services performed in the City of Flint.

These taxes shall be held in trust and paid over to the City of Flint in accordance with City ordinances and State law. Any failure to do so shall constitute a substantial and material breach of this contract.

Compensation: The City shall pay for requested services plus expenses as have been set forth herein, a contract price not to exceed $ 40,000.00 upon submission of proper invoices, releases, affidavits, and the like. Contractor recognizes that the City does not guarantee it will require any set amount of services. Contractor's services will be utilized as needed and as determined solely by the City of Flint. Contractor expressly recognizes that it has no right to payment of any amount exceeding $40,000.00 Contractor agrees that oral agreements by City officials to pay a greater amount are not binding.

1. Contractor shall submit itemized invoices for all services provided under this Agreement identifying:

(a) The date of service
(b) The name of person providing the service and a general description of the service provided.
(c) The unit rate and the total amount due.

Invoices shall be submitted to:

City of Flint
Accounts Payable
P.O. Box 246
Flint, MI 48501-0246

City of Flint
Utilities Department
4500 North Dort Highway
Flint, Michigan 48505

Or email to:**accountspayable@cityofflint.com**

The City may require additional information or waive requirements as it sees fit. The City will notify the Contractor of any errors or lack of sufficient documentation within 14 days of receipt of the invoice.

Contract Documents: The invitation for bids, instructions to bidders, proposal, affidavit, addenda (if any), statement of bidder's qualifications (when required), general conditions, special conditions, performance bond, labor and material payment bond, insurance certificates, technical specifications, and drawings, together with this agreement, form the contract, and they are as fully a part of the contract as if attached hereto or repeated herein.

Disclaimer of Contractual Relationship With Subcontractors: Nothing contained in the Contract Documents shall create any contractual relationship between the City and any Subcontractor or Sub-subcontractor.

Effective Date: This contract shall be effective upon the date that it is executed by all parties and presented to the City of Flint Clerk.

Certification, Licensing, Debarment, Suspension and Other Responsibilities: Contractor warrants and certifies that Contractor and/or any of its principals are properly certified and licensed to perform the duties required by this contract in accord with laws, rules, and regulations, and it not presently debarred, suspended, proposed for debarment or declared ineligible for the award of Federal contracts by any Federal agency. Contractor may not continue to or be compensated for any work performed during any time period where the debarment, suspension or ineligibility described above exists or may arise in the course of Contractor contractual relationship with the City. Failure to comply with this section constitutes a material breach of this Contract. Should it be determined that contractor performed work under this contract while non-compliance with this provision, Contractor agrees to reimburse the City for any costs that the City must repay to any and all entities.

Force Majeure: Neither party shall be responsible for damages or delays caused by Force Majeure or other events beyond the control of the other party and which could not reasonably have been anticipated or prevented. For purposes of this Agreement, Force Majeure includes, but is not limited to, adverse weather conditions, floods, epidemics, war, riot, strikes, lockouts, and other industrial disturbances; unknown site conditions, accidents, sabotage, fire, and acts of God. Should Force Majeure occur, the parties shall mutually agree on the terms and conditions upon which the services may continue.

Good Standing: Contractor must remain current and not be in default of any obligations due the City of Flint, including the payment of taxes, fines, penalties, licenses, or other monies due the City of Flint. Violations of this clause shall constitute a substantial and material breach of this contract. Such breach shall constitute good cause for the termination of this contract should the City of Flint decide to terminate on such basis.

Hold Harmless and Indemnification: To the fullest extent permitted by law, thei City and Contractor (hereinafter in this section the "Indemnifying Party") each agree to defend, pay on behalf of, indemnify, and hold harmless the other Party ("Indemnified Party"),its elected and appointed officials, employees, volunteers and others working on behalf of the Indemnified Party, against any and all claims, demands, suits, or losses, including all costs connected therewith, and for any and all damages which may be asserted, claimed, or recovered against or from the Indemnified Party, its elected and appointed officials, employees, volunteers or others working on behalf of the City, arising out of this Agreement, including but not limited to those by reason of personal injury, including bodily injury or death and/or property damage, including loss of use thereof, including those which may arise as a result of the Indemnifying Party's acts, omissions, faults, and negligence or that of any of his employees, agents, and representatives.

Independent Contractor: No provision of this contract shall be construed as creating an employer-employee relationship. It is hereby expressly understood and agreed that Contractor is an "independent contractor" as that phrase has been defined and interpreted by the courts of the State of Michigan and, as such, Contractor is not entitled to any benefits not otherwise specified herein.

Insurance/Worker's Compensation: Contractor shall not commence work under this contract until he has procured and provided evidence of the insurance required under this section. All coverage shall be obtained from insurance companies licensed and authorized to do business in the State of Michigan unless otherwise approved by the City's Risk Manager. All coverage shall be with insurance carriers reasonably acceptable to the City of Flint. Contractor shall maintain the following insurance coverage for the duration of the contract.

(a) Commercial General Liability coverage of not less than one million dollars ($1,000,000) combined single limit with the City of Flint, and including all elected and appointed officials, all employees and volunteers, all boards, commissions and/or authorities and their board members, employees and volunteers, named as "Additional Insureds" with respect to Contractor's duties and activities under the scope of this Agreement. This coverage shall include the following coverages as found in the most current edition of the ISO occurrence basis form CG 00 01: Bodily Injury, Personal Injury, Property Damage, Contractual Liability, Products and Completed Operations, Independent Contractors; Broad Form Commercial General Liability Endorsement and (XCU) Exclusions deleted. This coverage shall be primary to the Additional Insureds, and not contributing with any other insurance or similar protection available to the Additional Insureds, whether said other available coverage be primary, contributing, or excess.

(b) Workers Compensation Insurance in accordance with Michigan statutory requirements, including Employers Liability coverage with limits of one million dollars ($1,000,000) per accident.

(c) Commercial Automobile Insurance in the amount of not less than $1,000,000 combined single limit per accident with the City of Flint, and including all elected and appointed officials, all employees and volunteers, all boards, commissions and/or authorities and their board members, employees and volunteers, named as "Additional Insureds." This coverage shall be written on ISO business auto forms (or its equivalent) covering Automobile Liability, code "any auto."

(d) Professional Liability - Errors and Omissions. All projects involving the use of Architects, civil engineers, landscape design specialists, and other professional services must provide the City of Flint with evidence of Professional Liability coverage in an amount not less than one million dollars ($1,000,000). Evidence of this coverage must be provided for a minimum of three years after project completion.

Contractor shall furnish the City with a certificate of insurance for all coverage requested with original endorsements as required herein for those policies requiring the Additional Insureds. The certificate must identify the City of Flint, Risk Management Division, as the "Certificate Holder." If any of the above polices are due to expire during the term of this contract, Contractor shall deliver renewal certificates to the City of Flint with in ten business days of the expiration date. Contractor shall ensure that all subcontractors utilized obtain and maintain all insurance coverage required by this provision.

Laws and Ordinances: Contractor shall obey and abide by all of the laws, rules and regulations of the Federal Government, State of Michigan, Genesee County and the City of Flint, applicable to the performance of this agreement, including, but not limited to, labor laws, and laws regulating or applying to public improvements.

Modifications: Any modifications to this contract must be in writing and signed by the parties or the authorized employee, officer, board or council representative of the parties authorized to make such contractual modifications under State law and local ordinances.

No Third-Party Beneficiary: No contractor, subcontractor, mechanic, materialman, laborer, vendor, or other person dealing with the principal Contractor shall be, nor shall any of them be deemed to be, third-party beneficiaries of this contract, but each such person shall be deemed to have agreed (a) that they shall look to the principal Contractor as their sole source of recovery if not paid, and (b) except as otherwise agreed to by the principal Contractor and any such person in writing, they may not enter any claim or bring any such action against the City under any circumstances. Except as provided by law, or as otherwise agreed to in writing between the City and such person, each such person shall be deemed to have waived in writing all rights to seek redress from the City under any circumstances whatsoever.

Non-Assignability: Contractor shall not assign or transfer any interest in this contract without the prior written consent of the City provided, however, that claims for money due or to become due to Contractor from the City under this contract may be assigned to a bank, trust company, or other financial institution without such approval. Notice of any such assignment or transfer shall be furnished promptly to the City.

Non-Disclosure/Confidentiality: Contractor agrees that the documents identified herein as the contract documents are confidential information intended for the sole use of the City and that Contractor will not disclose any such information, or in any other way make such documents public, without the express written approval of the City or the order of the court of appropriate jurisdiction or as required by the laws of the State of Michigan.

Non-Discrimination: Contractor shall not discriminate against any employee or applicant for employment with respect to hiring or tenure; terms, conditions, or privileges of employment; or any matter directly or indirectly related to employment, because of race, color, creed, religion, ancestry, national origin, age, sex, height, weight, disability or other physical impairment, marital status, or status with respect to public assistance.

Notices: Notices to the City of Flint shall be deemed sufficient if in writing and mailed, postage prepaid, addressed to **Howard Croft, Department of Public Works Director, 1101 South Saginaw, Flint, Michigan 48502** and **Inez Brown, City Clerk, City of Flint, 1101 S. Saginaw Street, Flint, Michigan 48502**, or to such other address as may be designated in writing by the City from time to time. Notices to Contractor shall be deemed sufficient if in writing and mailed, postage prepaid, addressed to **General Counsel, 200 E. Randolph St., Suite 7900, Chicago, IL 60601**, or to such other address as may be designated in writing by Contractor from time to time.

Payments to Contractor by Client shall be by check payable to Contractor addressed to Contractor's address or by electronic transfer.

R-12 Prevailing Wages: Contractor is aware of City of Flint Resolution #R-12 dated April 8, 1991, which is hereby incorporated by reference, and agrees to abide by all of the applicable covenants and requirements set forth in said resolution.

Records Property of City: The contractor will provide a copy of all documents, information, reports and the like prepared or generated as a result of this contract to the City of Flint.

Scope of Services: Contractor shall provide all of the materials, labor, equipment, supplies, machinery, tools, superintendence, insurance and other accessories and services necessary to complete the project in accordance with the proposals submitted on January 29, 2015. Contractor shall perform the work in accordance with the Standard General Conditions and the Additional Terms and Conditions provided for in this contract in Exhibit A hereto.

Severability: In the event that any provision contained herein shall be determined by a court or administrative tribunal to be contrary to a provision of state or federal law or to be unenforceable for any reason, then, to the extent necessary and possible to render the remainder of this Agreement enforceable, such provision may be modified or severed by such court or administrative tribunal so as to, as nearly as possible, carry out the intention of the parties hereto, considering the purpose of the entire Agreement in relation to such provision. The invalidation of one or more terms of this contract shall not affect the validity of the remaining terms.

Standards of Performance: Contractor agrees to exercise independent judgment and to perform its duties under this contract in accordance with sound professional practices. The City is relying upon the professional reputation, experience, certification, and ability of Contractor. Contractor agrees that all of the obligations required by him under this Contract shall be performed by him or by others employed by him and working under his direction and control. The continued effectiveness of this contract during its term or any renewal term shall be contingent upon Contractor maintaining any required certification in accordance with the requirements of State law.

Subcontracting: No subcontract work, if permitted by the City, shall be started prior to the written approval of the subcontractor by the City. The City reserves the right to accept or reject any subcontractor.

Termination: This contract may be terminated by either party hereto by submitting a notice of termination to the other party, pursuant to Article III of Exhibit A herein. Such notice shall be in writing and shall be effective 10 days from the date it is submitted unless otherwise agreed to by the parties hereto. Contractor, upon receiving such notice and prorated payment upon termination of this contract shall give to the City all pertinent records, data, and information created up to the date of termination to which the City, under the terms of this contract, is entitled.

Time of Performance: Contractor's services shall commence immediately upon receipt of the notice to proceed and shall be carried out forthwith and without reasonable delay.

Union Compliance: Contractor agrees to comply with all regulations and requirements of any national or local union(s) that may have jurisdiction over any of the materials, facilities, services, or personnel to be furnished by the City.

Waiver: Failure of the City to insist upon strict compliance with any of the terms, covenants, or conditions of this Agreement shall not be deemed a waiver of any term, covenant, or condition. Any waiver or relinquishment of any right or power hereunder at any one or more times shall not be deemed a waiver or relinquishment of that right or power at any other time.

Whole Agreement: This written agreement and the documents cited herein embody the entire agreement between the parties. Any additions, deletions or modifications hereto must be in writing and signed by both parties.

IN WITNESS WHEREOF, the parties have executed this contract this (day) 10th of Dec February, 2015.

CONTRACTOR:

Its _____

WITNESS(ES):

CITY OF FLINT, a Michigan Municipal Corp.:

Gerald Ambrose
Emergency Manager

APPROVED AS TO FORM:

FOR

Peter M. Bade
Chief Legal Officer

EXHIBIT A
Additional Terms and Conditions

ARTICLE I – DEFINITION OF WORK

Contractor shall, as an independent contractor and not as an employee or agent of theCity, provide consulting and related services to Client in connection with the Project as outlined in Contractor's Proposal dated January 29, 2015, attached hereto as Exhibit A, hereinafter referred to as the "Services".

ARTICLE II - PAYMENTS

For Services enumerated under this Agreement, the City agrees to pay and Contractor agrees to accept compensation and the payment terms outlined as follows:

Contractor shall be paid a firm fixed fee of $225 per person per hour to perform the Services, as defined further in Article VII. As further defined in this section, the Services provided shall not exceed the following: for the One Week Assessment the fee paid by the City shall not exceed $40,000 for labor and expenses. Contractor shall submit an invoice as soon as practicable after the Project is completed. Invoices so submitted shall be paid within thirty (30) days after receipt byCity.

ARTICLE III - TERM

The Agreement shall be effective as of the date of this Agreement and shall continue for a term not to exceed sixty days.

ARTICLE IV – LIMITATION OF LIABILITY

IN NO EVENT SHALL CONTRACTOR BE LIABLE TO CLIENT FOR INCIDENTAL, INDIRECT, CONSEQUENTIAL, SPECIAL, PUNITIVE OR EXEMPLARY DAMAGES OF ANY KIND - INCLUDING LOST REVENUES OR PROFITS, LOSS OF BUSINESS OR LOSS OF DATA - ARISING OUT OF THIS AGREEMENT (INCLUDING WITHOUT LIMITATION AS A RESULT OF ANY BREACH OF ANY TERM OF THIS AGREEMENT), REGARDLESS OF WHETHER CONTRACTOR WAS ADVISED, HAD OTHER REASON TO KNOW, OR IN FACT KNEW OF THE POSSIBILITY THEREOF.

CONTRACTOR'S LIMIT OF LIABILITY UNDER THIS AGREEMENT SHALL IN NO EVENT EXCEED THE TOTAL PAYMENTS MADE BY CLIENT TO CONTRACTOR.

ARTICLE V – SCOPE OF WORK

The City has asked that work be carried out in stages. This is reflected in the January 29, 2015 Veolia proposal (the Proposal) both in text and in graphics. The initial stages to be carried out are more specifically defined below. The findings in those stages will be used to further identify future work. The Services to be provided are:

One Week Assessment - This involves a Kick Off meeting with the client and a Top Down assessment as defined in the Proposal. Veolia would provide two water and two communication experts for a total of 40 hours each at $225 an hour plus expenses. The product from that week would be a letter or power point presentation reviewing actions taken by the City to date, validating what has been done by the city to date and plans proposed going forward making recommendations for other ideas to try, putting a schedule together for those ideas s if more study or other actions is needed to investigate ideas.. The scope of work will involve the water plant, distribution system and communications with customers. This would include a presentation of the findings to stakeholders and others upon the city's request. The City would provide access to staff, consultants and records for review.

Implementation and Management Assistance - The RFP asked for additional services over a longer period of time. At this point it is not clear if additional services are needed, what type of service this would involve, how the services would be provided and for how long. Any such additional services, terms and

conditions therefore would be negotiated at a later date, whether through change order, amendment or otherwise.

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 02/09/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Marsh USA, Inc.
540 W. Madison Street
Chicago, IL 60661
Attn: Vaolia CertRequest@marsh.com | Fax: 212-948-5053

CONTACT NAME:
PHONE (A/C, No, Ext):
FAX (A/C, No):
E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE		NAIC #
INSURER A:	ACE American Insurance Company	22667
INSURER B:	ACE Fire Underwriters Insurance Company	20702
INSURER C:	Illinois Union Insurance Company	27960
INSURER D:	N/A	N/A
INSURER E:		
INSURER F:		

INSURED
Veolia Water North America Operating Services, LLC
101 West Washington Street, Suite 1400
Indianapolis, IN 46204

COVERAGES **CERTIFICATE NUMBER:** CH-005103059-01 **REVISION NUMBER:** 2

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY			HDO G27340167	01/01/2015	01/01/2016	EACH OCCURRENCE	$ 1,000,000
	X COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 1,000,000
	CLAIMS-MADE X OCCUR						MED EXP (Any one person)	$ 10,000
							PERSONAL & ADV INJURY	$ 1,000,000
							GENERAL AGGREGATE	$ 1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$ 1,000,000
	X POLICY PRO-JECT LOC							$
A	AUTOMOBILE LIABILITY			ISA H0883040A	01/01/2015	01/01/2016	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	HIRED AUTOS / NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	UMBRELLA LIAB OCCUR						EACH OCCURRENCE	$
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$
	DED RETENTION $							$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY			WLR C48139814 (AOS)	01/01/2015	01/01/2016	X WC STATU-TORY LIMITS / OTH-ER	
B	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N: N / N/A (Mandatory in NH)			SCF C48139838 (WI)	01/01/2015	01/01/2016	E.L. EACH ACCIDENT	$ 1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000
C	Contractors' Pollution and Professional Liability			GOO G27269096 001 CPL SIR = $250,000	07/01/2013	01/01/2016	Each Occurrence	1,000,000
							Prof Liab SIR = $1,500,000	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

City of Flint, and including all elected and appointed officials, all employees and volunteers, all boards, commissions and/or authorities and their board members, employees and volunteers are included as additional insured (except workers' compensation and professional liability) where required by written contract. This insurance is primary and non-contributory over any existing insurance and limited to liability arising out of the operations of the named insured and where required by written contract.

CERTIFICATE HOLDER

City of Flint
Risk Management Division
4500 North Dort Highway
Flint, MI 48505

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
of Marsh USA Inc.
Manashi Mukherjee Manashi Mukherjee

EXHIBIT 20

Response to Treasury Questions

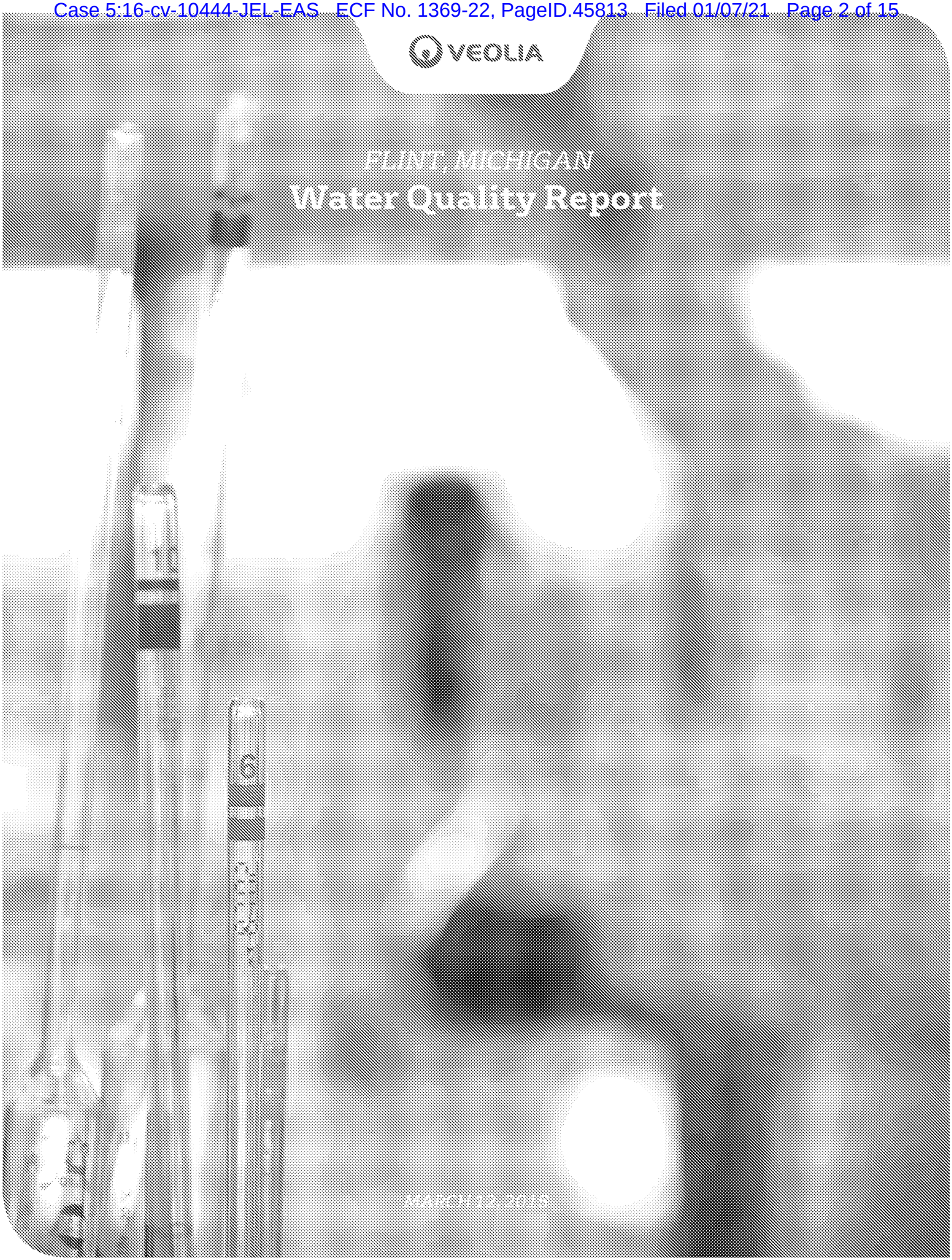
Questions	Answers
What is the basis for the estimated $18M cost to temporarily reconnect to the Great Lakes Water Authority?	We have a letter from DWSD dated January 2015 quoting the rate to return to Detroit. We used these figures along with current City of Flint average usage data to calculate the cost.
What is the timeline?	This will have to be negotiated with DWSD for an accurate timeline, it would only take a few days to coordinate with Genesee County to reintroduce the water into the Flint system once an agreement is reached. There may be a need for a citywide boil water advisory if this occurs.
Why didn't Veolia advise the City about the potential for elevated lead levels when using Flint river water?	Veolia's commissioned scope of work was to focus on the TTHM concerns but they did make corrosion control one of their recommendations and the City along with LAN engineering started the process of developing a plan. The plan was to work with the DEQ to establish the corrosion control following the installation of the new filters
What assurances do you have indicating a temporary reconnection to the Water Authority resolves the elevated lead problem or other system problems?	There are no assurances that changing water sources back to DWSD will eliminate the problems. It is understood that the water from lake Huron may be less corrosive than Flint River water but lead will continue to leach from household plumbing into drinking water.
Who are the assurances from?	N/A
Did the Veolia report recommend using Orthophosphates to treat the water?	The recommendation was to use phosphate.

EXHIBIT 21

VEOLIA

FLINT, MICHIGAN

Water Quality Report



MARCH 22, 2015

Water Quality Report
March 12, 2015

FROM
Veolia North America

TO
Emergency Manager Gerald Ambrose

Executive Summary

The City of Flint changed water sources, transitioning from Detroit's system to the Flint River. This change created water treatment challenges that have resulted in water quality violations. Aging cast-iron pipe has compounded the situation, leading to aesthetic issues including taste, odor and discoloration. Public interest and scrutiny of the drinking water system intensified following the distribution of required public notices of violation.

The City of Flint has made a number of good decisions regarding treatment changes that have improved water quality. However, this is a very complex water quality issue and the City is seeking additional advice on what to do to ensure healthful drinking water for the community.

Veolia appreciates the City's decision to seek independent third parties to review current treatment processes, maintenance procedures and actions taken to date, and provide ideas for improvement. We are pleased to present this final report to the City of Flint following our experts' 160-hour assessment of the water treatment plant, distribution system, customer service and communications programs, and capital plans and annual budget.

This report provides recommendations and a roadmap for improvement, though our engagement was limited in scope. Our assessment included reviewing actions taken by the City to date, validating the City's plans going forward, and making recommendations for ideas not being considered.

Although a review of water quality records for the time period under our study indicates compliance with State and Federal water quality regulations, Veolia, as an operator and manager of comparable utilities, recommends a variety of actions to address improvements in water quality and related aesthetics including: operational changes and improvements; changes in water treatment processes, procedures and chemical dosing; adjustments in how current technologies are being used; increased maintenance and capital program activities; increased training; and, an enhanced customer communications program.

We are also providing a recommended schedule and estimated costs for implementing changes. It is our desire to help Flint residents and public officials better understand the current situation so that informed decisions can be made to ensure safe drinking water for the city's customers.

Review of Actions Taken to Date

To address water quality issues, the city has made operational changes, sought help from the State, hired engineering firm Lockwood, Andrews & Newnam, Inc. (LAN) to provide additional advice, and hired Veolia for an assessment from a utility operator's perspective. The City has also reached out to different specialty vendors (chemical suppliers, filter companies and tank aeration companies) for information about products to help with the TTHM issues. These are logical steps to take.

Flint is not alone in dealing with TTHM problems, as many utilities across the country are facing this challenge. The City appears to be following standard steps that many of those communities are taking to successfully correct the problem.

Although the primary focus of this review was based on solving the TTHM problem, the public has also expressed its frustration over discolored and hard water. Those aesthetic issues have understandably increased the level of concern about the safety of the water.

The review of the water quality records during the time of Veolia's study shows the water to be in compliance with State and Federal regulations, and, based on those standards, the water is considered to meet drinking water requirements.

The City has been proactive in its efforts to reach out to the medical community, to set up a phone number and email address to receive complaints, to post State Water Quality reports, to provide the list of EPA required water tests, and offer to test the water at customers' homes.

From our review, these numerous efforts demonstrate how the city is trying to be transparent and responsive beyond what many other communities might do in similar circumstances.

State Report

The Michigan Department of Environmental Quality (MDEQ) has requested specific actions be taken related to the total trihalomethane (TTHM) issues. The February 2015 report from LAN (*Operational Evaluation Report TTHM Formation Concern*) indicated apparent reasons for the elevated levels of TTHM in the distribution system. These generally relate to high Total Organic Carbon (TOC) in the water source, improperly operating equipment both in the plant and the distribution system, less-than-optimal plant TOC removal and old cast-iron pipe in the distribution system. **Our assessment confirms that these reasons are likely given our on-site laboratory testing and analysis, as well as our first-hand observations.**

Due to time constraints, LAN's report to the State was submitted prior to Veolia's final analysis and recommendations, and contained a number of key initial and contingent steps the City should consider, including:

Initial Actions

- Hire a Third Party Water Quality Expert to Complete Independent Audit
- Obtain a THM Analyzer
- Carry Out Jar Testing
- Water Plant Optimization Softening
- Water Plant Optimization Disinfection of Filter Beds (Pre-Chlorination)
- Water Plant Optimization Polymer Aid to Coagulation and Flocculation
- Increase Water Main Flushing
- Water Modeling Cedar Street Pump Recirculation
- Water Modeling West Side Pump Recirculation
- Broken Valve Locations
- Increase Flushing

Contingent Actions

- Fix Ozone System
- Start Feeding Coagulant and Flocculation Polymer
- Convert to Lime and Soda Ash Softening
- Change Disinfection to Chloramine or Chlorine Dioxide Temporarily
- Install Pre-Oxidant at Intake
- Replace Filter Media Implement Advanced Treatment
- Increase Main Flushing
- Continue Valve Replacement
- Emphasize Cast Iron Pipe Replacement

Veolia's Recommendations

While many of Veolia's recommendations match the initial assessment provided by LAN, our approach, as an operator and manager of comparable utilities, considers a more comprehensive solution. These improvements include operational changes, differences in water treatment regimes and chemical dosing, increased maintenance, and increased training.

- **Addition of Permanganate –** The addition of a permanganate chemical will help reduce ozone demand as well as chlorine demand. The reduction of ozone is needed to help eliminate the possibility of violating the bromate limit. The addition of the chemical will require state approval, submission of design documents for approval, procurement of the equipment and installation. The State has indicated they will work with the City on expediting review and approval of any requested changes. The required dosage of permanganate is estimated to range from 0.5 mg/L to 1.2 mg/L with a corresponding price of $160,000 to $320,000 per year. (Please note – The water in the river is dynamic which means it will change with weather, seasons and other factors. The estimates provided are based on bench testing at a given time and as such require the operators to test water and to verify chemical dosages on a frequent basis.)
- **Reduction of Ozone Feed –** Treating water is a delicate balance - increasing ozone to fix the TTHM problem can raise bromate levels to a point of violation. The introduction of permanganate is being recommended to reduce the demand for ozone so that feed rates will not exceed 5 mg/L. The current ozone dosing has been as high as 8 mg/L and, as such, if allowed to continue, will increase the risk of violating the bromate levels.
- **Increase of Ferric Chloride –** Four coagulants were tested by Veolia -ferric chloride, ferric sulfate, polyaluminum chloride (PACl) and aluminum chlorohydrate (ACH). Ferric chloride and ACH were found to be the best choice of product for effectiveness in removing TOC, a precursor to TTHM formation. Current ferric chloride dosages are too low and dosages of 100 mg/L or more are recommended. Again, please note, that the amount of chemical needed changes with the nature of the river and as such, water must be tested multiple times a day with corresponding changes in chemical dosages. This increase to 100 mg/L is twice what is currently being fed and much higher than what had previously been fed last year. The increase in chemical costs could be up to $1,000,000 per year. This change in dosage (using ferric chloride) can be made immediately without state permit review.
- **Reduction of Lime –** Lime is currently being overfed. A higher dosage of lime does not necessarily mean better treatment. A review of different dosages with jar testing indicates that the current dosage of 280 mg/L can be reduced to 230 mg/L. This represents a potential range of savings of up to $270,000 per year. This change can be made immediately. It should be noted that the current softening equipment is in poor condition, which does complicate the treatment process with a poor balance of flow between the two basins, weirs that are not level causing bypassing with the softener basins, and simply old mechanical equipment that periodically breaks down. This equipment is not going to be needed when a change to lake water occurs. Addition of soda ash to help further reduce hardness in cold weather might require dosages up to 40 mg/L with an annual chemical cost up to $320,000. There have also been some questions or complaints from the public regarding hard water. The water entering the plant is currently 360 mg/L and the plant is reducing that level of hardness to about 210 mg/L. Optimization of the dosage can reduce the hardness

further to about 180 mg/L. This reduction however has been sporadic as equipment breakdowns and high flows have caused problems keeping the softening process on-line. As we have noted before, the dosage needs to be adjusted daily or more often based on process control monitoring. The raw water hardness in the summer is much less than in the winter. For illustration purposes, the difference could be 360 mg/L in raw water in winter compared with 220 mg/Lin the summer.

- **Eliminate Pre-Chlorination on the Filters –** The reduction of pre-chlorination on the filters during the summer months can help reduce TTHM formation. This action has to be considered carefully with procedures documented and reviewed for engineering principles. As such, it will take time for the design engineer to determine what could be done to assure the proper chlorine contact time and document that other safety protocols in water are met. This requires state approval. Any submission should be considered along with a possible change in filter media. If Granulated Activated Carbon (GAC) is installed then the pre-chlorination would be stopped or drastically reduced because of the chlorine impact on the GAC filter media. Veolia's initial investigation into changes in chlorine feed point indicate that the recommended action can be accomplished while maintaining the required regulatory contact time for disinfection.
- **Change Filters to Granulated Activated Carbon (GAC) –** The object of the other changes being made is to reduce the TOC before chlorine is added into the process. The plant by design is limited on the amount of TOC removal possible. A maximum removal of only 60% is likely if the plant is properly optimized. The change of filter media to GAC would provide the best reduction possible and provide better than 90% removal dramatically reducing the potential for TTHM formation and thus ensuring compliance with that parameter for the water system. The change in filter media; however, is complicated requiring approval by the state, design of the changes, procurement of the media and a contractor to install it. That will take time and is likely in a range of $1.5 million (more or less) in cost. The use of GAC also requires more testing and monitoring of the media and the TOC than with the current media. GAC will accumulate TOC and begin to become in effective after a period of time. Depending upon the level of TOC reaching the filters this could be as short as 3 months and as long as 9 months. The amount of TOC is dependent upon the river water quality and operation of the other plant processes. Once the ability of the filters to remove TOC is diminished, the GAC media has to be replaced if river water continues as a source. The change to lake water will not require TOC removal and the media could continue to be used as filter media for that new water source.
- **Corrosion Control –** The primary focus of this study was to assure compliance with the TTHM limits. That is not the only problem facing the city and its customers though. Many people are frustrated and naturally concerned by the discoloration of the water with what primarily appears to be iron from the old unlined cast iron pipes. The water system could add a polyphosphate to the water as a way to minimize the amount of discolored water. Polyphosphate addition will not make discolored water issues go away. The system has been experiencing a tremendous number of water line breaks the last two winters. Just last week there were more than 14 in one day. Any break, work on broken valves or hydrant flushing will change the flow of water and potentially cause temporary discoloration.
- **Eliminate a Storage Tank** - The water system has more storage than it requires, due to excess capacity in the water lines in combination with the storage tanks. The City has already employed LAN to update the hydraulic model. The hydraulic model should be used to help determine if water levels can be lowered further and even to remove some storage tanks from service. That decision may need to be made

seasonally. For example demand during water main breaks last week required extensive amounts of water. The excess storage is more a problem with TTHM formation for the system in summer than winter.

- **Prioritize Valve Replacement** - The hydraulic model shows long water age in portions of the system that appear to be contributing to the TTHM problems. LAN has updated the model to include the location of broken valves and that added information is being used to identify other system problems. The City has a contract for valve turning and repair work that should be focused on known broken valves, particularly in sections of the distribution system with old water age. This activity however must wait until warmer weather in fear of causing problems in the water system with lines freezing.
- **Target and Increase Flushing –** Flushing the fire hydrants can be useful in cleaning out lines to minimize discolored water complaints and also helping reduce the age of water. This DOES NOT mean just opening hydrants. The hydraulic model needs to be used to determine which hydrants should be opened and for how long to ensure the lines are properly cleaned. For example, this might require 15 minutes or even several hours of flushing depending on location. The flushing of hydrants also needs to include records of hydrant condition, color of water initially and after periodic increments plus chlorine residual testing. All of that information will help provide information to the engineers on the effectiveness of the procedure. Each crew doing the work should be trained to help explain the process to the public and also warn neighborhoods about flushing so that staining of laundry can be avoided.
- **Change to Lake Water –** The changes being made now to the water plant will not be the same changes required to treat lake water once it becomes available. A thorough analysis and plan needs to be made in preparation of that switch. This is going to need to include changes in how the plant is operated, like eliminating lime softening and reducing the dosages of many chemicals. Consideration will also have to be given to algae treatment when lake water is being used.
- **Operating Programs –** All of the changes discussed above are based on testing and techniques proposed by engineers and skilled operators of both LAN and Veolia. The staff will need further training and implementation of detailed protocols to successfully implement the changes and to ensure long-term success at the plant. This means the City needs to implement a series of programs to ensure success in these changes.
    - **Process Control Management Plan** (PCMP) – The amount of testing and resulting changes in chemical dosages, along with monitoring the impact on the water, will require a well-documented process that all operators follow. An example of this is jar testing, which is used by the operators to identify the most effective chemicals and dosages to optimize treatment. The staff understands the basic treatment process but needs further practice and training to become proficient in the use of routine process control to adjust for water quality. This is commonly referred to as a PCMP and is used as a standard operating procedure so that the operators on the day shift can communicate with the night shift, that operators are following the same treatment plan for water, that the adjustments are unified between different shifts and different people, that a desired water treatment quality is defined and variations from it signal alarms and that the staff knows what to do when the water quality setpoints begin to drift away from its desired quality levels.
    - **Lab QA/QC –** The operation of the water plant is dependent upon accurate lab results. Standard operating procedure needs to be set and lab technicians trained in that process. EPA and the State

set procedures and standards to be met and the staff should strive to meet those standards. The City has already purchased a TTHM analyzer but should also consider a TOC analyzer that can be an online continuous device to provide immediate information on influent and effluent levels of TOC. Part of the lab records should be historical review of data to help operators better understand the changes they make in the plant.

- **Maintenance Management** – The key to water equipment is having all the equipment effectively maintained and functioning properly. The current capital program is fixing many broken pieces of equipment and updating the plant to current standards. This however must be followed with a rigorous maintenance program that ensures the proper preventive maintenance, is able to predict when maintenance is needed to keep equipment functioning properly and responsive to changes in flows and source water quality.
- **Training** – The changes being suggested are new to the staff and as such training needs to be provided in what the changes involve, why they are being made, the impact on the water quality, and how best to run the plant. A good demonstration of skill level is for the staff to become certified by the State as a licensed water plant operator. Many utilities now require all operators to hold at least the minimum certification level as a starting point and offer incentives to increase their certification level.

- **Communication Program –** The city should lay out an immediate, written strategy for communicating with the public in the short-term, as well as a 6-to-12 month strategy that contemplates known, future events like the KWA pipeline and switch to lake water. A wide range of activities are underway to work with the public but a comprehensive and coordinated effort, with a strategic focus, will help the utility and its customers.
  - **Dedicated Communications Personnel –** The City has a single, dedicated public information officer, tasked with providing service to all of city government. The current focus on communications support for Public Works, and the anticipated needs over the next several years, indicate the city would benefit from the hiring of a staff person in Public Works who could establish a communications program designed to provide clear and concise information to a broad audience though a number of different channels. In the interim, the city could hire a communications intern, local communications firm, or somebody with experience who is able to provide reduced or no-cost services for the immediate future.
  - **Communications Planning – Public Notification** – The City should be congratulated on its efforts to keep the public informed. It is posting its monthly reports on the web page to provide transparency, though these reports are highly technical – and may be too technical for the customer base at large. They are valuable to those customers who do want this level of detail. The city should create a single-page dashboard of information that outlines the water utility's performance for the previous month, post the dashboard on the website, print copies for distribution at customer service or other reception areas, and be provided during speaking engagements or other events. This dashboard should be easy to understand, and include:
    - The number of water quality tests conducted the previous month
    - The number of violations reported

- Whether these results are in or out of compliance
- Information about other proactive measures such as main and hydrant replacements, or other programs to improve performance of the water utility
- Benchmarking information so the reader has a greater understanding of how Flint compares with other similar utilities in the region and across the country

- **Public Meetings –**There should be additional, proactive coordination with neighborhood, community and civic groups to provide speakers on timely topics. Given the list of numerous responsibilities, the Public Works director cannot do it alone – the city should identify three or four other staff members, knowledgeable about the water utility who can also speak to various groups, provide information and answer questions. The development of an outreach strategy to target key neighborhood, community and civic groups also will advance the communications effort and the dissemination of information in both the short and long term.
- **Standard tools** – Work crews in the field are often the faces of the utility – the city should create standardized tools for communicating with the public that can be easily and quickly delivered to the community in the event of main breaks, flushing or pre-planned capital improvements. Tools should include:
  - Door hangers for individual distribution
  - Yard signs with simple messaging to be placed near work-sites
  - A simple tri-fold brochure with useful information about the utility and appropriate contact information
  - Specific flyers about a range of topics
  - Infographics about how the water system works, from the intake to the customer's site
- **Change in Billing Format –** The City currently has no real way to reach all customers on a regular basis and provide information. The city should consider changing from a billing postcard to using an envelope and bill stuffer. Monthly or bi-monthly bill inserts are typically used to provide educational material for customers and are standard ways to provide information. Understandably, budget considerations must be taken into account.
- **Use Public Affairs Programming and Opportunities –** The news media has been covering this topic quite extensively – there are other media-related opportunities that may reach a wider audience. Taking advantage of these opportunities will help the city relay information to its customers and the community.
  - Participate in regular editorial-board meetings to provide background information and updates on key milestones or events.
  - Identify a local weekly television program and offer to provide guests to speak about key milestones or upcoming events.

Conclusions and Next Steps

The focus of this report is to help assure TTHM compliance and then improve general water quality. The City had good results in its most recent TTHM tests, although that is to be expected with the changes made to date and the cooler weather which contributes to low TTHM formation. Warm weather will be a different situation both in the nature of the Flint River water quality and in the formation of TTHM. With those changes coming, the City needs to act quickly to make improvements before additional testing takes place this spring and summer. The summary below provides the recommended actions, a priority for their implementation and projected costs either operational or capital. The costs are rough orders of magnitude and will vary with changes in water quality, operational decisions, and engineering choices being made and in some cases require State approval. Although a priority is assigned many of these actions can take place simultaneously.

Priority	Action	Annual Operational Cost	One Time Capital Cost
1	Implement operating programs for process control, lab QA/QC, maintenance, and training. These programs are needed regardless of the TTHM issue and will help with transition to lake water. The City has decided upon a central maintenance software and the water system should be the first to utilize this program since costs are already budgeted. These programs should be initiated immediately.	$ 25,000	$ 250,000 - $ 350,000
2	Contract with your engineer and initiate discussions with the State on the reduction of chlorine prior to the filters and changing the filter media to GAC. This activity has the longest time frame for design and approval, but also is extremely critical to assuring reduced TTHM production. The current filter cleaning and maintenance project needs to be adjusted to take into consideration the change in filter media both to dispose of the anthracite instead of cleaning and to install the GAC. This entire project needs to be done by early July to assure a flow of water throughout the system. Several months are required for the engineering design, State approval, bidding of work and installation of GAC and as such needs to begin now.	$ 0	$1,500,000
	Contract with your engineer and initiate discussions with the State on the addition of 0.5 to 1.2 mg/L of either potassium permanganate (dry) or sodium permanganate (liquid). This will take time to get approved and to implement. The use of liquid tanks at the raw water pump station may be the quickest and least expensive alternative for a temporary measure.	$ 160,000 - $ 320,000	$ 50,000

	Contract with your engineer and initiate discussions with the State on the addition of a corrosion control chemical. This action can be submitted and discussed with the state at the same time as the other chemical and filter changes saving time and effort. A target dosage of 0.5 mg/L phosphate is suggested for improved corrosion control.	$ 50,000	$ 50,000
3	Increase the ferric chloride dosage to 100 mg/L depending on river water TOC levels. (Lower TOC levels can be treated with less ferric chloride.) This change can be made now and is allowed by the State.	$ 1,000,000	$ 0
	Reduce the ozone feed rate to 5 mg/. This change can be done now and does not require State approval.	($50,000 – $100,000	$ 0
	Reduce the lime dosage to minimize hardness levels after softening. This will eliminate magnesium removal during treatment, but will also reduce total hardness. A reduction in carbon dioxide dosing for recarbonation treatment also is expected due to the reduction in lime feed. This change can be made now and does not require State approval.	($270,000)	$ 0
4	Confirm with the engineer when the revised hydraulic model will be completed and if necessary for time to focus on areas of longest water age if that would speed up the effort. Identify impact of reducing tank levels or eliminating a tank seasonally to improve water age. Include with this effort a list of hydrants to flush along with time required to assure drawing fresh water through the system. The engineer has been assigned this task already and confirmation of the timing of a delivery is needed.	$ 0	Already Contracted
	Ask the engineer to identify closed valves on a map that are impacting water age and that can be bid for replacement as soon as weather permits. Have the engineer identify areas of the system where the valve contractor should be focused on finding and fixing closed valves.	$ 0	Already Budgeted
5	Implement the recommendations in the communications program including a person assigned to public works education, using envelopes instead of cards along with bill stuffers for education and provide training for staff. Envelopes and bill stuffers are expensive and might be done periodically and not every month. The cost of TTHM notices, Annual Water Quality Reports and City notices should be figured into if any additional costs would exist. Many of these changes are underway now by the City.	Position Being Budgeted	

Notes

- The costs provided are rough order of magnitude which final engineering will firm up but will fluctuate with final decisions on engineering, operating technique and water quality.
- The change from river to lake water will dramatically cut the chemical costs as less is needed once the change occurs. This means that potassium permanganate will likely not be needed, ferric will drop as much as it went up, ozone levels will be lower and little lime will be needed.

Results Expected

The real question is what changes can be expected from these results in lowering the TTHM, improving the aesthetics and preparing for the change to lake water.

- **TTHM –** The City has already made great strides in reducing the TTHM levels with the changes already made. The additional suggestions by Veolia will further reduce TTHM in the water and help get the city released from the notices being provided to customers.
- **Hardness –** The hardness entering the plant this winter is 360 mg/L with the current system reducing it to 210 mg/L and optimization will reduce to about 180 mg/L. During the summer the levels will be lower probably in the 140 mg/L to 150 mg/L range. The target set by the current best operating practices is 120 mg/L to 150 mg/L.
- **Discolored Water –** The discolored water is caused by the old unlined cast iron pipe. The water from the plant can have an impact on discolored water, but a greater concern is the breaks and construction work that disrupt the flow of water causing discoloration. A polyphosphate is suggested to help bind the old cast iron pipe reducing instances of discolored water. This along with improve flow of water and programmed hydrant flushing will help, BUT WILL NOT eliminate discolored water occurrences.
- **Change to Lake Water –** The recommendations include the suggestion of programs to help the staff better manage the treatment process, additional testing to adjust the plant and additional lab monitoring, a maintenance program focused on keeping equipment properly functioning and more training for staff to improve their skill level. Those actions will prepare the staff for the change of water sources when it comes next year in addition to developing a thorough plan for the switch.

Resourcing the world

Veolia North America
101 West Washington Street, Suite 1400 East • Indianapolis, IN 46204
tel. (859 582 0104 • fax (317) 917 3718
rob.nicholas@veolia.com
twitter: @veolia_na
www.veolianorthamerica.com

EXHIBIT 22

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

IN RE: FLINT WATER CASES	No. 5:16-cv-10444 Hon. Judith E. Levy Mag. Mona K. Majzoub

HIGHLY CONFIDENTIAL

VIDEOTAPED DEPOSITION OF MARVIN GNAGY

VOLUME I

Thursday, December 12, 2019
at 9:05 a.m.

Taken at: Weitz & Luxenberg PC
3011 West Grand Boulevard, Suite 2100
Detroit, Michigan 48202

REPORTED BY: CAROL A. KIRK, RMR/CSR-9139
GOLKOW LITIGATION SERVICES
877.370.3377 ph | 917.591.5672 fax
deps@golkow.com

not want to consider, and that was looking at ammonia feed to produce chloramination.

Q. If you had concluded that treating these problems in the Flint River would cost a lot more than just switching back to Detroit, are you saying you wouldn't have needed to tell the city that?

MR. MCELVAINE: Objection.

You can answer.

A. We gave the city what we perceived would be chemical treatment and solids handling costs for treating the Flint River as well as the KWA or whatever that reservoir water was going to be, at least the data that we could find on what that water quality might be. It did show that the KWA water would be cheaper to treat; however, it also showed that the Flint River water could be treated to provide adequate drinking water to the citizens of Flint.

Q. You understood it would cost millions of dollars to implement the changes you recommended, right?

A. I'm aware there would be some money that would have to be spent, yes. I'm

not -- I don't know how much. We didn't evaluate that.

Q. And you didn't evaluate the relative costs of switching to Detroit versus staying in Flint and implementing your changes, did you?

A. No, we did not.

Q. You did not implement -- you didn't -- sorry.

You did not evaluate the relative effectiveness of staying with Detroit versus implementing some or all of the changes you recommended, did you?

MR. MCELVAINE: Objection.

You can answer.

A. No, we didn't evaluate that.

Q. You knew from the get-go that at least some people from --

A. Excuse me.

Q. You knew that some people from the city didn't want to address going back to Detroit, right?

MR. MCELVAINE: Hold on a second.

Okay. You can answer.

A. The people that we had communications with indicated that that was their choice, yes.

Q. And who was that?

A. That would have been -- well, in the kickoff meeting, Howard Croft specifically told us that.

Q. Anyone else?

A. Jerry Ambrose told us that.

Q. And they told you it would be too expensive to go back to Detroit?

A. I don't know. We were told that it would -- it was costing $12 million a year more than using their own treatment plant, I believe were the figures. I don't know for sure.

Q. Did you believe you had any obligation to advise the city if, notwithstanding the cost concerns that these individuals had expressed, you thought the best technical solution was to go back to Detroit?

MR. MCELVAINE: Objection.

You can answer.

A. Again, I can't even say it's the

best technical solution. It is one alternative. It was taken off the table by the city. We didn't evaluate it any further. We looked at what it would take to treat the Flint River water to meet the THM conditions and to mitigate red water occurrences.

Q. But your client is the city, right? It's not these individuals?

A. That's correct.

Q. So if you concluded that going back to Detroit was the best technical solution, you would have needed to tell the city that, wouldn't you?

A. We told --

MR. MCELVAINE: Objection.

You can answer.

A. We told the officials for the city that that was a possibility.

Q. So you did tell the officials it was a possibility to go back to Detroit?

A. I told them it was one alternative. I stated that the first day on site. I also told Mr. Ambrose, before the public meeting, that that was an alternative.

Thursday Afternoon Session
December 12, 2019
1:37 p.m.

- - -

THE VIDEOGRAPHER: We're back on the record at 1:37 p.m.

- - -

(Gnagy Deposition Exhibit 11 marked.)

- - -

BY MR. MORRISSEY:

Q. Mr. Gnagy, what I've handed you as Exhibit 11 is an e-mail to you an and Mr. Chen from Brent Wright at the city that attaches the --

MR. MCELVAINE: There's no e-mail attached. We just have the data. The witness doesn't have it either.

MR. MORRISSEY: All right. Somehow it didn't get copied to it, but just for identification, I will hand you the cover e-mail.

BY MR. MORRISSEY:

Q. You received the results that were attached to this e-mail by e-mail from Mr. Wright; is that correct?

A. Yes.

Q. All right. You can hand me that back. I don't have any questions about the e-mail itself.

MR. MCELVAINE: Want to just tell them for everybody's purpose?

MR. MORRISSEY: The e-mail, which I handed the witness, is a February 11, 2015 e-mail from Brent Wright to Mr. Gnagy and Mr. Chen. The subject is U of M-Flint test results, and the Bates number is VWNAOS 134131. I believe it's part of the same document that is the remainder of the exhibit, but somehow we missed it in the copying.

BY MR. MORRISSEY:

Q. But anyhow, the exhibit consists of a cover letter from Monarch -- to Monarch Environmental from Brighton Analytical. Do you know who Monarch Environmental is?

A. I do not.

Q. And Brighton Analytical, is that some sort of testing lab?

A. I don't know.

Q. Have you worked with them before?
A. No.
Q. But you received these results from the city of Flint, correct?
A. That's correct.
Q. And you understood these were the results that had been done -- that were the result of looking at the water at the campus, right?
A. The University of Michigan at Flint campus, yes.
Q. Yep. And you reviewed the results?
A. Yes.
Q. And there had been 15 sites on campus tested, correct? If you turn to page 134 --
A. Yes, from this document, it appears there were 15 different samples taken, yes.
Q. And if you turn to page 134145, there are results for a site described as NBCS third floor sample site.
Do you see that?

A. Yes.

Q. And the total lead in drinking water found at that site was 29 --

A. Correct.

Q. -- correct?

And 29 is in excess of the action level, correct?

A. It's in excess of the 15 microgram per liter action level, yes.

Q. And a test result of double the action level for lead is of concern, right?

A. As I stated earlier, it may not be. This is not the -- this is a one sample result. It's not the compilation of the 90th percentile -- excuse me. 90th percentile calculation.

Q. Right. What do you need to do from here to assess whether it's -- once you get this result, you need to do further work to assess whether or not there's a problem, right?

A. That's correct.

Q. Did you do that further work?

A. Yes.

Q. What did you do?

A. You take each of the lead individual samples and list them in order from the smallest value to the largest value. Then you take the number of samples times 0.9, and then that result is the 90th percentile for this sample set. If you do the math on it, 90th percentile comes up to 6 micrograms per liter which is below the action level of 15.

The high result of the one sample at 29 doesn't mean that they violated the lead standards. It means they had a sample or two above the action level.

Q. So once --

A. Let me finish.

Q. Go ahead.

A. In reviewing this data, it appeared to be a normal distribution of data from a statistical data set, 15 samples. It's not 100, but it's 15. And the difference between the 90th percentile and the maximum concentration out of that sample set is within the norm of what we typically see for monitoring data for lead.

Q. By this point, did you know that a

portion of the distribution system consisted of lead pipes?

A. I don't recall whether I did or not at this point.

Q. Okay. And having one of 15 samples at double the action level, did that lead you wanting to do any further analysis beyond just calculating the 90th percentile for those 15 samples?

A. No.

MR. MCELVAINE: Objection.

You can answer.

A. No. I already stated that this is a normal distribution of monitoring data. A 29 microgram per liter level would not cause me any alarm.

Q. So this didn't give you any pause that there might be an imminent lead problem in the city of Flint?

A. No, just the opposite. It pretty much confirmed that they were in compliance with the Lead and Copper Rule requirements.

Q. And these 15 samples from one spot in Flint, was that all you had at that point?

non-carbonate hardness that are chlorides, sulfates, and nitrates. And with experience in the region, I did a rough feel for what those numbers typically are, and those percentages then were used to determine what those values might look like.

Q. So did you turn to a resource and look up some standards or averages or regional types, or did you take this number out of your head based on your experience?

A. It's based on data from my experience.

Q. So in the course of preparing this document, you didn't turn to any books or websites or internal company charts that informed your numbers on this line that is identified Cl?

A. No.

- - -

(Gnagy Deposition Exhibit 44 marked.)

- - -

BY MR. BERG:

Q. All right. Mr. Gnagy, I've handed you what has been marked as Exhibit 44. It's a

document that states at the top, "City of Flint Drinking Water Lead & Copper Monitoring (July - December 2014)."

Is that correct?

A. That's correct.

Q. And for the record, this is Bates number VWNAOS020758.

Is this the lead test data that you said that you were given by the Flint representatives when you asked for it?

A. It appears to be, yes.

Q. Having now looked at it, can you recall and testify that this is, in fact, what you were given?

A. Yes.

Q. Okay. Do you recall testifying that with respect to the action level calculated at a 90th percentile, that the action level in this test period was 6 or 6-micrograms per liter?

A. I did -- I believe I did state that, yes.

Q. And this bears that out; is that correct?

A. It appears to, yes. .006-milligrams per liter.

Q. And tell me, if you can recall, who it is that you asked to give you this document?

A. Mike Glasgow.

Q. And did Mike give it to you?

A. Yes.

Q. And did you at that point discuss it with anyone else?

A. Mr. Chen.

Q. Okay. Do you recall that discussion?

A. Off the top of my head, no. We reviewed the data while we were at the plant.

Q. Do you recall having any meetings at which people sat around the table and discussed this document in which representatives of the city were present?

A. I don't recall that, no.

Q. How about any such meetings when representatives of the city were not present other than your discussions with Mr. Chen?

A. We discussed the data, I believe,

remember at least a statement that that was being done, yes.

Q. Okay. So you recall that Warren Green may have alluded to it in his conversations with you?

A. Yes.

Q. Is Raftelis Financial a company that you're familiar with?

A. I am not.

Q. Yesterday in your testimony you indicated that you learned since you left Flint that the city was aware of lead results in early 2015 that it did not share with you and Veolia, correct?

A. That's correct.

Q. And in your testimony yesterday, you referenced a test result from the Walters' residence.

Do you remember that?

A. I do.

Q. Were there other test results that you believe the city was aware of in early 2015 that it did not share with you and Veolia?

A. I can't recall with the

information that I have looked at recently whether there were other sites within the city that U.S. EPA was investigating or not. I do know from other presentations about this event, that there were lots of lead and copper samples taken throughout the city that were elevated.

Q. And it's your belief that the city was withholding that information?

A. I think they deliberately withheld it from us, yes.

Q. When you saw the test results from U of M-Flint, you specifically asked the city for their lead and copper test results, correct?

A. I testified to that effect, that we asked for lead and copper test results at some point, yes.

Q. Let's turn to Number 12. Exhibit Number 12 is Mr. Gnagy's notes from February 10, 2015. And the page ending 100, there's a couple slash marks, and then it says "Plant tour."

Do you see that?

A. I do see that, yes.

Q. So is it true that the -- on February 10, there was initially a meeting, and

CERTIFICATE

I, Carol A. Kirk, a Registered Merit Reporter and Notary Public in and for the State of Michigan, duly commissioned and qualified, do hereby certify that the within-named MARVIN GNAGY was by me first duly sworn to testify to the truth, the whole truth, and nothing but the truth in the cause aforesaid; that the deposition then given by him was by me reduced to stenotype in the presence of said witness; that the foregoing is a true and correct transcript of the deposition so given by him; that the deposition was taken at the time and place in the caption specified and was completed without adjournment; and that I am in no way related to or employed by any attorney or party hereto or financially interested in the action; and I am not, nor is the court reporting firm with which I am affiliated, under a contract as defined in Civil Rule 28(D).

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office at Dexter, Michigan on this 27th day of December 2019.

Carol A Kirk

CAROL A. KIRK, RMR, CSR-9139
NOTARY PUBLIC - STATE OF MICHIGAN
My Commission Expires: August 19, 2022.

- - -

EXHIBIT 23

From: Nicholas, Robert [robert.nicholas@veolia.com]
Sent: Wednesday, February 18, 2015 4:02 PM
To: jlorenz@cityofflint.com; Elizabeth Murphy; Howard Croft; gambrose@cityofflint.com
BCC: Robert Nicholas
Subject: Copy of Presentation
Attachments: Flint Public Works Committee Interim Report V6 - Final.pptx

Good Afternoon

You will find attached a copy of the presentation for this afternoon.

--
Rob Nicholas
Vice President, Development
Municipal & Commercial Business
VEOLIA NORTH AMERICA

tel +1 859 582 0104
5071 Endview Pass / Brooksville, FL 34601
Robert.Nicholas@veolia.com
www.veolianorthamerica.com

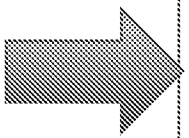
Resourcing the world VEOLIA

City of Flint, MI
City Council Public Works Committee
Interim Water Quality Report

Veolia Scope of Work

Week 1

- Provide a review of current actions
- Engage staff, visit facilities and analyze data
- Make interim report



Week 2

- Carry out more detailed study of initial findings
- Make recommendations for Improving water quality
- Provide a plan, cost and schedule for change

Items of Note

- **Not in scope** – studying why the change from DWSD or the history of the utility
- **What we found** – A very frustrated community and a staff trying to solve the problem, having some success but frustrated with the pace of change

Everybody Is Checking the Safety of Water

- City, state, news media, universities and other groups
- Safe = compliance with state and federal standards and required testing
  - *Latest tests show water is in compliance with drinking water standards*
  - *Monthly report available on web page*
- More than 20,000 tests required annually for city
- Strict testing requirements in place (what and how to test)

Why TTHM Notices?

- TTHM is formed as a result of the reaction between chlorine and organic material in the water
- City is required to test quarterly at 8 sites
  - *Last summer, several sites had more TTHM than allowed*
- City has reduced levels of TTHM and now all sites are in compliance
  - *Customer notification letters are required until tests are in compliance an average of four quarters*
- It will take at least 2 more quarters to lower average
  - *Even a change to DWSD water doesn't solve problem*
- Flint is not alone – hundreds of communities are facing TTHM issues

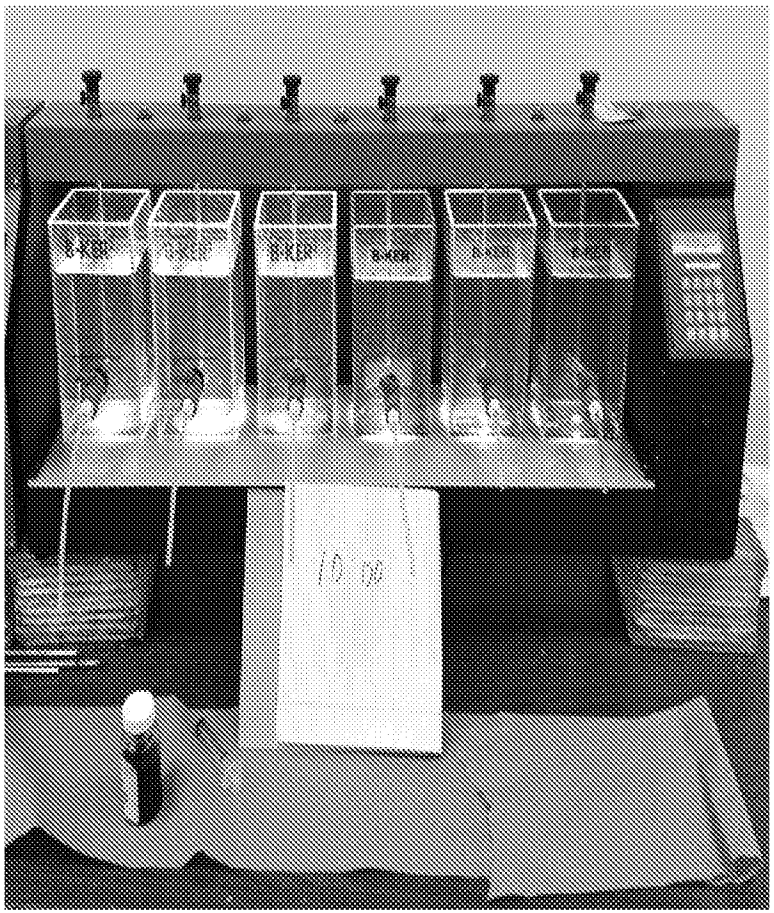
Why Discolored Water?

- Old cast iron pipes
- Always has been some discolored water problems – mostly after water breaks
- Efforts to reducing TTHM didn't help discoloration
  - *Doesn't mean the water is unsafe but it is not appealing and raises questions*
- City will test the water at your home – call 787-6537 or email flintwater@cityofflint.com
- Tracking customer complaints is important

Location of water quality complaints
The last 12 months – fewer than you think

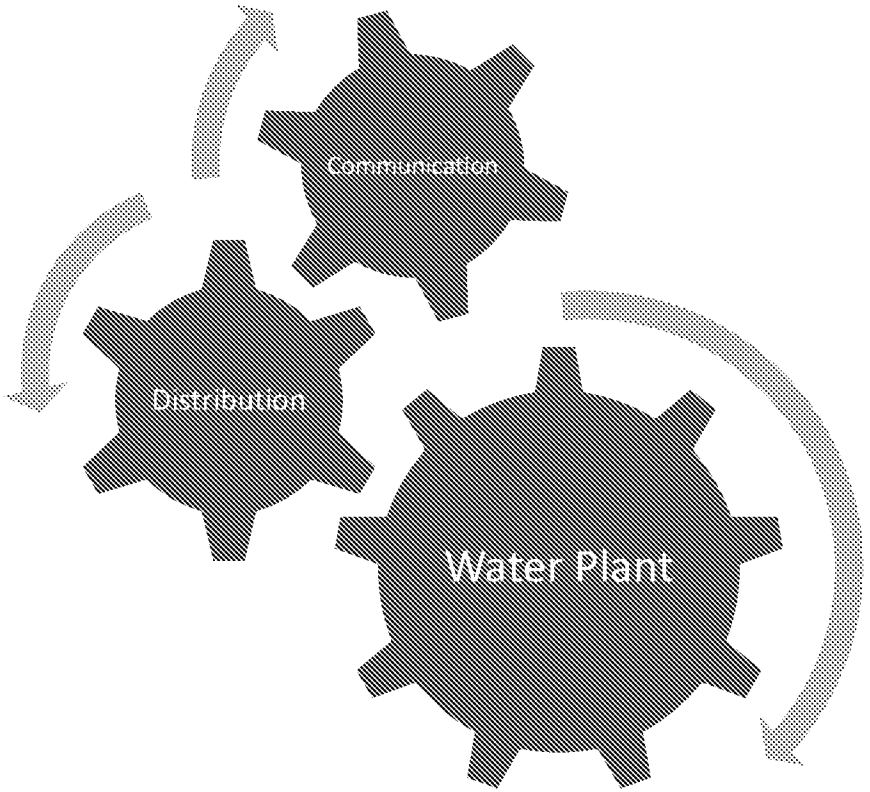
Water Quality Can Be Improved

- Adjust the chemicals being fed – stop some, increase some and change some
- Provide better monitoring of water quality to help make adjustments
- Continue repair or replacement of broken parts
- Reduce the over capacity of the distribution system
- Do a better job explaining what is happening
- Do a better job of asking for help



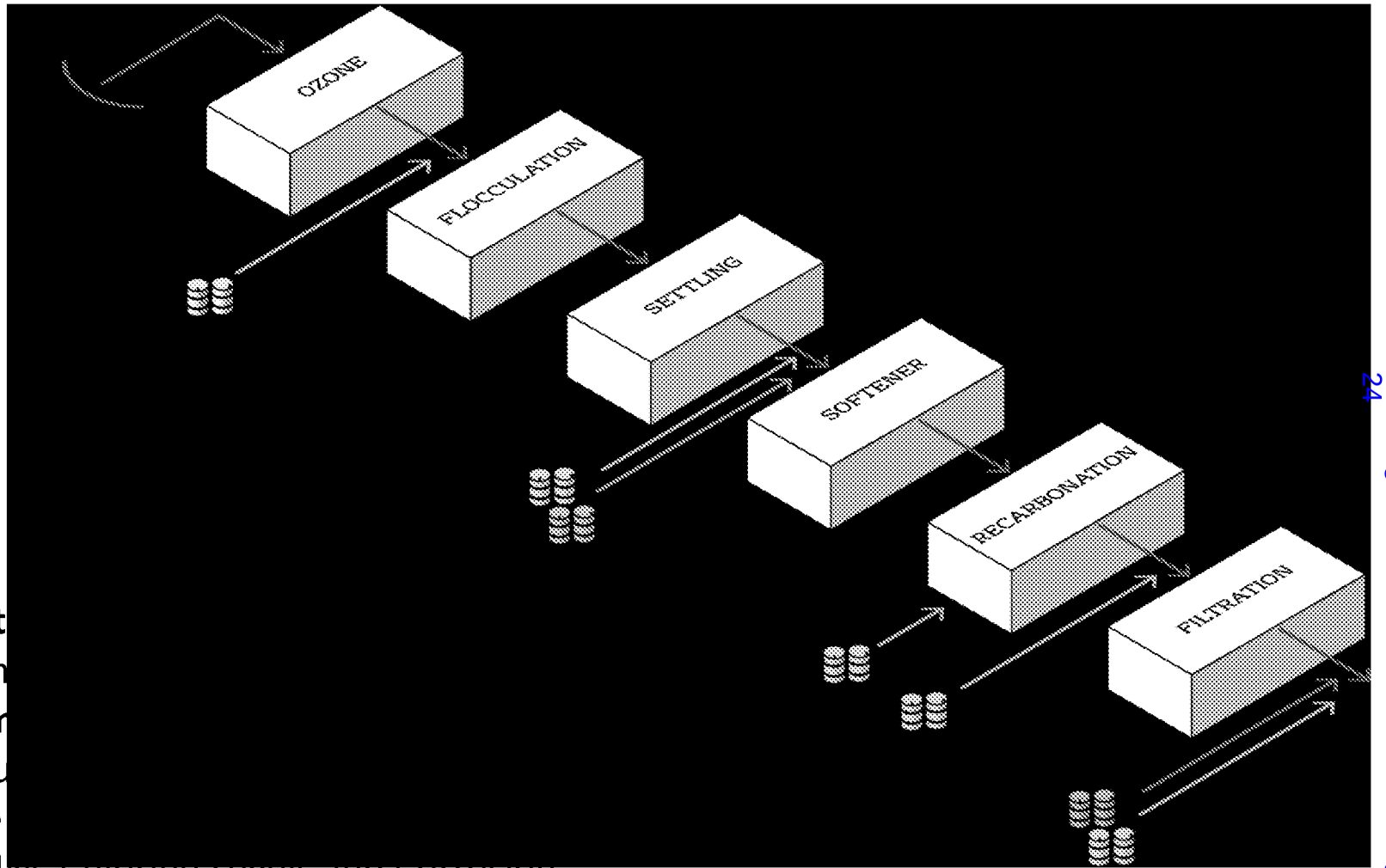
Further Explanation of Solutions

Solution Involves Coordination of 3 Activities



- Water plant improvements
  - *Optimize chemical dosages*
  - *Consider different chemicals*
  - *Change dosing points*
  - *Install granulated activated carbon*
  - *Complete plant upgrades*
  - *Implement best mgt practices*
- Distribution system improvements
  - *Fix broken valves*
  - *Ask for customer feedback*
  - *Reduce tank storage*
  - *Target line flushing*
  - *Run a hydraulic model*
- Better communication with customers
  - *Engage advisory committees*
  - *More accessible utility*
  - *Make it easy to access information*
  - *Better customer communication*

Optimize Plant Processes



- **Test**
  com
- **Com**
  indu
- **Use**
  TTHM, Chlorine Levels and Corrosion

Complete Plant Construction & Re Prioritize Capital

Cost effective plan in budget

- Complete water plant renovation
  - *Target SCADA and instrumentation in plant*
- Speed up valve turning contract & provide money for replacements
- Speed up hydraulic model update to reduce tank volume
- Evaluate installing of granulated activated carbon on filters

Weather can impact timing

Digging up a water valve for repair
Need good weather to start

Implement Best Management Practices

<u>Activities to Help Operators Maintain Good Water Quality</u>

- Process Control Management Plan
- Lab QA/QC Program
- Computerized Maintenance Management System
- Asset Management System
- Training and Certification Program
- Vulnerability Plan

Distribution System Improvements

- Speed up flow of water from plant to homes – 2 weeks plant to house
  - *Find closed valves & open them*
  - *Replace broken valves*
  - *Update hydraulic model*
  - *Reduce system storage*
- Track customer complaints
  - *Test customer water*
  - *Spot flush hydrants to clean areas of stagnant water in the system*

Flushing out discolored water

Improving Customer Service

Make It Easy to Access Information and People

Develop a proactive customer communication plan

- Create advisory committees to help direct efforts and improve flow of information
- Establish a single point of contact to manage all water quality complaints
- Provide additional customer service training to staff
- Expand neighborhood and community outreach
- Change monthly billing statements from card to envelope with information

Example - Communicate in the field

NOTICE: ANNUAL FLUSHING PROGRAM

We are conducting our annual flushing program to enhance your water quality and clean the distribution system.

DC Water crews will be flushing hydrants in your area 10:00 p.m. to 6:30 a.m. on the following dates:

9/24 **through** 9/30

IMPORTANT INFORMATION

- Your water supply will not be shut off during hydrant flushing.
- You may notice slight water discoloration or low water pressure.
- During this time, customers can continue normal water usage, including drinking, bathing and laundry (unless water is discolored).

If you experience discolored water during this period:

- Run your cold water taps for 15 minutes. If it does not clear up, please contact our Drinking Water Division.
- Do not run your hot water. If you experience discolored water from your hot water tap for several hours, then it is recommended to drain and flush your water heater tank.

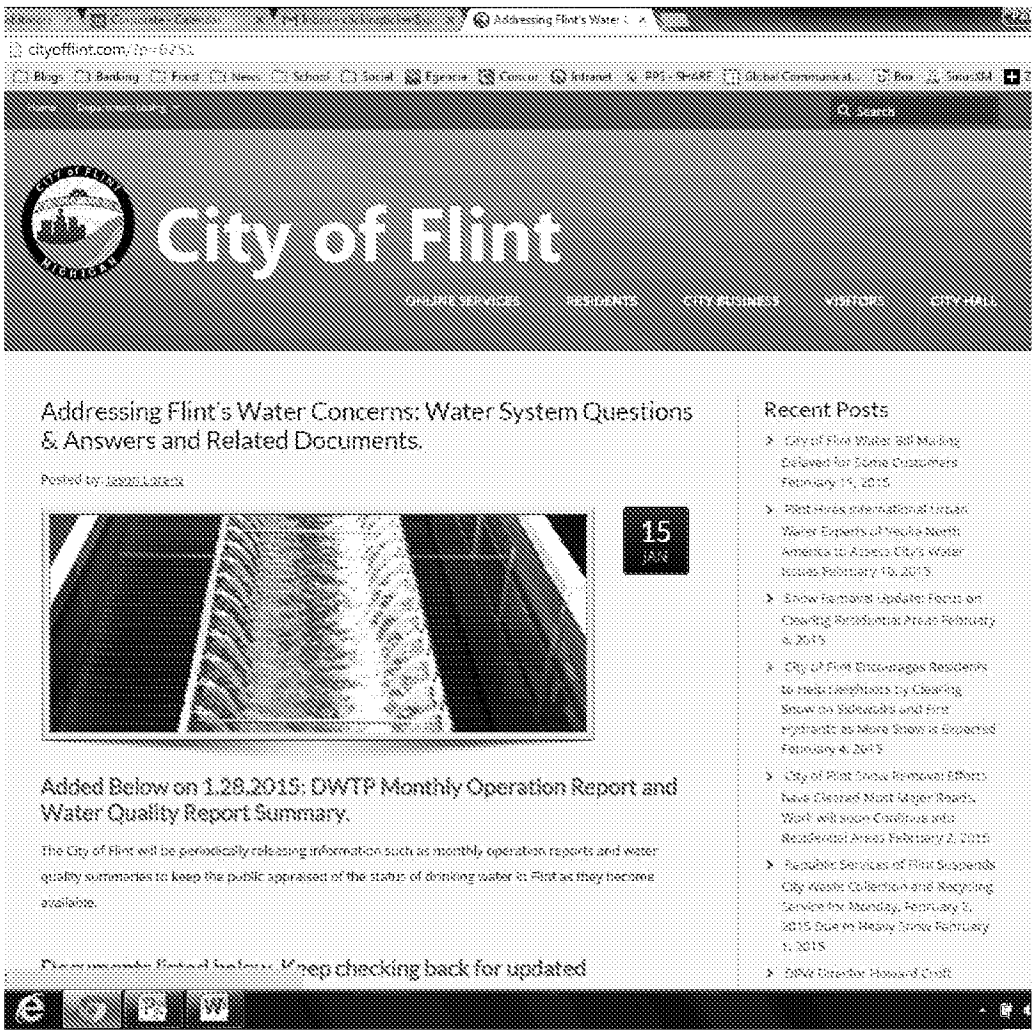
Provide field crews with additional communications tools to use to address questions or concerns from the public

Create door hangers, flyers, or yard signs to notify neighborhoods about main breaks, hydrant flushing, or system maintenance that may affect the public.

Create a business card or other contact card with the name and phone number of the single point of contact with the Department of Public Works who is managing information flow.

**sample door hanger provided by DC Water & Sewer Authority*

Clear, concise information is key



Simplify the reports on the web page dedicated to addressing water system questions

- *Create a single-page, easy to understand report for the public*
- *Use charts or provide other examples to demonstrate water quality testing and system or treatment plant improvements underway*
- *Provide name, phone number and email address for identified point of contact so customers can request more information*
- *Continue to provide Monthly Operation Report and Water Quality Report Summary for those customers interested in more technical information*
- *Use site to provide additional notice of field work that may impact customers*

VEOLIA

What Is Next

Next Steps

Week 1

- Provide a review of current actions
- Engage staff, visit facilities and analyze data
- Make interim report

Week 2

- Carry out more detailed study of initial findings
- Make recommendations for Improving water quality
- Provide a plan, cost and schedule for change

Questions Being Heard

REMEMBER

We just started. Might not have an answer yet to your question

- **When will water improve -** The water has improved with current actions. More changes will occur over weeks and months because of safety reviews
- **Date of next update and final report** – An update will be provided next week and a report the following week.
- **Time frame for implementing recommendations –** The City is already started. Others a few days and some weeks or months due to State approval being required or weather.
- **Cost of changes** – Don't know yet but we are aware of the financial concerns

More Questions Being Heard

- **How are TTHM formed –** It's the reaction of chlorine to organics (leafs, dirt) in the water.
- **How to reduce TTHM –** Reduce organics before introducing chlorine and shorten time chlorine has to react with the organics
- **What causes discoloration –** Older lines, the iron parts of the system will leach iron into the water causing the discoloration. Other times its just air built up.
- **Why no discoloration with DWSD –** There was. Flint had a bad time with breaks of old line and is doing lots of construction. This stirred up the water and caused discoloration.

More Questions Being Heard

- **Can you test my water –** The city will test your water for free. But, only 2 of 20 people have taken the city up on the offer since it began offering the service.
- **Medical problems –** Some people may be sensitive to any water. Talk to your doctor. The City is communicating with the medical community.
- **Confidence that future problems will be avoided –** Recommendations will include putting programs in place to better respond to water changes and assure quality

Veolia

Questions?

EXHIBIT 24

City of Flint Email

Howard Croft <hcroft@cityofflint.com>

Leanne Walters - 212 Browning

5 messages

Michael Glasgow <mglasgow@cityofflint.com> Tue, Feb 24, 2015 at 1:48 PM
To: Howard Croft <hcroft@cityofflint.com>, Daugherty Johnson <djohnson@cityofflint.com>, Robert Bincsik <rbincsik@cityofflint.com>, Brent Wright <bwright@cityofflint.com>

Gentlemen,

We have a new issue with 212 Browning. I was there last week (2/18) for a follow up to the sampling from the week before (2/11). Nothing had changed in regards to discoloration and high iron content. However I had Leanne collect a sample for Lead & Copper as part of our monitoring requirements for 2015. The results come back today and the level of lead was 104 ppb. The limit on lead is 15 ppb. In our previous round of lead and copper sampling in 2014, only 2 samples (out of 100) were above our limit of 15 ppb, with the highest values at 37 & 23 ppb. There is definitely a pressing issue here, and with this recent lead result and the previous iron results, she has some data to prove it. I will have her collect another lead and copper sample to validate or dismiss the original result. Lead can be found in many plumbing features including faucets, but I worry if her service line is lead. I will attempt to approach adjacent neighbors to see if the issue is only at her residence, or is spreading through the neighborhood (through iron testing at first). I have had no other calls or testing requests from the general area.

Mike

Robert Bincsik <rbincsik@cityofflint.com> Tue, Feb 24, 2015 at 2:19 PM
To: Michael Glasgow <mglasgow@cityofflint.com>
Cc: Howard Croft <hcroft@cityofflint.com>, Daugherty Johnson <djohnson@cityofflint.com>, Brent Wright <bwright@cityofflint.com>

The majority of service lines in the COF are lead from the main to the curb and in some cases from the main to the house. Marvin from Veolia mentioned to me he thought we needed to add phosphate to our water to help prevent this. Perhaps we need to move on this sooner rather than later given we have approximately 80% lead service lines and 1000's of leaded joints.

[Quoted text hidden]

--

Thank you,

Robert Bincsik
Water Distribution and
Sewer Maintenance Supervisor
City of Flint
3310 E. Court Street
Flint, MI 48506
Ph: 810.766.7202 ext. 3413
Fx: 810.743.5758

Howard Croft <hcroft@cityofflint.com> Tue, Feb 24, 2015 at 2:26 PM
To: Robert Bincsik <rbincsik@cityofflint.com>
Cc: Michael Glasgow <mglasgow@cityofflint.com>, Daugherty Johnson <djohnson@cityofflint.com>, Brent Wright <bwright@cityofflint.com>

Yes,

Move quickly to isolate this to the service line if possible. I would check as many of the neighbors as possible and practical.

[Quoted text hidden]

--

Howard Croft
Public Works Director
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
PH# 810.766.7135 Ext.2043
hcroft@cityofflint.com

Robert Bincsik <rbincsik@cityofflint.com> Tue, Feb 24, 2015 at 4:10 PM
To: Howard Croft <hcroft@cityofflint.com>
Cc: Michael Glasgow <mglasgow@cityofflint.com>, Daugherty Johnson <djohnson@cityofflint.com>, Brent Wright <bwright@cityofflint.com>

I think this indicates a larger potential problem in the system. If this one service is showing lead issues the entire system could begin to show these problems.

[Quoted text hidden]

Michael Glasgow <mglasgow@cityofflint.com> Wed, Feb 25, 2015 at 8:45 AM
To: Robert Bincsik <rbincsik@cityofflint.com>, Brent Wright <bwright@cityofflint.com>, Daugherty Johnson <djohnson@cityofflint.com>, Howard Croft <hcroft@cityofflint.com>

I'm not sure I would rush to say this will be seen in the entire system, we have only seen an issue < 3% of samples out of the last few months (103 samples total). Most treatment plants calculate the Langelier Index to give a general idea of the "aggressiveness" of the water. Our index usually runs on the positive, which means the water should be scale forming and not corrosive. We are required to perform testing of 25 sample sites each quarter for pH, calcium, alkalinity, temperature, and conductivity. These values are then used to calculate the "aggressiveness" of the water. I wish we could fix our problems with a corrosion inhibitor, but I'm not sure that is the case. Also, most inhibitors are phosphate based, which may come to haunt us in the summer months as phosphate is an energy source for biological growth.

[Quoted text hidden]

EXHIBIT 25

Brighton Analytical L.L.C.
2105 Pless Drive · Brighton, Michigan 48114 · Phone (810) 229-7575 · Fax (810) 229-8650 · E-mail bal-brighton@sbcglobal.net

January 15, 2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

Subject: MCN0115.03
MCN0115.03

Dear Mr. Wirth :

Thank you for making Brighton Analytical, L.L.C. your laboratory of choice. Attached are the results for the samples submitted on 01/09/2015 for the above mentioned project. NELAP/TNI Accredited Analysis and MDEQ Drinking Water Certified Analysis will be identified in their respective reporting formats. Hard copies can be supplied at your request for a fee of $20.00 per copy.

The invoice for this project will be emailed separately. If you have any questions concerning the data or invoice, please don't hesitate to contact our office. Please reference Brighton Analytical, L.L.C. Project ID 33034 when calling or emailing. We thank you for this opportunity to partner with you on this project and hope to work with you again in the future.

Sincerely,
Brighton Analytical, L.L.C.

BA
Brighton Analytical, L.L.C.™
Email: ba-brighton@sbcglobal.net
2105 Pless Drive
Brighton, MI 48114
Phone: 810-229-7575
Fax: 810-229-8650

BA PROJECT #: 33034

PAGE 2 OF 2

ABBREVIATIONS FOR MATRIX
S = Solid
L = Liquid
DW = Drinking H_2O
O = Oil
P = Wipe
A = Air (Tedlar Bag)
F = Filter
T = Tube
M = Misc.

PROJECT NAME: MCN0115.03
PROJECT #: MCN0115.03
PO #: (PLEASE NOTE IF DIFFERENT BILLING ADDRESS) MCN0115.03
Sample collected by: Charles E. Wirth

COMPANY/MAILING ADDRESS: Alenack Env. Inc. P.O. Box 1986 Brighton, MI 48116
ATTN: 810 220 2288
PHONE: 810 220 2313
FAX OR EMAIL:

REQUESTED TURNAROUND: (circle one)
Rush: 1 - 3 business days (verify with lab & specify due date/time)
1 Day = 2.5X Cost 2 Day = 2X Cost 3 Day = 1.5X Cost
Standard: 5 business days

If RUSH, approved by:

Container Type & Quantity: VOA'S (PRES Y N N/A); HDPE UNPRESERVED; HDPE HNO_3; HDPE H_2SO_4; HDPE NAOH; AMBER PRESERVED?; GLASS, NO PRESERVATIVE; STERILIZED BACTERIA; MEOH Preserved Y N

Analysis Requested/Method: Full Partial Chem; pH; Bacteria; Volatiles / TTHM; Metals Series; Alkalinity

Brighton ID #	Sample Description	Date	Time	VOA'S	HDPE Unpres.	HDPE HNO_3	HDPE H_2SO_4	HDPE NAOH	Amber	Glass	Steril. Bact.	MEOH	Sample Matrix	Full Partial Chem	pH	Bacteria	Volatiles / TTHM	Metals Series	Alkalinity		
1) 9832	#11 Housing Bsmt Kit	1/9/15	1100	2	1	1					1		DW	X	X	X	X	X	X		
2) 33	#12 Housing 1st Flr	↓	1100	2	1	1					1		DW	↓	↓	↓	↓	↓	↓		
3) 34	#13 Rec Ctr UL	↓	1200	2	1	1					1		DW	↓	↓	↓	↓	↓	↓		
4) 35	#14 UCEN 3rd Flr	↓	1300	2	1	1					1		DW	↓	↓	↓	↓	↓	↓		
5) 36	#15 French Hall 2nd Flr	↓	1330	2	1	1					1		DW	↓	↓	↓	↓	↓	↓		
6)																					
7) 37	FIELD BLANK			1									DW				X			→ NO Charge	
8)																					
9)																					
10)																					

Samples received within hold time? yes ☒ no ☐
Temperature of samples °C: ON ICE / 4°C
pHs verified in login? yes ☒ no ☐
Headspace/bubbles in VOA's? yes ☐ no ☒ n/a ☐
Sample containers and COC match? yes ☒ no ☐

BILLING ADDRESS (IF REQUIRED):
METALS: Cu, Pb, As Series
VOA Vials … Received and [illegible] 1-9-14

Drinking H_2O:
Fax to LCHD? yes ☐ no ☐
Chlorinated Water Supply? yes ☐ no ☐
AMT.:
MCL Failure: yes ☐ no ☐
Client Notified (date/time/initials):

Special Instructions:

Please fill out the Chain of Custody completely and review. Incorrect or incomplete information will result in a "hold" on all analyses.

Trans. #	RELINQUISHED BY:	RECEIVED BY:	DATE:	TIME:	Trans. #	RELINQUISHED BY:	RECEIVED BY:	DATE:	TIME:
1	Charles E. Wirth	[illegible] (LAB)	1/9/15	2:45 PM	3				
2					4				

VWNAOS134133

MCNC115.03 1/9/15 P.1

Sample #	Location
#1	NBC North Basement Fire Suppression Room N. Wall @ Main
#2	NBC North 8th Floor Drinking Fountain East
#3	NBC South Basement Men's Room West Sink
#4	NBC South 3rd Flr. Lobby Drinking Fountain East
#5	William S. White Bldg 1st Flr. Mechanical Room @ Main
#6	William S. White Bldg. 4th Flr. Center Drinking Fountain East
#7	UPAV Basement Mechanical Room @ Main
#8	UPAV 2nd Flr. East Entry (University Pavilion) Drinking Fountain N. Wall
#9	Central Energy Plant Lower Level South Wall @ Main

MCNO 115.03 4/2/15 P2

#10 Central Energy Plant 1st Floor
Drinking Fountain South Wall

#11 Housing Basement Mechanical Room
@ Main

#12 Housing 1st Flr Lobby Drinking Fountain

#13 Recreation Center
Upper Level Southeast Drinking Fountain West

#14 University Center 3rd Floor
Drinking Fountain Northwest

#15 French Hall 2nd Floor
West Wall Drinking Fountain North

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12 08:00
Submit Date/Time: 1/9/2015 12 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09822

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #1 NBCN Bsmt.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	4	ug/L	1	10	EPA 200.8 rev5.4	15:45	01/12/2015
Total Copper (Drinking Water)	Not detected	ug/L	20	1300	EPA 200.8 rev5.4	15:45	01/12/2015
Total Lead (Drinking Water)	1	ug/L	1	15	EPA 200.8 rev5.4	15:45	01/12/2015
Total Sodium (Drinking Water)	20000	ug/L	1000		EPA 200.7	10:02	01/14/2015
Total Metal Analysis							
Hardness by Calculation	210000	ug/L	5000		EPA 200.8 rev5.4	15:45	01/12/2015
Total Iron	620	ug/L	20		EPA 200.8 rev5.4	15:45	01/12/2015
Inorganic Analysis							
Chloride	85000	ug/L	1000		EPA 300.0R2.1	15:03	01/09/2015
Total Alkalinity	110000	ug/L	5000		SM2320B	09:50	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	300	ug/L	100	4000	EPA 300.0R2.1	15:03	01/09/2015
Nitrate (Drinking Water)	730	ug/L	50	10000	EPA 300.0R2.1	15:03	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	15:03	01/09/2015
pH (Drinking Water)	6.3	S.I.			SM4500 H+B	15:00	01/09/2015
Sulfate (Drinking Water)	34000	ug/L	5000		EPA 300.0R2.1	15:03	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	19:59	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
Bromodichloromethane	18	ug/L	0.5	80	EPA 524.2	19:59	01/12/2015
Bromoform	5	ug/L	0.5	80	EPA 524.2	19:59	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	19:59	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	19:59	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
Chloroform	13	ug/L	0.5	80	EPA 524.2	19:59	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
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Sample Date/Time: 1/9/2015 12 08:00
Submit Date/Time: 1/9/2015 12 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09822

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #1 NBCN Bsmt.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	19:59	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
Dibromochloromethane	17	ug/L	0.5	80	EPA 524.2	19:59	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	19:59	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	19:59	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	19:59	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	19:59	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	19:59	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	19:59	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	19:59	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	19:59	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	19:59	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	19:59	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	19:59	01/12/2015
Total TTHM (Drinking Water)	53	ug/L	2.0		EPA 524.2	19:59	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12 08:00
Submit Date/Time: 1/9/2015 12 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09822**

Project Name: **MCN0115.03**
Project Number: **MCN0115.03**
Sample ID: **#1 NBCN Bsmt.**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	19:59	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	19:59	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	19:59	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	19:59	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	19:59	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	19:59	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	19:59	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	19:59	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

Released by _____
Date 1/15/15

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
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Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09823**

Project Name: **MCN0115.03**
Project Number:**MCN0115.03**
Sample ID: **#2 NBCN 8th Flr.**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	2	ug/L	1	10	EPA 200.8 rev5.4	15:51	01/12/2015
Total Copper (Drinking Water)	950	ug/L	20	1300	EPA 200.8 rev5.4	15:51	01/12/2015
Total Lead (Drinking Water)	3	ug/L	1	15	EPA 200.8 rev5.4	15:51	01/12/2015
Total Sodium (Drinking Water)	19000	ug/L	1000		EPA 200.7	10:05	01/14/2015
Total Metal Analysis							
Hardness by Calculation	200000	ug/L	5000		EPA 200.8 rev5.4	15:51	01/12/2015
Total Iron	240	ug/L	20		EPA 200.8 rev5.4	15:51	01/12/2015
Inorganic Analysis							
Chloride	83000	ug/L	1000		EPA 300.0R2.1	15:28	01/09/2015
Total Alkalinity	110000	ug/L	5000		SM2320B	09:57	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	400	ug/L	100	4000	EPA 300.0R2.1	15:28	01/09/2015
Nitrate (Drinking Water)	650	ug/L	50	10000	EPA 300.0R2.1	15:28	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	15:28	01/09/2015
pH (Drinking Water)	7.0	S.I.			SM4500 H+B	15:04	01/09/2015
Sulfate (Drinking Water)	33000	ug/L	5000		EPA 300.0R2.1	15:28	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	21:37	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
Bromodichloromethane	17	ug/L	0.5	80	EPA 524.2	21:37	01/12/2015
Bromoform	4	ug/L	0.5	80	EPA 524.2	21:37	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	21:37	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	21:37	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
Chloroform	16	ug/L	0.5	80	EPA 524.2	21:37	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09823

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #2 NBCN 8th Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	21:37	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
Dibromochloromethane	14	ug/L	0.5	80	EPA 524.2	21:37	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	21:37	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	21:37	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	21:37	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	21:37	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	21:37	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	21:37	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	21:37	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	21:37	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	21:37	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	21:37	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	21:37	01/12/2015
Total TTHM (Drinking Water)	51	ug/L	2.0		EPA 524.2	21:37	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12 08:00
Submit Date/Time: 1/9/2015 12 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09823**

Project Name: **MCN0115.03**
Project Number: **MCN0115.03**
Sample ID: **#2 NBCN 8th Flr.**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	21:37	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	21:37	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	21:37	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	21:37	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	21:37	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	21:37	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	21:37	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	21:37	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

Released by _____
Date 1/15/15

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12 08:30
Submit Date/Time: 1/9/2015 12 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09824**

Project Name: **MCN0115.03**
Project Number:**MCN0115.03**
Sample ID: **#3 NBCS Bsmt**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	Not detected	ug/L	1	10	EPA 200.8 rev5.4	15:57	01/12/2015
Total Copper (Drinking Water)	Not detected	ug/L	20	1300	EPA 200.8 rev5.4	15:57	01/12/2015
Total Lead (Drinking Water)	7	ug/L	1	15	EPA 200.8 rev5.4	15:57	01/12/2015
Total Sodium (Drinking Water)	18000	ug/L	1000		EPA 200.7	10:07	01/14/2015
Total Metal Analysis							
Hardness by Calculation	210000	ug/L	5000		EPA 200.8 rev5.4	15:57	01/12/2015
Total Iron	310	ug/L	20		EPA 200.8 rev5.4	15:57	01/12/2015
Inorganic Analysis							
Chloride	85000	ug/L	1000		EPA 300.0R2.1	15:54	01/09/2015
Total Alkalinity	110000	ug/L	5000		SM2320B	10:02	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	400	ug/L	100	4000	EPA 300.0R2.1	15:54	01/09/2015
Nitrate (Drinking Water)	890	ug/L	50	10000	EPA 300.0R2.1	15:54	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	15:54	01/09/2015
pH (Drinking Water)	7.0	S.I.			SM4500 H+B	15:07	01/09/2015
Sulfate (Drinking Water)	35000	ug/L	5000		EPA 300.0R2.1	15:54	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	21:56	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
Bromodichloromethane	19	ug/L	0.5	80	EPA 524.2	21:56	01/12/2015
Bromoform	4	ug/L	0.5	80	EPA 524.2	21:56	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	21:56	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	21:56	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
Chloroform	14	ug/L	0.5	80	EPA 524.2	21:56	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09824

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #3 NBCS Bsmt

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	21:56	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
Dibromochloromethane	17	ug/L	0.5	80	EPA 524.2	21:56	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	21:56	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	21:56	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	21:56	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	21:56	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	21:56	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	21:56	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	21:56	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	21:56	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	21:56	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	21:56	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	21:56	01/12/2015
Total TTHM (Drinking Water)	54	ug/L	2.0		EPA 524.2	21:56	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12 08:30
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09824**

Project Name: **MCN0115.03**
Project Number: **MCN0115.03**
Sample ID: **#3 NBCS Bsmt**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	21:56	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	21:56	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	21:56	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	21:56	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	21:56	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	21:56	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	21:56	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	21:56	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

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2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
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Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09825

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #4 NBCS 3rd Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	Not detected	ug/L	1	10	EPA 200.8 rev5.4	16:03	01/12/2015
Total Copper (Drinking Water)	1000	ug/L	20	1300	EPA 200.8 rev5.4	16:03	01/12/2015
Total Lead (Drinking Water)	29	ug/L	1	15	EPA 200.8 rev5.4	16:03	01/12/2015
Total Sodium (Drinking Water)	18000	ug/L	1000		EPA 200.7	10:09	01/14/2015
Total Metal Analysis							
Hardness by Calculation	200000	ug/L	5000		EPA 200.8 rev5.4	16:03	01/12/2015
Total Iron	90	ug/L	20		EPA 200.8 rev5.4	16:03	01/12/2015
Inorganic Analysis							
Chloride	83000	ug/L	1000		EPA 300.0R2.1	16:20	01/09/2015
Total Alkalinity	98000	ug/L	5000		SM2320B	10:09	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	500	ug/L	100	4000	EPA 300.0R2.1	16:20	01/09/2015
Nitrate (Drinking Water)	660	ug/L	50	10000	EPA 300.0R2.1	16:20	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	16:20	01/09/2015
pH (Drinking Water)	7.0	S.I.			SM4500 H+B	15:12	01/09/2015
Sulfate (Drinking Water)	34000	ug/L	5000		EPA 300.0R2.1	16:20	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	22:15	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
Bromodichloromethane	15	ug/L	0.5	80	EPA 524.2	22:15	01/12/2015
Bromoform	2	ug/L	0.5	80	EPA 524.2	22:15	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	22:15	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	22:15	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
Chloroform	18	ug/L	0.5	80	EPA 524.2	22:15	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12:08:30
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09825

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #4 NBCS 3rd Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	22:15	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
Dibromochloromethane	11	ug/L	0.5	80	EPA 524.2	22:15	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	22:15	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	22:15	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	22:15	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	22:15	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	22:15	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	22:15	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	22:15	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	22:15	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	22:15	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	22:15	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	22:15	01/12/2015
Total TTHM (Drinking Water)	46	ug/L	2.0		EPA 524.2	22:15	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09825**

Project Name: **MCN0115.03**
Project Number: **MCN0115.03**
Sample ID: **#4 NBCS 3rd Flr.**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	22:15	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	22:15	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	22:15	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	22:15	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	22:15	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	22:15	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	22:15	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	22:15	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

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Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

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Submit Date/Time: 1/9/2015 12 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09826

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #5 WSW Mech.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	2	ug/L	1	10	EPA 200.8 rev5.4	16:26	01/12/2015
Total Copper (Drinking Water)	Not detected	ug/L	20	1300	EPA 200.8 rev5.4	16:26	01/12/2015
Total Lead (Drinking Water)	3	ug/L	1	15	EPA 200.8 rev5.4	16:26	01/12/2015
Total Sodium (Drinking Water)	18000	ug/L	1000		EPA 200.7	10:12	01/14/2015
Total Metal Analysis							
Hardness by Calculation	170000	ug/L	5000		EPA 200.8 rev5.4	16:26	01/12/2015
Total Iron	230	ug/L	20		EPA 200.8 rev5.4	16:26	01/12/2015
Inorganic Analysis							
Chloride	85000	ug/L	1000		EPA 300.0R2.1	16:46	01/09/2015
Total Alkalinity	84000	ug/L	5000		SM2320B	10:14	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	100	ug/L	100	4000	EPA 300.0R2.1	16:46	01/09/2015
Nitrate (Drinking Water)	1100	ug/L	50	10000	EPA 300.0R2.1	16:46	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	16:46	01/09/2015
pH (Drinking Water)	7.2	S.I.			SM4500 H+B	15:17	01/09/2015
Sulfate (Drinking Water)	36000	ug/L	5000		EPA 300.0R2.1	16:46	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	22:35	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
Bromodichloromethane	11	ug/L	0.5	80	EPA 524.2	22:35	01/12/2015
Bromoform	3	ug/L	0.5	80	EPA 524.2	22:35	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	22:35	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	22:35	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
Chloroform	8	ug/L	0.5	80	EPA 524.2	22:35	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09826**

Project Name: **MCN0115.03**
Project Number:**MCN0115.03**
Sample ID: **#5 WSW Mech.**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	22:35	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
Dibromochloromethane	10	ug/L	0.5	80	EPA 524.2	22:35	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	22:35	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	22:35	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	22:35	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	22:35	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	22:35	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	22:35	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	22:35	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	22:35	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	22:35	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	22:35	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	22:35	01/12/2015
Total TTHM (Drinking Water)	32	ug/L	2.0		EPA 524.2	22:35	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09826

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #5 WSW Mech.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	22:35	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	22:35	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	22:35	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	22:35	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	22:35	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	22:35	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	22:35	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	22:35	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

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Brighton Analytical L.L.C.
2105 Press Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
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NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12:09:00
Submit Date/Time: 1/9/2015 12:14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09827

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #6 WSW 4th Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	3	ug/L	1	10	EPA 200.8 rev5.4	16:32	01/12/2015
Total Copper (Drinking Water)	220	ug/L	20	1300	EPA 200.8 rev5.4	16:32	01/12/2015
Total Lead (Drinking Water)	Not detected	ug/L	1	15	EPA 200.8 rev5.4	16:32	01/12/2015
Total Sodium (Drinking Water)	17000	ug/L	1000		EPA 200.7	10:41	01/14/2015
Total Metal Analysis							
Hardness by Calculation	180000	ug/L	5000		EPA 200.8 rev5.4	16:32	01/12/2015
Total Iron	60	ug/L	20		EPA 200.8 rev5.4	16:32	01/12/2015
Inorganic Analysis							
Chloride	85000	ug/L	1000		EPA 300.0R2.1	17:12	01/09/2015
Total Alkalinity	75000	ug/L	5000		SM2320B	10:19	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	200	ug/L	100	4000	EPA 300.0R2.1	17:12	01/09/2015
Nitrate (Drinking Water)	1100	ug/L	50	10000	EPA 300.0R2.1	17:12	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	17:12	01/09/2015
pH (Drinking Water)	7.3	S.I.			SM4500 H+B	15:24	01/09/2015
Sulfate (Drinking Water)	35000	ug/L	5000		EPA 300.0R2.1	17:12	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	22:55	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
Bromodichloromethane	9	ug/L	0.5	80	EPA 524.2	22:55	01/12/2015
Bromoform	0.8	ug/L	0.5	80	EPA 524.2	22:55	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	22:55	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	22:55	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
Chloroform	14	ug/L	0.5	80	EPA 524.2	22:55	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
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BA Project # 33034
BA Sample ID CA09827

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #6 WSW 4th Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	22:55	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
Dibromochloromethane	4	ug/L	0.5	80	EPA 524.2	22:55	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	22:55	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	22:55	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	22:55	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	22:55	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	22:55	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	22:55	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	22:55	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	22:55	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	22:55	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	22:55	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	22:55	01/12/2015
Total TTHM (Drinking Water)	28	ug/L	2.0		EPA 524.2	22:55	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

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Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09827

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #6 WSW 4th Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	22:55	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	22:55	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	22:55	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	22:55	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	22:55	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	22:55	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	22:55	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	22:55	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

Released by _____
Date 1/15/15

Brighton Analytical L.L.C.
2105 Press Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
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Sample Date/Time: 1/9/2015 12 09:30
Submit Date/Time: 1/9/2015 12 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09828

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #7 UPAV Bsmt.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	5	ug/L	1	10	EPA 200.8 rev5.4	16:38	01/12/2015
Total Copper (Drinking Water)	Not detected	ug/L	20	1300	EPA 200.8 rev5.4	16:38	01/12/2015
Total Lead (Drinking Water)	2	ug/L	1	15	EPA 200.8 rev5.4	16:38	01/12/2015
Total Sodium (Drinking Water)	16000	ug/L	1000		EPA 200.7	10:43	01/14/2015
Total Metal Analysis							
Hardness by Calculation	210000	ug/L	5000		EPA 200.8 rev5.4	16:38	01/12/2015
Total Iron	80	ug/L	20		EPA 200.8 rev5.4	16:38	01/12/2015
Inorganic Analysis							
Chloride	83000	ug/L	1000		EPA 300.0R2.1	17:38	01/09/2015
Total Alkalinity	100000	ug/L	5000		SM2320B	10:25	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	400	ug/L	100	4000	EPA 300.0R2.1	17:38	01/09/2015
Nitrate (Drinking Water)	930	ug/L	50	10000	EPA 300.0R2.1	17:38	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	17:38	01/09/2015
pH (Drinking Water)	7.9	S.I.			SM4500 H+B	15:35	01/09/2015
Sulfate (Drinking Water)	35000	ug/L	5000		EPA 300.0R2.1	17:38	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	23:14	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
Bromodichloromethane	19	ug/L	0.5	80	EPA 524.2	23:14	01/12/2015
Bromoform	3	ug/L	0.5	80	EPA 524.2	23:14	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	23:14	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	23:14	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
Chloroform	14	ug/L	0.5	80	EPA 524.2	23:14	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015

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BA Project # 33034
BA Sample ID CA09828

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #7 UPAV Bsmt.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	23:14	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
Dibromochloromethane	15	ug/L	0.5	80	EPA 524.2	23:14	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	23:14	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	23:14	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	23:14	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	23:14	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	23:14	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	23:14	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	23:14	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	23:14	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	23:14	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	23:14	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	23:14	01/12/2015
Total TTHM (Drinking Water)	51	ug/L	2.0		EPA 524.2	23:14	01/12/2015

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BA Project # 33034
BA Sample ID CA09828

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #7 UPAV Bsmt.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	23:14	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	23:14	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	23:14	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	23:14	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	23:14	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	23:14	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	23:14	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	23:14	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

Released by
Date 1/15/15

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2105 Press Drive
Brighton, Michigan 48114
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Monarch Environmental, Inc.
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Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09829**

Project Name: **MCN0115.03**
Project Number:**MCN0115.03**
Sample ID: **#8 UPAV 2nd Flr.**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	3	ug/L	1	10	EPA 200.8 rev5.4	16:44	01/12/2015
Total Copper (Drinking Water)	40	ug/L	20	1300	EPA 200.8 rev5.4	16:44	01/12/2015
Total Lead (Drinking Water)	Not detected	ug/L	1	15	EPA 200.8 rev5.4	16:44	01/12/2015
Total Sodium (Drinking Water)	17000	ug/L	1000		EPA 200.7	10:46	01/14/2015
Total Metal Analysis							
Hardness by Calculation	210000	ug/L	5000		EPA 200.8 rev5.4	16:44	01/12/2015
Total Iron	30	ug/L	20		EPA 200.8 rev5.4	16:44	01/12/2015
Inorganic Analysis							
Chloride	83000	ug/L	1000		EPA 300.0R2.1	18:04	01/09/2015
Total Alkalinity	100000	ug/L	5000		SM2320B	10:30	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	300	ug/L	100	4000	EPA 300.0R2.1	18:04	01/09/2015
Nitrate (Drinking Water)	1000	ug/L	50	10000	EPA 300.0R2.1	18:04	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	18:04	01/09/2015
pH (Drinking Water)	7.8	S.I.			SM4500 H+B	15:40	01/09/2015
Sulfate (Drinking Water)	35000	ug/L	5000		EPA 300.0R2.1	18:04	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	23:34	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Bromodichloromethane	15	ug/L	0.5	80	EPA 524.2	23:34	01/12/2015
Bromoform	2	ug/L	0.5	80	EPA 524.2	23:34	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	23:34	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	23:34	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Chloroform	14	ug/L	0.5	80	EPA 524.2	23:34	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12 09:30
Submit Date/Time: 1/9/2015 12 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09829

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #8 UPAV 2nd Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	23:34	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Dibromochloromethane	10	ug/L	0.5	80	EPA 524.2	23:34	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	23:34	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	23:34	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	23:34	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	23:34	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	23:34	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	23:34	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	23:34	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	23:34	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	23:34	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	23:34	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	23:34	01/12/2015
Total TTHM (Drinking Water)	41	ug/L	2.0		EPA 524.2	23:34	01/12/2015

Brighton Analytical L.L.C.
2105 Press Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12 09:30
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09829

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #8 UPAV 2nd Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	23:34	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	23:34	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	23:34	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	23:34	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	23:34	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	23:34	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	23:34	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	23:34	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

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Date 1/15/15

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2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
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Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09830**

Project Name: **MCN0115.03**
Project Number:**MCN0115.03**
Sample ID: **#9 CEPLL**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	3	ug/L	1	10	EPA 200.8 rev5.4	18:11	01/12/2015
Total Copper (Drinking Water)	Not detected	ug/L	20	1300	EPA 200.8 rev5.4	18:11	01/12/2015
Total Lead (Drinking Water)	1	ug/L	1	15	EPA 200.8 rev5.4	18:11	01/12/2015
Total Sodium (Drinking Water)	16000	ug/L	1000		EPA 200.7	10:55	01/14/2015
Total Metal Analysis							
Hardness by Calculation	170000	ug/L	5000		EPA 200.8 rev5.4	18:11	01/12/2015
Total Iron	Not detected	ug/L	20		EPA 200.8 rev5.4	18:11	01/12/2015
Inorganic Analysis							
Chloride	85000	ug/L	1000		EPA 300.0R2.1	18:29	01/09/2015
Total Alkalinity	61000	ug/L	5000		SM2320B	10:40	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	100	ug/L	100	4000	EPA 300.0R2.1	18:29	01/09/2015
Nitrate (Drinking Water)	1100	ug/L	50	10000	EPA 300.0R2.1	18:29	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	18:29	01/09/2015
pH (Drinking Water)	7.6	S.I.			SM4500 H+B	15:47	01/09/2015
Sulfate (Drinking Water)	36000	ug/L	5000		EPA 300.0R2.1	18:29	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	23:53	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Bromodichloromethane	9	ug/L	0.5	80	EPA 524.2	23:53	01/12/2015
Bromoform	2	ug/L	0.5	80	EPA 524.2	23:53	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	23:53	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	23:53	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Chloroform	6	ug/L	0.5	80	EPA 524.2	23:53	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015

Brighton Analytical L.L.C.
2105 Press Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09830

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #9 CEPLL

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	23:53	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Dibromochloromethane	7	ug/L	0.5	80	EPA 524.2	23:53	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	23:53	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	23:53	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	23:53	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	23:53	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	23:53	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	23:53	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	23:53	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	23:53	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	23:53	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	23:53	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	23:53	01/12/2015
Total TTHM (Drinking Water)	24	ug/L	2.0		EPA 524.2	23:53	01/12/2015

Brighton Analytical L.L.C.
2105 Press Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09830

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #9 CEPLL

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	23:53	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	23:53	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	23:53	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	23:53	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	23:53	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	23:53	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	23:53	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	23:53	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

Released by _____
Date 1/15/15

Brighton Analytical L.L.C.
2105 Press Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09831**

Project Name: **MCN0115.03**
Project Number: **MCN0115.03**
Sample ID: **#10 CEP 1st Flr.**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	5	ug/L	1	10	EPA 200.8 rev5.4	18:17	01/12/2015
Total Copper (Drinking Water)	190	ug/L	20	1300	EPA 200.8 rev5.4	18:17	01/12/2015
Total Lead (Drinking Water)	3	ug/L	1	15	EPA 200.8 rev5.4	18:17	01/12/2015
Total Sodium (Drinking Water)	15000	ug/L	1000		EPA 200.7	10:57	01/14/2015
Total Metal Analysis							
Hardness by Calculation	160000	ug/L	5000		EPA 200.8 rev5.4	18:17	01/12/2015
Total Iron	40	ug/L	20		EPA 200.8 rev5.4	18:17	01/12/2015
Inorganic Analysis							
Chloride	530000	ug/L	1000		EPA 300.0R2.1	18:55	01/09/2015
Total Alkalinity	Not detected	ug/L	5000		SM2320B	10:35	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	400	ug/L	100	4000	EPA 300.0R2.1	18:55	01/09/2015
Nitrate (Drinking Water)	880	ug/L	50	10000	EPA 300.0R2.1	18:55	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	18:55	01/09/2015
pH (Drinking Water)	2.1	S.I.			SM4500 H+B	15:50	01/09/2015
Sulfate (Drinking Water)	59000	ug/L	5000		EPA 300.0R2.1	18:55	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	00:13	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
Bromodichloromethane	19	ug/L	0.5	80	EPA 524.2	00:13	01/12/2015
Bromoform	3	ug/L	0.5	80	EPA 524.2	00:13	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	00:13	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	00:13	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
Chloroform	36	ug/L	0.5	80	EPA 524.2	00:13	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09831

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #10 CEP 1st Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	00:13	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
Dibromochloromethane	14	ug/L	0.5	80	EPA 524.2	00:13	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	00:13	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	00:13	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	00:13	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	00:13	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	00:13	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	00:13	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	00:13	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	00:13	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	00:13	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	00:13	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	00:13	01/12/2015
Total TTHM (Drinking Water)	72	ug/L	2.0		EPA 524.2	00:13	01/12/2015

Brighton Analytical L.L.C.
2105 Press Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12 10:00
Submit Date/Time: 1/9/2015 12 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09831

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #10 CEP 1st Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	00:13	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	00:13	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	00:13	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	00:13	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	00:13	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	00:13	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	00:13	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	00:13	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

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Date 1/15/15

Brighton Analytical LLC
2105 Press Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 1: 11:00
Submit Date/Time: 1/9/2015 1: 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09832

Project Name: **MCN0115.03**
Project Number:**MCN0115.03**
Sample ID: **#11 Housing Bsmt.**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	Not detected	ug/L	1	10	EPA 200.8 rev5.4	18:23	01/12/2015
Total Copper (Drinking Water)	Not detected	ug/L	20	1300	EPA 200.8 rev5.4	18:23	01/12/2015
Total Lead (Drinking Water)	4	ug/L	1	15	EPA 200.8 rev5.4	18:23	01/12/2015
Total Sodium (Drinking Water)	16000	ug/L	1000		EPA 200.7	11:07	01/14/2015
Total Metal Analysis							
Hardness by Calculation	180000	ug/L	5000		EPA 200.8 rev5.4	18:23	01/12/2015
Total Iron	1300	ug/L	20		EPA 200.8 rev5.4	18:23	01/12/2015
Inorganic Analysis							
Chloride	85000	ug/L	1000		EPA 300.0R2.1	19:21	01/09/2015
Total Alkalinity	66000	ug/L	5000		SM2320B	11:03	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	200	ug/L	100	4000	EPA 300.0R2.1	19:21	01/09/2015
Nitrate (Drinking Water)	1100	ug/L	50	10000	EPA 300.0R2.1	19:21	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	19:21	01/09/2015
pH (Drinking Water)	7.1	S.I.			SM4500 H+B	16:00	01/09/2015
Sulfate (Drinking Water)	37000	ug/L	5000		EPA 300.0R2.1	19:21	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	00:32	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
Bromodichloromethane	10	ug/L	0.5	80	EPA 524.2	00:32	01/12/2015
Bromoform	2	ug/L	0.5	80	EPA 524.2	00:32	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	00:32	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	00:32	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
Chloroform	7	ug/L	0.5	80	EPA 524.2	00:32	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015

Brighton Analytical L.L.C.
2105 Press Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09832**

Project Name: **MCN0115.03**
Project Number: **MCN0115.03**
Sample ID: **#11 Housing Bsmt.**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	00:32	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
Dibromochloromethane	9	ug/L	0.5	80	EPA 524.2	00:32	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	00:32	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	00:32	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	00:32	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	00:32	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	00:32	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	00:32	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	00:32	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	00:32	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	00:32	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	00:32	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	00:32	01/12/2015
Total TTHM (Drinking Water)	28	ug/L	2.0		EPA 524.2	00:32	01/12/2015

Brighton Analytical L.L.C.
2105 Press Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 11:00
Submit Date/Time: 1/9/2015 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09832

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #11 Housing Bsmt.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	00:32	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	00:32	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	00:32	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	00:32	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	00:32	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	00:32	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	00:32	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	00:32	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

Released by _____
Date 1/15/15

Brighton Analytical L.L.C.
2105 Piess Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12 11:00
Submit Date/Time: 1/9/2015 12 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09833

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #12 Housing 1st Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	2	ug/L	1	10	EPA 200.8 rev5.4	18:47	01/12/2015
Total Copper (Drinking Water)	310	ug/L	20	1300	EPA 200.8 rev5.4	18:47	01/12/2015
Total Lead (Drinking Water)	Not detected	ug/L	1	15	EPA 200.8 rev5.4	18:47	01/12/2015
Total Sodium (Drinking Water)	15000	ug/L	1000		EPA 200.7	11:09	01/14/2015
Total Metal Analysis							
Hardness by Calculation	200000	ug/L	5000		EPA 200.8 rev5.4	18:47	01/12/2015
Total Iron	Not detected	ug/L	20		EPA 200.8 rev5.4	18:47	01/12/2015
Inorganic Analysis							
Chloride	81000	ug/L	1000		EPA 300.0R2.1	21:05	01/09/2015
Total Alkalinity	100000	ug/L	5000		SM2320B	11:08	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	300	ug/L	100	4000	EPA 300.0R2.1	21:05	01/09/2015
Nitrate (Drinking Water)	1000	ug/L	50	10000	EPA 300.0R2.1	21:05	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	21:05	01/09/2015
pH (Drinking Water)	7.1	S.I.			SM4500 H+B	16:07	01/09/2015
Sulfate (Drinking Water)	35000	ug/L	5000		EPA 300.0R2.1	21:05	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	00:52	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
Bromodichloromethane	15	ug/L	0.5	80	EPA 524.2	00:52	01/12/2015
Bromoform	0.8	ug/L	0.5	80	EPA 524.2	00:52	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	00:52	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	00:52	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
Chloroform	29	ug/L	0.5	80	EPA 524.2	00:52	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
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Sample Date/Time: 1/9/2015 12 11:00
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09833**

Project Name: **MCN0115.03**
Project Number: **MCN0115.03**
Sample ID: **#12 Housing 1st Flr.**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	00:52	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
Dibromochloromethane	6	ug/L	0.5	80	EPA 524.2	00:52	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	00:52	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	00:52	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	00:52	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	00:52	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	00:52	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	00:52	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	00:52	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	00:52	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	00:52	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	00:52	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	00:52	01/12/2015
Total TTHM (Drinking Water)	51	ug/L	2.0		EPA 524.2	00:52	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09833

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #12 Housing 1st Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	00:52	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	00:52	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	00:52	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	00:52	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	00:52	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	00:52	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	00:52	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	00:52	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

Released by _____
Date 1/15/15

Brighton Analytical L.L.C.
2105 Piess Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12:12:00
Submit Date/Time: 1/9/2015 12:14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09834

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #13 Rec. Ctr. UL

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	Not detected	ug/L	1	10	EPA 200.8 rev5.4	18:52	01/12/2015
Total Copper (Drinking Water)	60	ug/L	20	1300	EPA 200.8 rev5.4	18:52	01/12/2015
Total Lead (Drinking Water)	Not detected	ug/L	1	15	EPA 200.8 rev5.4	18:52	01/12/2015
Total Sodium (Drinking Water)	16000	ug/L	1000		EPA 200.7	11:11	01/14/2015
Total Metal Analysis							
Hardness by Calculation	220000	ug/L	5000		EPA 200.8 rev5.4	18:52	01/12/2015
Total Iron	280	ug/L	20		EPA 200.8 rev5.4	18:52	01/12/2015
Inorganic Analysis							
Chloride	81000	ug/L	1000		EPA 300.0R2.1	21:31	01/09/2015
Total Alkalinity	100000	ug/L	5000		SM2320B	11:14	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	300	ug/L	100	4000	EPA 300.0R2.1	21:31	01/09/2015
Nitrate (Drinking Water)	1000	ug/L	50	10000	EPA 300.0R2.1	21:31	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	21:31	01/09/2015
pH (Drinking Water)	7.2	S.I.			SM4500 H+B	16:12	01/09/2015
Sulfate (Drinking Water)	35000	ug/L	5000		EPA 300.0R2.1	21:31	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	01:11	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
Bromodichloromethane	26	ug/L	0.5	80	EPA 524.2	01:11	01/12/2015
Bromoform	3	ug/L	0.5	80	EPA 524.2	01:11	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	01:11	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	01:11	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
Chloroform	26	ug/L	0.5	80	EPA 524.2	01:11	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015

Brighton Analytical L.L.C.
2105 Press Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12:00
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Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09834**

Project Name: **MCN0115.03**
Project Number: **MCN0115.03**
Sample ID: **#13 Rec. Ctr. UL**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	01:11	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
Dibromochloromethane	17	ug/L	0.5	80	EPA 524.2	01:11	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	01:11	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	01:11	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	01:11	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	01:11	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	01:11	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	01:11	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	01:11	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	01:11	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	01:11	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	01:11	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	01:11	01/12/2015
Total TTHM (Drinking Water)	72	ug/L	2.0		EPA 524.2	01:11	01/12/2015

Brighton Analytical L.L.C.
2105 Press Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 12:00
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Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09834

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #13 Rec. Ctr. UL

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	01:11	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	01:11	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	01:11	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	01:11	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	01:11	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	01:11	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	01:11	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	01:11	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

Released by _____
Date 1/15/15

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
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Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09835**

Project Name: **MCN0115.03**
Project Number: **MCN0115.03**
Sample ID: **#14 UCEN 3rd Flr.**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	Not detected	ug/L	1	10	EPA 200.8 rev5.4	18:58	01/12/2015
Total Copper (Drinking Water)	110	ug/L	20	1300	EPA 200.8 rev5.4	18:58	01/12/2015
Total Lead (Drinking Water)	Not detected	ug/L	1	15	EPA 200.8 rev5.4	18:58	01/12/2015
Total Sodium (Drinking Water)	15000	ug/L	1000		EPA 200.7	11:16	01/14/2015
Total Metal Analysis							
Hardness by Calculation	200000	ug/L	5000		EPA 200.8 rev5.4	18:58	01/12/2015
Total Iron	Not detected	ug/L	20		EPA 200.8 rev5.4	18:58	01/12/2015
Inorganic Analysis							
Chloride	81000	ug/L	1000		EPA 300.0R2.1	21:57	01/09/2015
Total Alkalinity	110000	ug/L	5000		SM2320B	11:19	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	300	ug/L	100	4000	EPA 300.0R2.1	21:57	01/09/2015
Nitrate (Drinking Water)	1000	ug/L	50	10000	EPA 300.0R2.1	21:57	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	21:57	01/09/2015
pH (Drinking Water)	7.1	S.I.			SM4500 H+B	16:18	01/09/2015
Sulfate (Drinking Water)	35000	ug/L	5000		EPA 300.0R2.1	21:57	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	01:30	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
Bromodichloromethane	21	ug/L	0.5	80	EPA 524.2	01:30	01/12/2015
Bromoform	2	ug/L	0.5	80	EPA 524.2	01:30	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	01:30	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	01:30	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
Chloroform	31	ug/L	0.5	80	EPA 524.2	01:30	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
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Sample Date/Time: 1/9/2015 12 13:00
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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09835

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #14 UCEN 3rd Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	01:30	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
Dibromochloromethane	11	ug/L	0.5	80	EPA 524.2	01:30	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	01:30	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	01:30	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	01:30	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	01:30	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	01:30	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	01:30	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	01:30	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	01:30	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	01:30	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	01:30	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	01:30	01/12/2015
Total TTHM (Drinking Water)	65	ug/L	2.0		EPA 524.2	01:30	01/12/2015

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2105 Press Drive
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e-mail:bai-brighton@sbcglobal.net
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Sample Date/Time: 1/9/2015 13:00
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Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09835

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #14 UCEN 3rd Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	01:30	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	01:30	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	01:30	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	01:30	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	01:30	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	01:30	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	01:30	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	01:30	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

Released by _____
Date 1/15/15

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2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
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Sample Date/Time: 1/9/2015 12 13:30
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Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # **33034**
BA Sample ID **CA09836**

Project Name: **MCN0115.03**
Project Number:**MCN0115.03**
Sample ID: **#15 French Hall 2nd Flr.**

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Metal Analysis							
Total Arsenic (Drinking Water)	1	ug/L	1	10	EPA 200.8 rev5.4	17:36	01/12/2015
Total Copper (Drinking Water)	Not detected	ug/L	20	1300	EPA 200.8 rev5.4	17:36	01/12/2015
Total Lead (Drinking Water)	3	ug/L	1	15	EPA 200.8 rev5.4	17:36	01/12/2015
Total Sodium (Drinking Water)	17000	ug/L	1000		EPA 200.7	11:18	01/14/2015
Total Metal Analysis							
Hardness by Calculation	200000	ug/L	5000		EPA 200.8 rev5.4	17:36	01/12/2015
Total Iron	70	ug/L	20		EPA 200.8 rev5.4	17:36	01/12/2015
Inorganic Analysis							
Chloride	83000	ug/L	1000		EPA 300.0R2.1	22:23	01/09/2015
Total Alkalinity	97000	ug/L	5000		SM2320B	11:24	01/15/2015
Drinking Water Inorganic Analysis							
Fluoride (Drinking Water)	400	ug/L	100	4000	EPA 300.0R2.1	22:23	01/09/2015
Nitrate (Drinking Water)	90	ug/L	50	10000	EPA 300.0R2.1	22:23	01/09/2015
Nitrite (Drinking Water)	Not detected	ug/L	50	1000	EPA 300.0R2.1	22:23	01/09/2015
pH (Drinking Water)	7.1	S.I.			SM4500 H+B	16:24	01/09/2015
Sulfate (Drinking Water)	37000	ug/L	5000		EPA 300.0R2.1	22:23	01/09/2015
Drinking Water Microbiological Analysis							
E. coli(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Total Coliform(Drinking Water)	Negative			0	ATP D05-0035	16:00	01/09/2015
Drinking Water Volatile Analysis							
Benzene	Not detected	ug/L	0.5	5	EPA 524.2	01:50	01/12/2015
Bromobenzene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
Bromochloromethane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
Bromodichloromethane	Not detected	ug/L	0.5	80	EPA 524.2	01:50	01/12/2015
Bromoform	Not detected	ug/L	0.5	80	EPA 524.2	01:50	01/12/2015
Bromomethane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
Carbon tetrachloride	Not detected	ug/L	0.5	5	EPA 524.2	01:50	01/12/2015
Chlorobenzene	Not detected	ug/L	0.5	100	EPA 524.2	01:50	01/12/2015
Chloroethane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
Chloroform	Not detected	ug/L	0.5	80	EPA 524.2	01:50	01/12/2015
Chloromethane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
2-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015

Brighton Analytical L.L.C.
2105 Pless Drive
Brighton, Michigan 48114
Phone: (810)229-7575 (810)229-8650
e-mail:bai-brighton@sbcglobal.net
MDNRE Certified #9404
NELAC Accredited #176507

Sample Date/Time: 1/9/2015 1: 13:30
Submit Date/Time: 1/9/2015 1: 14:45
Report Date: 1/15/2015

Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09836

Project Name: MCN0115.03
Project Number:MCN0115.03
Sample ID: #15 French Hall 2nd Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
4-Chlorotoluene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
cis-1,2-Dichloroethene	Not detected	ug/L	0.5	70	EPA 524.2	01:50	01/12/2015
cis-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
Dibromochloromethane	Not detected	ug/L	0.5	80	EPA 524.2	01:50	01/12/2015
1,2-Dibromoethane(Ethylene Dibromide)	Not detected	ug/L	0.5		EPA 524.2	01:50	01/12/2015
Dibromomethane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
1,2-Dichlorobenzene	Not detected	ug/L	0.5	600	EPA 524.2	01:50	01/12/2015
1,3-Dichlorobenzene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
1,4-Dichlorobenzene	Not detected	ug/L	0.5	75	EPA 524.2	01:50	01/12/2015
Dichlorodifluoromethane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
1,2-Dichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	01:50	01/12/2015
1,1-Dichloroethane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
1,1-Dichloroethene	Not detected	ug/L	0.5	7	EPA 524.2	01:50	01/12/2015
1,2-Dichloropropane	Not detected	ug/L	0.5	5	EPA 524.2	01:50	01/12/2015
1,3-Dichloropropane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
2,2-Dichloropropane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
1,1-Dichloropropene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
Ethylbenzene	Not detected	ug/L	0.5	700	EPA 524.2	01:50	01/12/2015
Hexachlorobutadiene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
Isopropylbenzene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
4-Isopropyltoluene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
Methylene chloride	Not detected	ug/L	0.5	5	EPA 524.2	01:50	01/12/2015
Methyl(tert)butyl ether(MTBE)	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
Naphthalene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
n-Butylbenzene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
n-Propylbenzene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
sec-Butylbenzene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
Styrene	Not detected	ug/L	0.5	100	EPA 524.2	01:50	01/12/2015
tert-Butylbenzene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
1,1,1,2-Tetrachloroethane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
Tetrachloroethene	Not detected	ug/L	0.5	5	EPA 524.2	01:50	01/12/2015
Toluene	Not detected	ug/L	0.5	1000	EPA 524.2	01:50	01/12/2015
Total TTHM (Drinking Water)	Not detected	ug/L	2.0		EPA 524.2	01:50	01/12/2015

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Monarch Environmental, Inc.
P.O. Box 1986
Brighton, MI 48116

BA Project # 33034
BA Sample ID CA09836

Project Name: MCN0115.03
Project Number: MCN0115.03
Sample ID: #15 French Hall 2nd Flr.

Analyte Name	Result	Units	RL	MCL	Method Reference	Analysis Time	Analysis Date
Drinking Water Volatile Analysis							
trans-1,2-Dichloroethene	Not detected	ug/L	0.5	100	EPA 524.2	01:50	01/12/2015
trans-1,3-Dichloropropene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
1,2,3-Trichlorobenzene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
1,2,4-Trichlorobenzene	Not detected	ug/L	0.5		EPA 524.2	01:50	01/12/2015
1,1,1-Trichloroethane	Not detected	ug/L	0.5	200	EPA 524.2	01:50	01/12/2015
1,1,2-Trichloroethane	Not detected	ug/L	0.5	5	EPA 524.2	01:50	01/12/2015
Trichloroethene	Not detected	ug/L	0.5	5	EPA 524.2	01:50	01/12/2015
Trichlorofluoromethane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
1,2,3-Trichloropropane	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
1,2,4-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
1,3,5-Trimethylbenzene	Not detected	ug/L	1		EPA 524.2	01:50	01/12/2015
Vinyl chloride	Not detected	ug/L	0.5	2	EPA 524.2	01:50	01/12/2015
Xylenes(total)	Not detected	ug/L	1.5	10000	EPA 524.2	01:50	01/12/2015

RL=Reported detection limit for analytical method requested. Some compounds require special analytical methods to achieve MDNR designated target detection limits (TDL).

MCL = Maximum contaminant Levels.
Analysis not specifically identified as drinking water are for non-regulatory compliance purposes.

Released by
Date 1/15/15

Brighton Analytical L.L.C.

BRIGHTON ANALYTICAL, LLC

QUALITY ASSURANCE/QUALITY CONTROL

GC/MS
VOLATILE METHOD 524.2
REPRESENTATIVE BATCH PRECISION AND ACCURACY QUALITY CONTROL SUMMARY

Analysis Date: January 12, 2015 Standard ID: 2382 Inst./Detec: VOL5 GC/MS

Laboratory ID#: LCS Matrix: Water Analyst: CW

	Matrix Spike - Precision *			Matrix Spike - Accuracy			
	Spike 1	Spike 2	Relative Percent Difference	Spk Conc	% Recovery	Range (%)	Method Blank ug/L
d4-1,2-Dichloroethane	5.1	5.1	0.4	5ug/L	102	70-130	95%
4-Bromofluorobenzene	5.2	4.6	11.1	5ug/L	98	70-130	89%
COMPOUNDS							Sample / blk background
1,1-Dichloroethene	10.1	9.3	8.7	10ug/L	97%	70-130	<0.5
Trichloroethene	9.7	9.4	2.7	10ug/L	96%	70-130	<0.5
Benzene	9.6	9.8	1.3	10ug/L	97%	70-130	<0.5
Toluene	9.9	9.5	3.3	10ug/L	96%	70-130	<0.5
Chlorobenzene	9.7	9.4	4.0	10ug/L	96%	70-130	<0.5

* Matrix spike precision +/-20 Relative Percent Difference.

(ug/L is equivalent to ppb)

Comments:

REPRESENTATIVE BATCH QUALITY CONTROL

Accuracy & Precision

Analyst: LT **Parameter:** Alkalinity

Analysis Date: 01/15/15 **Method Reference:** 310.1 / SM2320B

Matrix: Total **Batch:** W1

SPIKE - ACCURACY

Laboratory ID	Spike Concentration (ug/L)	Background (ug/L)	Recoveries (%)	Acceptable Range (%)	Method Blank Concentration (ug/L)
CA09830	250000	61000	71 / 96	80 - 120	<5000

SPIKE - PRECISION

Laboratory ID	Observed A (ug/L)	Observed B (ug/L)	RPD (%)	Acceptable Range	
CA09830	237500	300500	23.4	0 - 20	

MISCELLANEOUS

	Standard ID #	(%)	Acceptable Range	
Independent Secondary Reference Material:	P228-506	111	90 - 110	
Method Standard (Laboratory Control Spike)	120314LT	93	80 - 120	

COMMENTS: Matrix Spike Recovery is low due to sample matrix.

REPRESENTATIVE BATCH QUALITY CONTROL

Accuracy & Precision

Analyst: HD **Parameter:** pH

Analysis Date: 1/9/2015 **Method Reference:** SM4500H+B/9040/9045

SPIKE - ACCURACY					
Laboratory ID	**TRUE Value**	**Background**	**Observed Value**	**Acceptable Range**	**Method Blank Concentration**
BUFFER 2407581	6.00		6.08	0.05	

SPIKE - PRECISION					
Laboratory ID	**Observed A**	**Observed B**	**DIFFERENCE**	**Acceptable Range**	
CA09831	2.07	2.05	0.02	0.05	

	Standard ID #	**% Recovery**	
Independent Secondary Reference Material:			
Method Standard (Laboratory Control Spike):			

COMMENTS:

Representative Batch Precision And Accuracy Quality Control Summary

Ion Chromatograph EPA Method 300.0

Date: 1/9/15

Reviewed by:

Analyst: RM/LS

ERA P228
ERA # : WP 205
Exp. Date: May-15

Analyte	Sample Conc	LCS Value	LCS Conc.	% Rec. LCS	ERA Conc.	ERA TRUE Value	% Rec ERA	Control limits	Units
Fluoride	<100	5,000	4,953	99	1,983	2,020	98	90-110%	ug/L
Chloride	<1000	50,000	50,710	101	46,381	46,500	100	90-110%	ug/L
Nitrite	<10	1,000	1,043	104				90-110%	ug/L
Nitrate	<10	1,000	1,037	104	28,204	26,100	108	90-110%	ug/L
Sulfate	<1000	50,000	51,345	103	22,219	23,400	95	90-110%	ug/L

Sample ID# 9832

Analyte	Sample Conc	Spike Value	MS Conc.	MSD Conc.	% Rec MS	% Rec MSD	RPD	Control limits	Units
Fluoride	173	5,000	4,561	4,550	88	88	0.2	80-120%	ug/L
Chloride	85,314	50,000	133,050	133,412	95	96	0.3	80-120%	ug/L
Nitrite	0	1,000	599	620	60	62	3.6	80-120%	ug/L
Nitrate	1,093	1,000	2,516	2,538	142	144	0.9	80-120%	ug/L
Sulfate	37,094	50,000	86,813	86,971	99	100	0.2	80-120%	ug/L

Nitrite and Nitrate recoveries are out of control due to sample matrix.

Sample ID# 9836

Analyte	Sample Conc	Spike Value	MS Conc.	MSD Conc.	% Rec MS	% Rec MSD	RPD	Control limits	Units
Fluoride	395	5,000	5,147	5,094	95	94	1.0	80-120%	ug/L
Chloride	83,227	50,000	131,792	131,823	97	97	0.0	80-120%	ug/L
Nitrite	0	1,000	871	889	87	89	2.1	80-120%	ug/L
Nitrate	92	1,000	1,107	1,098	102	101	0.9	80-120%	ug/L
Sulfate	37,450	50,000	88,086	87,977	101	101	0.1	80-120%	ug/L

Sample ID#

Analyte	Sample Conc	Spike Value	MS Conc.	MSD Conc.	% Rec MS	% Rec MSD	RPD	Control limits	Units
Fluoride		5,000						80-120%	ug/L
Chloride		50,000						80-120%	ug/L
Nitrite		1,000						80-120%	ug/L
Nitrate		1,000						80-120%	ug/L
Sulfate		50,000						80-120%	ug/L

ICP-MS
METHOD 200.8

REPRESENTATIVE BATCH PRECISION AND ACCURACY QUALITY CONTROL SUMMARY

Analysis Date: 1/12/2015 Standard ID: 010515-W1 Batch: 2W 01/12/15

Matrix Spike Lab ID: CA09836 Matrix: Total Water Analyst: GW

Metals	Matrix Spike - Precision *			Matrix Spike - Accuracy**				Miscellaneous***		
	Matrix Spike (ug/L)	Matrix Spike Dup (ug/L)	RPD (%)	Spk Conc (ug/L)	MS Recovery (%)	MSD Recovery (%)	Sample Conc (ug/L)	Method Blk (ug/L)	LCS-Method STD (%)	Ind. Std. SPEX 1&3 (%)
Beryllium	2105	2090	0.7	2000	105.3	104.5	0	<1	103.3	101.3
Sodium	41640	41810	0.4	20000	95.3	96.1	22590	<1000	101.2	99.4
Magnesium	39170	39360	0.5	20000	97.6	98.5	19660	<100	101.1	98.3
Aluminum	2047	2057	0.5	2000	100.2	100.7	42.4	<50	101.7	103.3
Potassium	23120	23200	0.3	20000	98.6	99.0	3401	<100	99.5	98.9
Calcium	65600	65870	0.4	20000	93.4	94.8	46920	<100	101.7	95.8
Vanadium	2058	2050	0.4	2000	102.9	102.5	0.3	<1	102.2	99.0
Chromium	2068	2080	0.6	2000	103.1	103.7	5.1	<1	103.6	102.4
Manganese	2101	2107	0.3	2000	102.7	103.0	47.3	<5	102.3	101.6
Iron	20500	20660	0.8	20000	102.2	103.0	69.6	<20	101.9	99.2
Cobalt	2066	2080	0.7	2000	103.3	104.0	0.7	<1	103.5	101.1
Nickel	2123	2141	0.8	2000	103.2	104.1	59.6	<1	104.1	103.8
Copper	2047	2033	0.7	2000	101.4	100.7	18.7	<1	101.8	104.4
Zinc	2136	2121	0.7	2000	98.7	98.0	161.1	<4	100.1	102.9
Arsenic	2064	2057	0.3	2000	103.2	102.8	0.9	2.9	101.8	102.8
Selenium	2181	2228	2.1	2000	109.1	111.4	0	<0.4	101.1	100.1
Molybdenum	2044	1992	2.6	2000	102.1	99.5	1.9	<1	102.0	99.2
Silver	19.87	19.70	0.9	20	97.9	97.0	0.3	<0.2	103.0	100.0
Cadmium	2051	2007	2.2	2000	102.5	100.3	0.4	<0.2	102.8	99.7
Antimony	2059	2045	0.7	2000	103.0	102.3	0	1.1	104.7	109.1
Barium	2075	2041	1.7	2000	102.8	101.1	19.6	<1	105.4	101.9
Thallium	2044	2024	1.0	2000	102.2	101.2	0	<0.5	103.4	106.8
Lead	2072	2035	1.8	2000	103.5	101.6	3	<1	106.6	101.5

* Matrix spike precision range +/- 20% RPD

** Matrix spike accuracy range +/- 30% recovery

*** LCS accuracy range +/- 20% recovery / Ind std accuracy range +/- 10% recovery

Comments:

ICP-MS
METHOD 200.8

REPRESENTATIVE BATCH PRECISION AND ACCURACY QUALITY CONTROL SUMMARY

Analysis Date: 1/12/2015 Standard ID: 010515-W1 Batch: 1W 01/12/15

Matrix Spike Lab ID: CA09811 Matrix: Total Water Analyst: GW

Metals	Matrix Spike - Precision *			Matrix Spike - Accuracy**				Miscellaneous***		
	Matrix Spike (ug/L)	Matrix Spike Dup (ug/L)	RPD (%)	Spk Conc (ug/L)	MS Recovery (%)	MSD Recovery (%)	Sample Conc (ug/L)	Method Blk (ug/L)	LCS-Method STD (%)	Ind. Std. SPEX 1&3 (%)
Beryllium	1985	2085	4.9	2000	99.3	104.3	0	<1	106.2	101.3
Sodium	24010	24470	1.9	20000	96.8	99.1	4651	<1000	105.7	99.4
Magnesium	25800	26020	0.8	20000	97.3	98.4	6340	<100	105.2	98.3
Aluminum	2020	2072	2.5	2000	100.4	103.0	12.4	<50	106.2	103.3
Potassium	20770	21060	1.4	20000	98.3	99.7	1117	<100	104.5	98.9
Calcium	50340	49680	1.3	20000	93.2	89.9	31710	<100	106.8	95.8
Vanadium	2017	2037	1.0	2000	100.8	101.8	0.2	<1	105.3	99.0
Chromium	2025	2052	1.3	2000	101.2	102.6	0.7	<1	106.5	102.4
Manganese	2033	2059	1.3	2000	101.6	102.9	1.2	<5	106.9	101.6
Iron	20310	20230	0.4	20000	101.2	100.8	79.6	<20	106.2	99.2
Cobalt	2028	2053	1.2	2000	101.4	102.7	0	<1	107.4	101.1
Nickel	2030	2047	0.8	2000	101.5	102.3	0.5	<1	107.0	103.8
Copper	1974	1981	0.4	2000	98.7	99.0	0.4	<1	104.8	104.4
Zinc	1946	1957	0.6	2000	97.3	97.8	0.8	<4	102.1	102.9
Arsenic	2018	2005	0.6	2000	100.9	100.3	0	<1	104.1	102.8
Selenium	2114	2523	17.6	2000	105.7	126.2	0	<0.4	114.4	100.1
Molybdenum	1956	2001	2.3	2000	97.8	100.0	0.3	<1	104.9	99.2
Silver	19.34	19.96	3.2	20	96.2	99.3	0.1	<0.2	104.4	100.0
Cadmium	1983	2015	1.6	2000	99.1	100.7	0.8	1.0	105.0	99.7
Antimony	1959	2035	3.8	2000	97.9	101.7	0.2	<1	108.0	109.1
Barium	2006	2023	0.8	2000	100.2	101.1	1.4	<1	106.3	101.9
Thallium	1994	2015	1.0	2000	99.7	100.8	0	<0.5	105.6	106.8
Lead	2040	2068	1.4	2000	102.0	103.4	0	<1	107.5	101.5

* Matrix spike precision range +/- 20% RPD

** Matrix spike accuracy range +/- 30% recovery

*** LCS accuracy range +/- 20% recovery / Ind std accuracy range +/- 10% recovery

Comments:

REPRESENTATIVE BATCH QUALITY CONTROL

Accuracy & Precision

Analyst: LT **Parameter:** Sodium

Analysis Date: 01/14/15 **Method Reference:** 200.7/6010A

Matrix: Total **Batch:** WI

SPIKE - ACCURACY

Laboratory ID	Spike Concentration (ug/L)	Background (ug/L)	Recoveries (%)	Acceptable Range (%)	Method Blank Concentration (ug/L)
CA9836	20000	17340	75/74	70 - 130	<100

SPIKE - PRECISION

Laboratory ID	Observed A (ug/L)	Observed B (ug/L)	RPD (%)	Acceptable Range	
CA9836	32370	32120	0.78	0 - 20	

MISCELLANEOUS

	Standard ID #	Recovery (%)	Acceptable Range (%)	
Independent Secondary Reference Material:	SPEX 1&3	96	95 - 105	
Method Standard (Laboratory Control Spike):	091914Na	89	80 - 120	

COMMENTS:

EXHIBIT 26

Flint, Michigan WTP
2/10/15

Communications being worked on new
Lake Huron may be available year end 2015

Mike Glasgow
(LAN) Warren Green
(Util. Div.) Howard Croft
(Util. Admin) ~~Daugherty~~ Duffy Johnson

Jeff Hanson (LAN)
Matt McFarland
(Dist) Rob
Brent Wright

1952 plant ALNM
2003? plant upgrades
Water age maps Infowater model – LAN doing new model

lost 16,000 users
12 mgd DWSD 30% WL
18 mgd now ~ 50% WL
water theft was major problem
doing leak detection
(10,000) many vacant homes – freeze/thaw
– 2000 – 2500 new each year
AMR system
– RFP coming to replace 20,000 meters 2015

Funding now in place to make repairs/replacements
105% rate inc. over 3 yrs.
$140/mo. water + sewer

PR issues remain
- THM notice spurred public distrust

Complaint logs – mapped
- odors come in numerous places

Staffing may be an issue – down 4 from budgeted positions
No technical leadership

old plant SW w/softening backup to Detroit

Conv. Single-stage softening
" two-stage " 12 mgd
Conventional treatment 24 mgd

1968 DWSD supply
- terminated Apr. 2015
- refurbished #44 mill plant improvement 2000
- 2003 refurbished for continuous service
- operated 4 wks/yr to waste

20 staff / budget 24 9 licensed staff
8 op / budget 12

37 dist. / 4 below full staff
4 dist licensed

- have THM analyzer onsite next wk.
- recommend TOC analyzer

Process control needed
Training needed

- reduce Ox demand
- reduce TOC
- " THM

PAC feed available (dry feeder)

jar testing set/prog to mimic plant
1000 G rapid mix 30sec.
45 30 15 floc 10 min each 3 stage
plate settlers 0.3 gpm/ft² (80% area)
ozone contactors
~3 12 mgd cells
T10 0.65
20 min dt @ 36 mgd
O3 res. about 1/3 of dt only

1.4 gpm/ft²
softeners
35 min
floc
floc speed?

presed chamber upstream ozone
no washwater recycle / but available 2-10%
dual media 3 gpm/ft² @ 36 mgd
sand/anthr
no gravel
air scour

2015 Jan 7.6 raw 3.1 tap } TOC
3.0 soft. 5.0 unsoft.

THMs - May/Aug elevated
Feb/Oct low

Plant tour
~~presed clarifier upstream~~
pre O_3
- 3 cells (12 mgd each)
diffusers in 1st 2 sections (vertical) only
- O_2 front, middle, end manual samples

lox w/ N_2 boost
2 generators / destruct systems
11.6% O_3 today
55 cfm
Cont 3 260 ppd 5.8 mgd 2 mg/L
$NaHSO_3$ O_3 quench when needed

plate clarifiers
2 bays - 3 trains = 6 total bays

2 rapid mixers – one each train

3 stage floc basins each side
— to plate clarifiers

riser well to feed channel to softeners
2 westech SCC

softeners to 2 recarb trains
— RSF systems

recarb to filters

Operators Lab

main lab (control room near main lab)

12 dual media filters Pump St 9 then
— effluent N/S combine to CW 3 MG

OT → prefilter Cl_2 just upstream filter bldg.
postfilter Cl_2 at PS 4 then CW

plans to install filtered PS to fill Port Res.
(old CW)

potential modeling Flint water
- c/2 decay (test, getting ch monitoring results)
- Softening / recarbonation
- THM formations
- source characterization
- TOC profile by process
- oxidant demand reduction

possible GAC filter caps 30" or more if space available
700sf each

8.3 min
6.3 min
1750 cf each × 12 = 21,000 cf
× $59/cf
$1,239,000

2.09 cfm
@ 13 mgd
3.18 cfm
@ 24 mgd

5 min
3.78 min
18" 1050 cf each × 12 = 12,600 cf
× $59/cf
$743,400

8 filters operating 2-3 gpm/sf
2.2 @ 18
2.97 @ 24

PAC 430 – 187 (66.5%) TTHM FP reduction (LAN data)
Warren thinks we should assume 29 mg/l summer flow

Dist. System

West Reservoir 12 mg w/ pump station

Cedar St. Reservoir 20 MG w/ pump station

~~Hamtramck~~ Lorenz Booster Pumping Station

2 MG elevated at plant

Warren Green

- raw water dt before O3
  - 18 mgd 30 min (est.)
  - 24 mgd 19 min (est.)

Corrosion Control checking 2/18/15

	Dec 2014		Aug 2014	
	Raw	Tap	Raw	Tap
pH	8.24	8.09	8.09	7.78
TH	317	192	235	155
Ca	290	152	190	133
Mg	47	40	35	22
TA	258	88	194	82
NCH	59	104	41	73
Cl	47	80	40	63
SO4	12	24	1	10
CCPP		0.8		0.3
LI		−0.12		−0.17
DIC		21.5		20.2

* corrosive water conditions exist discussed w/ plant staff and suggested potential issues with lead and copper monitoring in the future. Might need to balance pH and corrosion control with THM compliance issues.

Date	Bromate	O3 dosage
9/24/14	9	3.09
10/31/14	10	4.78
11/24/14	<10	2.13
12/22/14	23	7.19
1/26/15	19	7.13

PVS FeCl3
1.41
38%

Soft. Clarifier Effluent 9/12/15

TA/PA 1.33

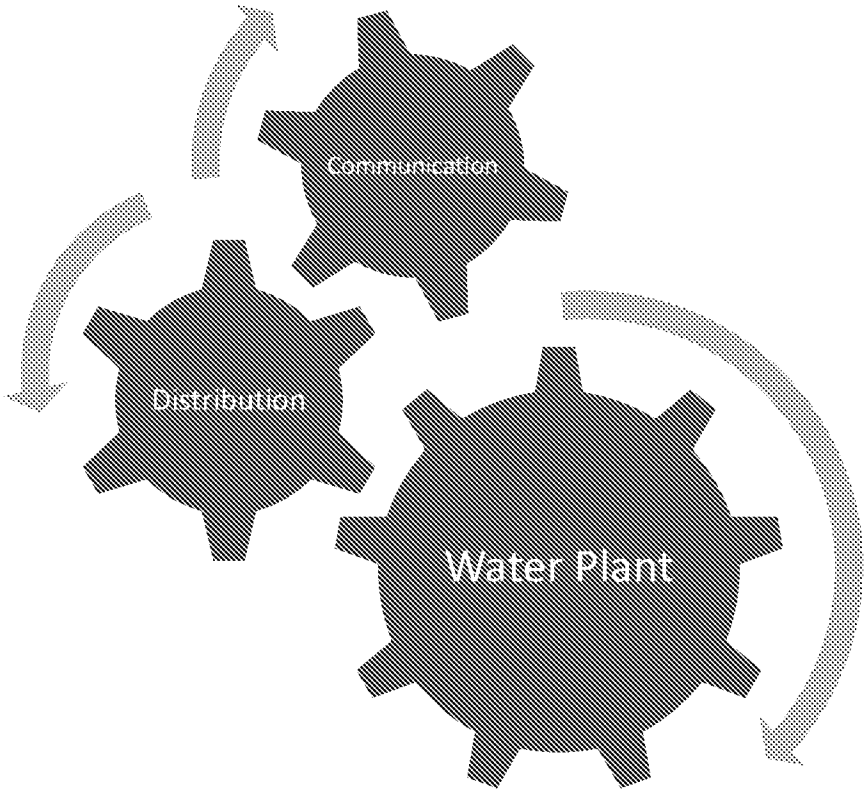
pH	11.44	10.92
TA	56	CO3 28
PA	42	OH 28
Ca	54.5 as Ca	136 mg/L
TH	210	
Mg	84	
	136	
	64	
	200	

EXHIBIT 27

VEOLIA

City of Flint, MI
Water Quality Report
Technical Advisory Committee

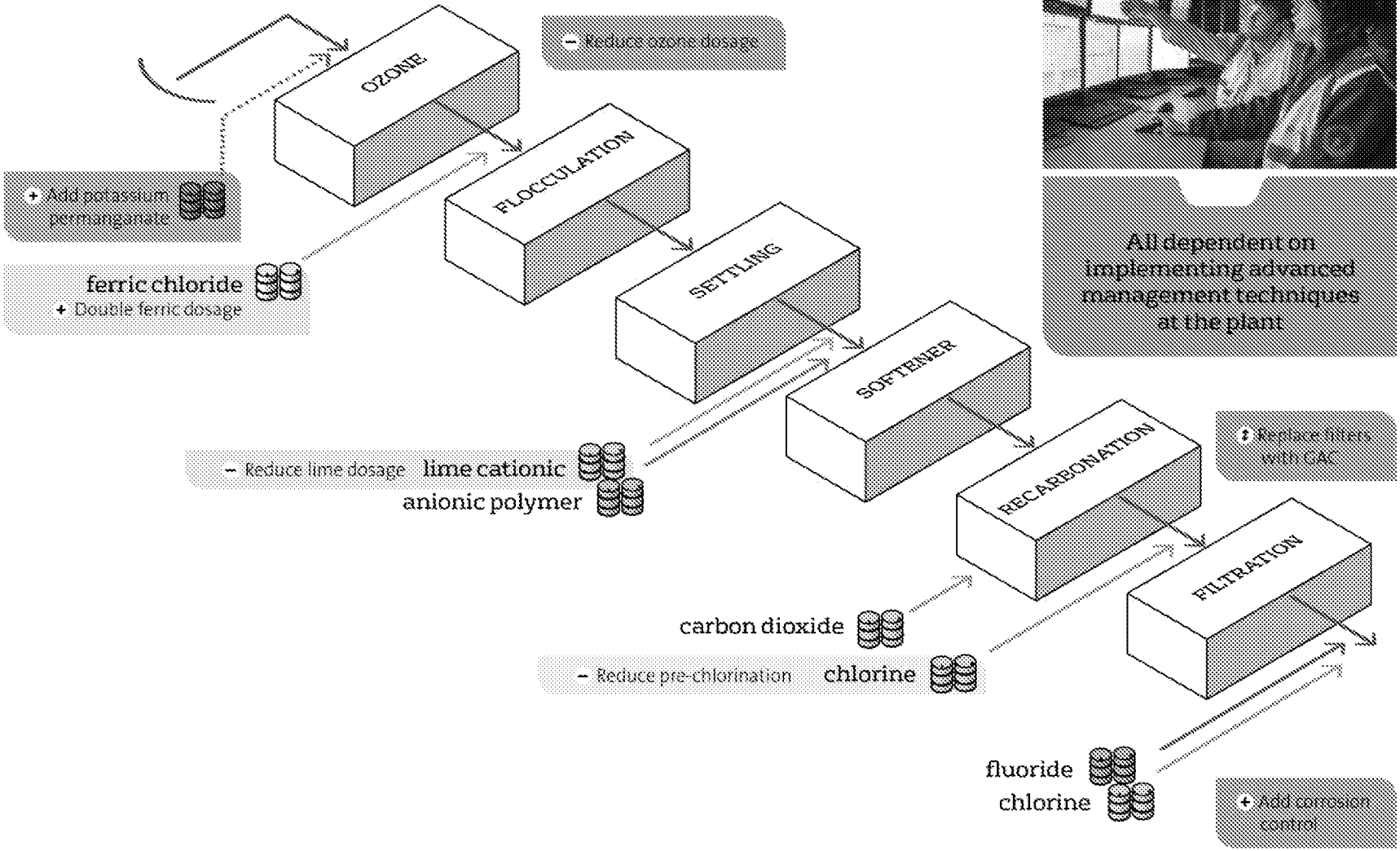
Solution Involves Coordination of 3 Activities



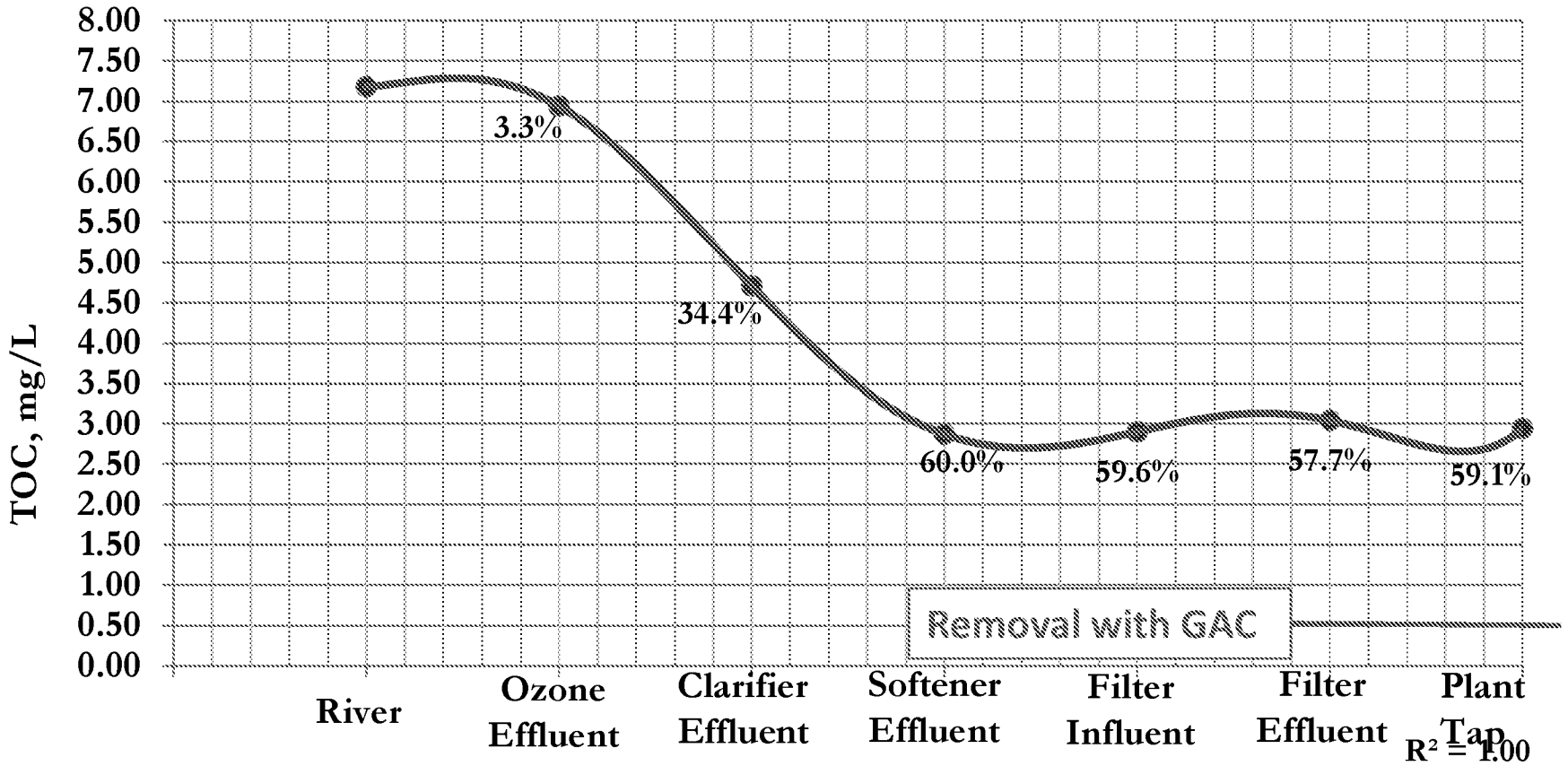
- Water plant improvements
  - *Optimize chemical dosages*
  - *Consider different chemicals*
  - *Install granulated activated carbon*
  - *Complete plant upgrades*
  - *Implement best mgt practices*
- Distribution system improvements
  - *Fix broken valves*
  - *Ask for customer feedback*
  - *Reduce tank storage*
  - *Target line flushing*
  - *Run a hydraulic model*
- Better communication with customers
  - *Engage advisory committees*
  - *More accessible utility*
  - *Make it easy to access information*
  - *Better customer communication*

Optimize Plant Processes

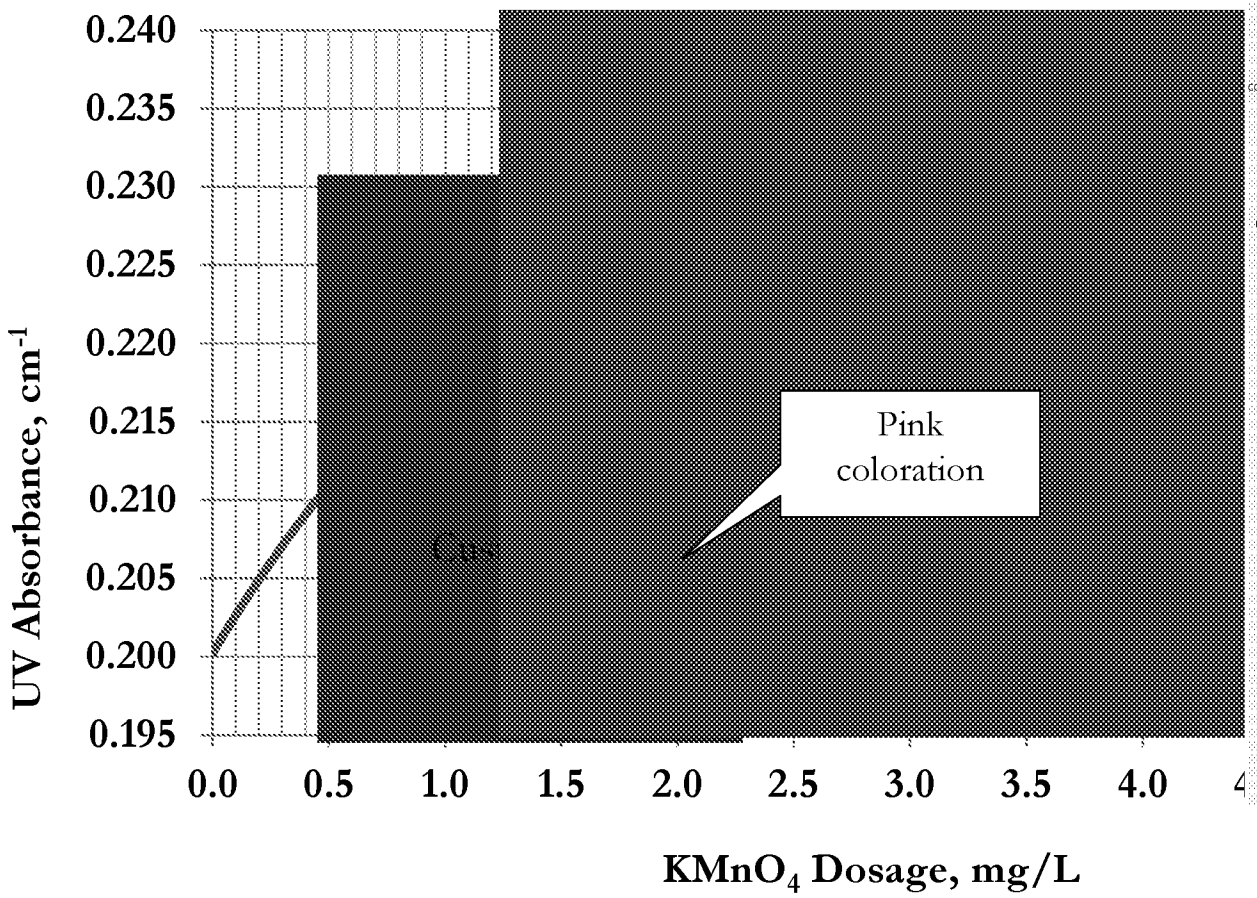
All dependent on implementing advanced management techniques at the plant



TOC Removal Efficiency Optimizing Current Plant



Potassium Permanganate Dosing Graph



JAR TEST BENCH SHEET

FACILITY NAME	Flint, Michigan				DATE	February 16, 2015	
CHEMICAL DATA		ALUM	$FeCl_3$	$Fe_2(SO_4)_3$	POLYMER	LIME	$KMnO_4$
Specific gravity							1.16
Percent dry chemical							20
Stock volume, mL							100
Chemical added, mL or grams							0.9
Stock concentration, mg/L							2,000
Solution volume, mL							
Stock solution added, mL							
Solution concentration, mg/L							
TEST CONDITIONS		STIRRER RPM		DURATION		Simulated Conditions	
Rapid Mixing		300		seconds	G		sec^{-1}
Flocculation		30	15	minutes	G		
Settling		0		minutes	Coag. 0.3		gpm/ft^2
Filtered distilled water time				seconds	Soft. 1.16		gpm/ft^2

RAW WATER CHARACTERISTICS

Temperature °C	pH	Alkalinity	Hardness	Turbidity	Color	TOC	DOC	POC
						7.05		
Filterability Index	Calcium	Magnesium	Iron	Manganese	THMFP	UV_{254}		
						0.198		

JAR NUMBER	1	2	3	4	5	6
Raw water volume, mL	2,000	2,000	2,000	2,000	2,000	2,000
Alum solution added, mL						
Alum dosage, mg/L						
Ferric solution added, mL						
Ferric dosage, mg/L						
Polymer solution added, mL						
Polymer dosage, mg/L						
$KMnO_4$ solution added, mL	0.5	1.5	2.5	3.5	4.5	5.5
$KMnO_4$ dosage, mg/L	0.5	1.5	2.5	3.5	4.5	5.5
Lime solution added, mL						
Lime dosage, mg/L						

FLOC FORMATION OBSERVATIONS

5 minutes	
10 minutes	
15 minutes	
20 minutes	
25 minutes	

SETTLING CHARACTERISTICS OBSERVATIONS

1 minute	
2 minutes	
3 minutes	
4 minutes	
6 minutes	

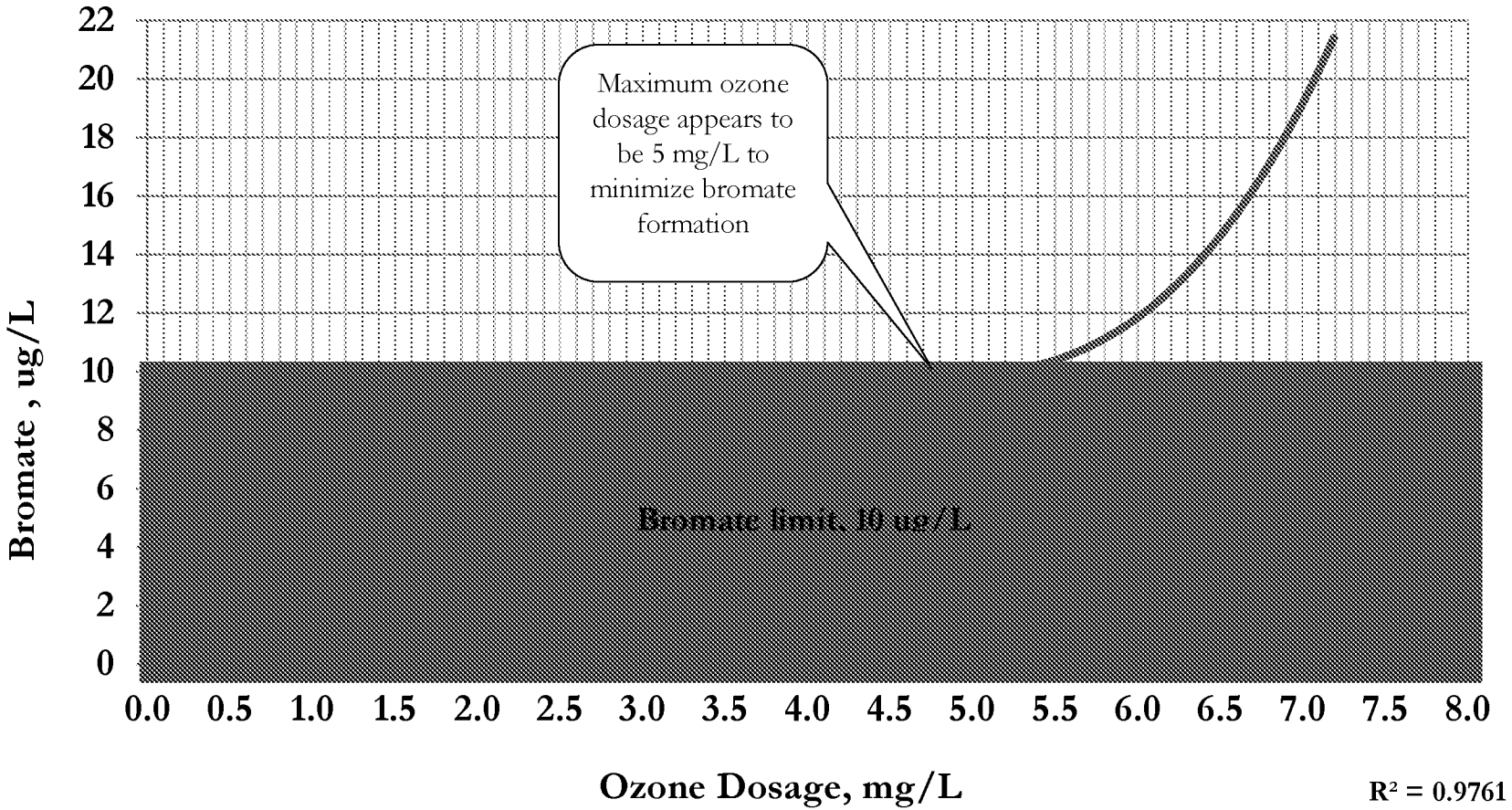
SETTLED WATER RESULTS

Turbidity, NTU						
Water pH						
Alkalinity, mg/L						
Hardness, mg/L						
TOC, mg/L						
UV_{254}, cm^{-1}	0.219	0.222	0.229	0.230	0.232	0.237
Filtered water time						
Filterability Index						
NOTES:						

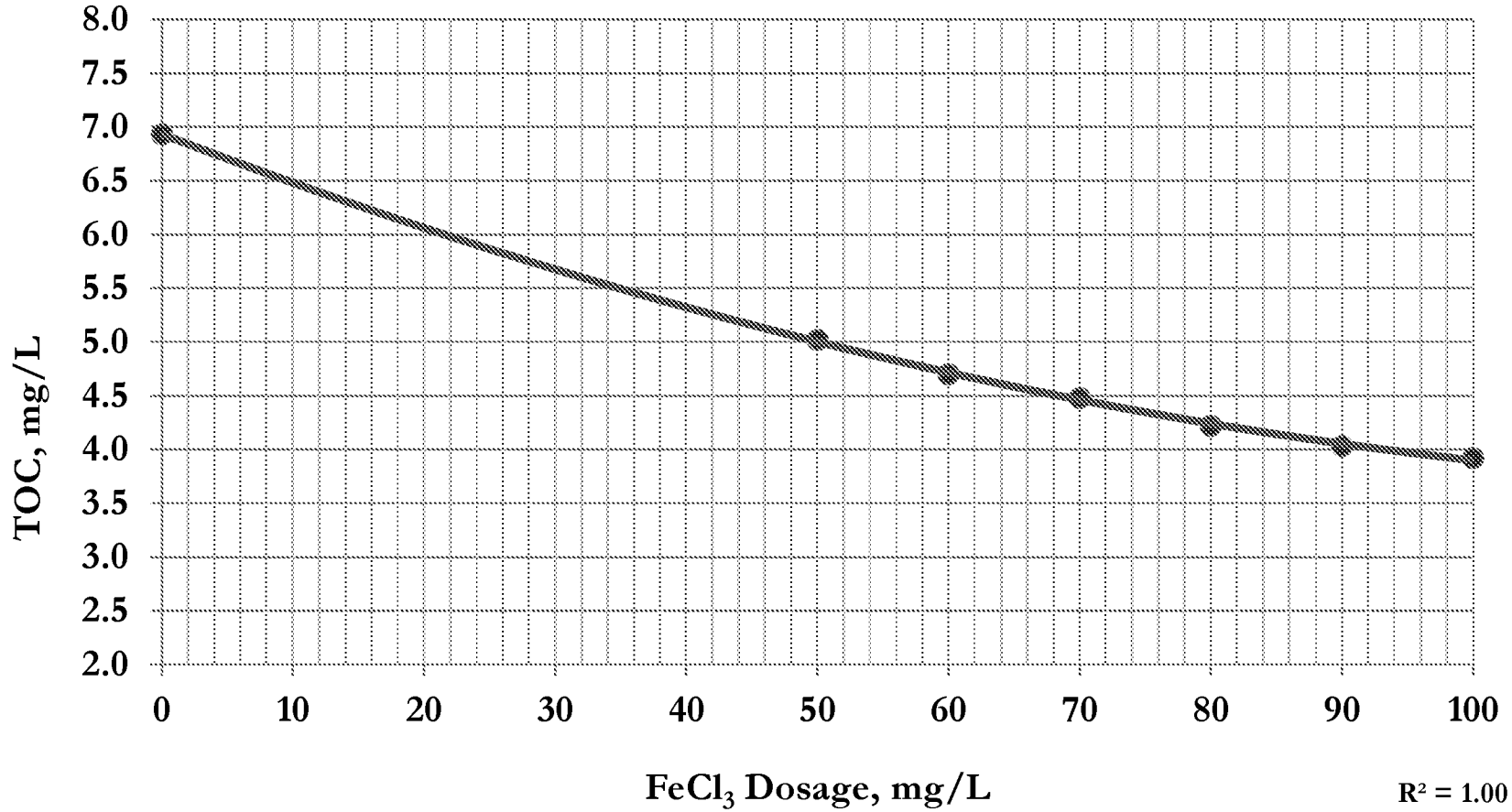
Veolia Water North America

$R^2 = 0.9753$

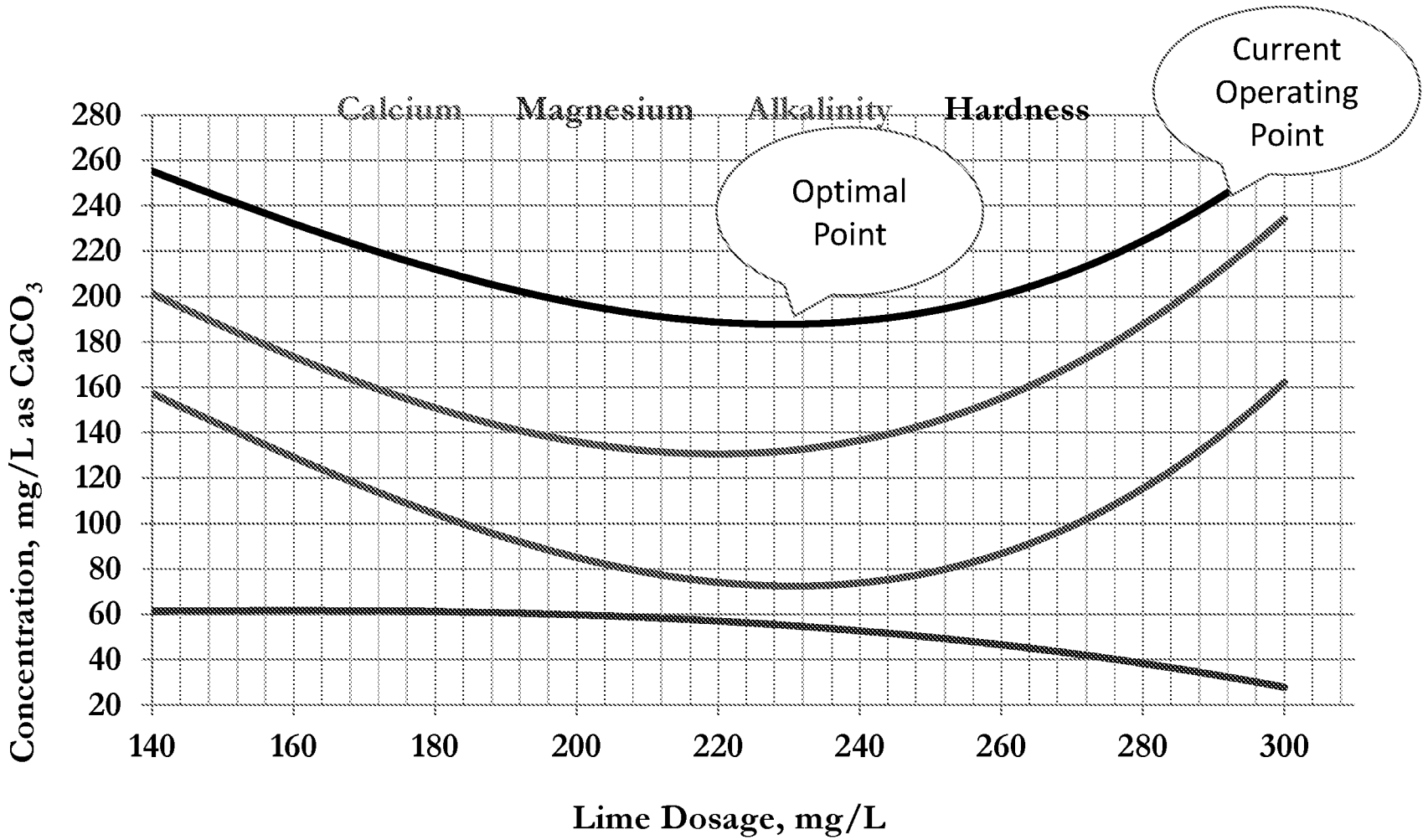
Bromate Dosing Graph



Dosage of Ferric Chloride



Lime Dosage Graph



Implement Best Management Practices

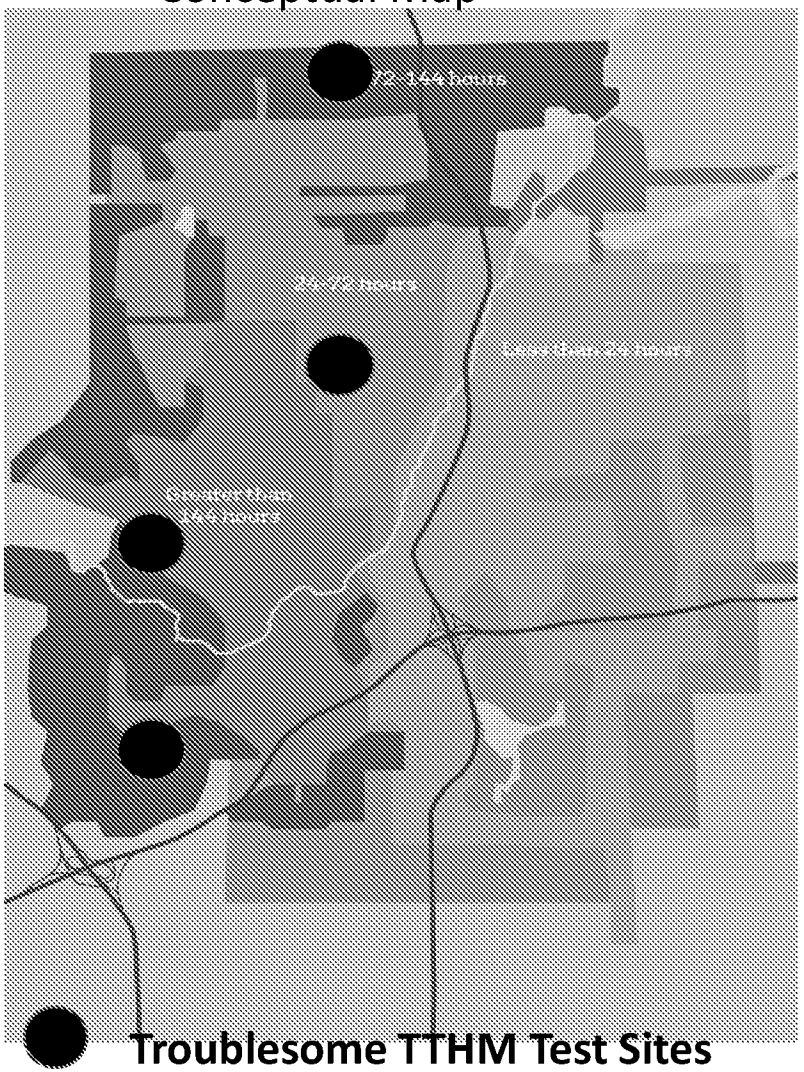
<u>Activities to Help Operators Maintain Good Water Quality</u>

- Process Control Management Plan
- Lab QA/QC Program
- Computerized Maintenance Management System
- Asset Management System
- Training and Certification Program
- Vulnerability Plan

Water Age Map

- Speed up flow of water from plant to homes – 2 weeks plant to house
  - *Find closed valves & open them*
  - *Replace broken valves*
  - *Update hydraulic model*
  - *Reduce system storage*
- Track customer complaints
  - *Test customer water*
  - *Spot flush hydrants to clean areas of stagnant water in the system*

Conceptual Map



Troublesome TTHM Test Sites

Make It Easy to Access Information and People

Develop a proactive customer communication plan

- Create advisory committees to help direct efforts and improve flow of information
- Add additional communication personnel for the utility
- Develop a pro active communication program
- Establish a single point of contact to manage all water quality complaints
- Provide additional customer service training and tools to staff
- Expand neighborhood and community outreach
- Change monthly billing statements from card to envelope with information

VEOLIA

Questions?

EXHIBIT 28

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

In re: FLINT WATER CASES	)	Civil Action No. 5:16-cv-10444-JEL-MKM (consolidated)
	)	Hon. Judith E. Levy
	)	Mag. Mona K. Majzoub

HIGHLY CONFIDENTIAL
REMOTE VIDEOTAPED DEPOSITION OF
ERIC J. OSWALD

VOLUME I

Monday, November 9, 2020

Remote videotaped deposition of ERIC J. OSWALD, conducted at the location of the witness in Battle Creek, Michigan, commencing at 9:01 a.m., on the above date, before Carol A. Kirk, Registered Merit Reporter, Certified Shorthand Reporter, and Notary Public.

GOLKOW LITIGATION SERVICES
877.370.3377 ph | 917.591.5672 fax
deps@golkow.com

MR. CAMPBELL: Okay. You can take that down.

And, Alaina, if you could bring up the March 12 report and scroll -- show the first page, first of all, and then we'll scroll to the back.

MS. DEVINE: Exhibit 23.

- - -

(Oswald Deposition Exhibit 23 marked.)

- - -

BY MR. CAMPBELL:

Q. I don't know if you can see the date down on the bottom of the first page.

A. I can. March 12.

Q. Do you see the March 12, 2015 date?

A. Yes.

Q. Do you see that, sir?

All right. So if we scroll all the way to the end, you're going to see a set of prioritized action items that Veolia North America recommended to the City of Flint on March 12, 2015.

And because they're prioritized,

they're numbered numerically 1, 2, 3, 4, and so forth. And if you look at priority number 2 and scroll to the next page, you'll see these words, "Contract with your engineer and initiate discussions with the state on the addition of a corrosion control chemical.

"This action can be submitted and discussed with the state at the same time as the other chemical and filter changes saving time and effort. A target dosage of 0.5 milligrams per liter phosphate is suggested for improved corrosion control."

Did I read that correctly?

A. Yes.

Q. Do you remember a little while ago in the deposition before our break, you said on more than one occasion that you just don't dump a chemical into the water in order to achieve corrosion control. You have to look at it and study it and the like.

Do you remember that? I'm paraphrasing your testimony.

A. I do.

Q. I didn't get your answer. I'm

sorry.

A. I do remember that. Yes.

Q. Yes. Okay. So on March 12, 2015, Veolia North America is saying to the City of Flint that it should get together with its engineer and the state, meaning the DEQ, to discuss the addition of a corrosion control chemical.

Do you see that?

A. I do.

Q. That's a perfectly appropriate recommendation, isn't it, sir?

A. It is.

Q. You would not take issue with that recommendation at all, would you?

A. I would not take issue with that recommendation in that first sentence, no.

MR. CAMPBELL: Okay. I'm done with that, Alaina.

And now I think I'll end up and then pass the witness with -- let me bring up the Flint Water Advisory Task Force final report. We've marked that -- was that Number 5 or something

at that, yes.

Q. All right. So Veolia North America in March of 2015 suggested to -- or recommended, specifically recommended, to the City of Flint, its customer, that it begin with an initial dose of phosphate of 1 milligram per liter, but to do so in conjunction with their engineer and the regulator, that is, the MDEQ as part of a study.

Do you remember that?

A. I remember seeing on the chemical list the 1 milligram per liter of orthophosphate, yes.

Q. A recommendation for the City of Flint to undertake that type of an evaluation with its engineer, meaning LAN, and with the regulator, meaning the MDEQ, is a perfectly appropriate and sensible thing to do; isn't it?

MR. SCHNATZ: Objection to form.

A. Yes, it is.

MR. CAMPBELL: Thank you. No further questions.

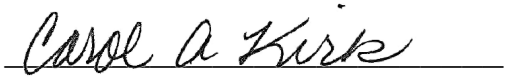
And thanks for your time, Director.

CERTIFICATION

I, Carol A. Kirk, Registered Merit Reporter and Certified Shorthand Reporter, do hereby certify that prior to the commencement of the examination, ERIC J. OSWALD, was duly remotely sworn by me to testify to the truth, the whole truth, and nothing but the truth.

I DO FURTHER CERTIFY that the foregoing is a verbatim transcript of the testimony as taken stenographically by me at the time, place, and on the date hereinbefore set forth, to the best of my ability.

I DO FURTHER CERTIFY that I am neither a relative nor an employee nor attorney nor counsel of any of the parties to this action, and that I am neither a relative nor employee of such attorney or counsel, and that I am not financially interested in the action.



Carol A. Kirk, RMR, CSR
Notary Public
Dated: November 20, 2020

EXHIBIT 28

From: Michael Glasgow <mglasgow@cityofflint.com>
Sent: Thursday, February 26, 2015 7:56 AM
To: Lea Moste
Subject: Re: Water testing Results
Attachments: Redacted-PII (Pb & Cu).pdf

Lee,

Here are your Lead & Copper Results. This number is very high, 104 ppb of lead. In the last few months over 100 samples have been tested and only 2 were over the 15 ppb regulatory limit, and the highest level I have seen is 37 ppb. I will pass this info to Mr. Croft so he is aware. I will send the sample I collected from your kitchen faucet today for a complete metals test (12 different metals), to see what the level is without letting the water stagnate over night. I'm hoping that value will be much, but we will have to see. Sorry for this news, but I wanted to let you know right away.

Mike

On Tue, Feb 24, 2015 at 1:50 PM, Michael Glasgow <mglasgow@cityofflint.com> wrote:
Lee,

I will bring a copy of last years annual report when I stop by tomorrow. The annual report from 2014 must be delivered to residents by July 1st of this year. I imagine we may have it complete by June.

Mike

On Fri, Feb 20, 2015 at 1:00 AM, Redacted-PII @gmail.com> wrote:
Mike,
Thank you for the water reports and we already planned to see you on the 25th at 10:00am. I was wondering if you know who I need to talk to in the water plant to obtain the Annual Drinking Water Report from last year. According to the EPA website there is link to access but when you click on it, it cannot be accessed. Was also curious if there is an expected time frame for this years report due to the switch. If you can be of any assistance I would appreciate it.

Thank You
LeeAnne Walters

On Thu, Feb 19, 2015 at 12:47 PM, Michael Glasgow <mglasgow@cityofflint.com> wrote:
Lee & Dennis,

Here is a list of test results from water sampled at your home over the last 2 weeks. I have sent in your lead and copper sample, and also a sample from the toilet tank for manganese. I should hopefully have results from this testing early next week. I'll plan on stopping over on Wednesday (the 25th) around 10 am again to give you these results & sample again.

Mike

EXHIBIT 30

From: Rosenthal, Adam (DEQ)
Sent: Thursday, June 25, 2015 10:48 AM
To: Mike Glasgow;'bwright@cityofflint.com'
Cc: Prysby, Mike (DEQ);Busch, Stephen (DEQ)
Subject: 6/30 & 7/1/15 deadlines
Attachments: Flint-2015-04-03-LT2ESWTR.pdf

Morning Mike & Brent, just wanted to remind you/confirm that Flint is on track for a few items.

1 – We hope you have 61 more lead/copper samples collected and sent to the lab by 6/30/15, and that they are will be below the AL for lead. As of now with 39 results, Flint's 90th percentile is over the AL for lead.

2 – LT2 source water monitoring plan, reminder that it is due to our office for review by 7/1/15 per Mike's 4/3/15 letter, (attached).

3 – Consumer Confidence Report, (CCR), has not been received yet – due to our office, Gen. Co. LHD & your customers by 7/1/15.

Please provide an update for the above items.

thanks,

Adam Rosenthal, EQA
MDEQ – Office of Drinking Water and Municipal Assistance
Lansing District – Constitution Hall 1SW
PO Box 30242
Lansing, MI 48909
517-284-6644
fax: 517-241-3571

For MORs, Lab Results & Reporting Forms:
DEQ-DWMA-Lansing@michigan.gov

EXHIBIT 31

N DEPARTMENT OF ENVIRONMENTAL QUALITY
F DRINKING WATER AND MUNICIPAL ASSISTANCE

DRAFT

AND COPPER REPORT AND
ONSUMER NOTICE OF LEAD RESULT
CERTIFICATE FOR COMMUNITY WATER SUPPLY

Issued under authority of 1976 PA 399, MCL 325.1001 *et al.*, and Administrative Rules, as amended.
Failure to submit this information is a violation of Act 399 and may subject the water supply to enforcement penalties.

Administrative Rule R 325.10710d requires water supplies to report lead and copper monitoring information within 10 days after the end of the monitoring period. This form may be used to meet this requirement. Submit the information to the appropriate Department of Environmental Quality (DEQ) district office. For district office addresses, visit www.michigan.gov/deq and click on Locations.

1. Water Supply Name: City of Flint Water Plant
2. County: Genesee
3. WSSN: 2310
4. Population: 99,763
5. Monitoring Period: From: 1/1/15 To: 6/30/15
6. Minimum # of Samples Required: 100 60
7. # of Samples Taken: 71 ~~72~~ 69
8. Name of Certified Laboratory: DEQ Drinking Water Laboratory

9. SAMPLE CRITERIA:

Yes	No	Explain No responses in Comments block.	
☐	☒	a. Are the same sampling points used as in the previous monitoring period?	
☐	☒	b. Are all samples from Tier 1 sites?	For more information see *Instructions* paragraph 11, subparagraph "Sample Category."
☒	☐	c. Are all samples from Tier 1, 2, or 3 sites giving Tier 1 priority?	
☒	☐	d. If no Tier 1, 2, or 3 sites are available, do all sites have plumbing materials commonly found at other locations in the system?	
☒	☐	e. Is the minimum number of lead service line samples taken (when applicable)?	

Comments:
A total of 175 sample bottles and instructions were distributed to city residents. We are continuing to solicit samples due to the fact that we did not reach the minimum number for this monitoring period.

Lead service - majority (30,000?)

10. NAME:

Name: Michael Glasgow

Title: Utilites Administrator Phone: 810-766-7135 Date: 7/28/2015

EQP 5942 (Rev. 06/2012)

DRAFT

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water Plant WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
2205 Flusing Rd	2/15/15	1	L	C,P	N.D.	0.13	54663
212 Browning Ave.	2/18/15	1	L	P	104	N.D.	54945
1809 Stevenson St.	2/10/15	1	L	P	10	N.D.	54956
4202 Custer Ave.	3/4/15	1	L	C,P	6	0.27	56223
401 E. Newall St.	3/2/15	1	L	P	5	N.D.	56225
215 Browning Ave. ok	3/21/15	1	L	C,P	N.D.	0.16	56226
2615 Trumbull Ave.	2/27/15	1	L	C,P	3	N.D.	56227
201 Browning Ave. ok	3/5/15	1	L	P	N.D.	N.D.	56228
1224 Decker St.	3/17/15	1	L	C,P	13	0.10	57728
1220 Decker St.	3/17/15	1	L	P	4	N.D.	57730
1379 Washington Ave.	3/19/15	1	L	P	8	N.D.	57731
1383 Washington Ave.	3/19/15	1	L	C,P	6	0.17	57734
1372 Washington Ave.	3/19/15	1	L	C,P	2	0.14	57733
1367 Washington Ave.	3/17/15	1	L	P	1	N.D.	57735
1701 Marquettte Dr.	3/14/15	1	L	C,P	1	0.19	57736
778 Bundy Ave.	3/24/15	1	L	P	N.D.	N.D.	58413
3714 Beecher Rd.	3/24/15	1	L	C	2	0.52	58414
1016 Ingleside Ave.	4/9/15	1	L	C,P	7	0.07	59749
1818 Rock Creek Ln.	4/6/15	1	L	C,P	3	0.11	59750
3010 Cheyenne St.	4/3/15	1	L	C,P	5	0.10	59751

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

11. TAP SAMPLING DATA: (Use additional sheets as needed) DRAFT

Water Supply Name/County City of Flint Water Plant WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
2606 Mountain Ave.	4/15/15	1	L	P	N.D.	N.D.	60546
2020 Crooked Ln.	4/24/15	1	L	C,P	5	0.10	61845
310 E. Moore St.	4/22/15	1	L	P	5	N.D.	61846
631 Alvord Ave.	5/6/15	1	L	P	42	N.D.	63410
216 Browning Ave.	5/7/15	1	L	C,P	22	0.31	63411
3714 Beecher Rd.	5/14/15	1	L	C,P	8	0.15	64283
~~625 S. Grand Traverse~~	~~5/18/15~~	~~5~~	~~L~~	~~C,P~~	~~20~~	~~0.14~~	64284 X
912 Lexington Ave.	5/15/15	1	L	P	6	N.D.	64285
349 Robbie Ln.	5/31/15	1	L	P	2	N.D.	67428
353 Robbie Ln.	5/30/15	1	L	C,P	5	0.11	67427
341 Robbie Ln.	5/31/15	1	L	C,P	3	0.05	67426
328 Robbie Ln.	5/30/15	1	L	C,P	2	0.09	67425
357 Robbie Ln.	5/31/15	1	L	C	3	0.20	67424
344 Robbie Ln.	5/31/15	1	L	C,P	4	0.11	67423
1807 Oren Ave.	6/8/15	1	L	P	21	N.D.	68023
421 Lyon St.	6/14/15	1	L	C,P	7	0.14	68788
1528 Delaware Ave.	6/12/15	1	L	P	3	N.D.	68789
3811 Brentwood Dr.	6/14/15	1	L	P	42	N.D.	68790
1615 S. Franklin Ave.	6/14/15	1	L	P	N.D.	N.D.	68791
853 E. 7th St.	6/12/15	1	L	C,P	7	0.07	68792

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

19

3

11. TAP SAMPLING DATA: (Use additional sheets as needed)

Water Supply Name/County City of Flint Water Plant WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
1150 Woodside Dr.	6/14/15	1	L	P	29	N.D.	68793
547 Copeman Blvd.	6/14/15	1	L	P	18	N.D.	68794
920 Stocker Ave.	6/21/15	1	L	P	1	N.D.	69622
742 Lincoln Ave.	6/19/15	1	L	P	2	N.D.	69623
3517 Bennett Ave.	6/24/15	1	L	C,P	3	0.06	69624
1730 Overhill Dr.	6/22/15	1	L	C,P	1	0.08	69625
2117 Stanford Ave.	6/23/15	1	L	C,P	5	0.08	69626
2432 Beta Ln.	6/21/15	1	L	P	N.D.	N.D.	69627
2023 Miller Rd.	6/21/15	1	L	C,P	3	0.06	69628
721 East St. Apt #2	6/25/15	4	L	C,P	10	0.16	70222
3814 Whitter	6/25/15	1	L	P	2	N.D.	70223
3120 Norwood	6/24/15	1	L	P	5	N.D.	70224
2122 Pierce St.	6/21/15	1	L	P	2	N.D.	70225
3521 Bennett Ave.	6/25/15	1	L	P	3	N.D.	70226
1602 Raspberry Ln.	6/24/15	1	L	P	N.D.	N.D.	70227
1809 Lynbrook	6/26/15	1	L	P	3	N.D.	70228
2112 Sherff	6/24/15	1	L	C,P	9	0.06	70229
1205 Blanchard Ave.	6/24/15	1	L	C,P	11	0.05	70230
860 Schafer St.	6/26/15	1	L	C,P	N.D.	0.06	70231
2110 Flushing Rd.	6/30/15	1	L	C	N.D.	0.10	71158

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

20

11. TAP SAMPLING DATA: (Use additional sheets as needed)

DRAFT

Water Supply Name/County City of Flint Water Plant WSSN 2310

RESULTS:

Sample Location	Sample Date	Sample Category[1]	Service Lines[2]	Bldg Plumb-ing[2]	Lead (ppb)	Copper (ppb)	Lab #
2300 Flushing Rd.	6/29/15	1	L	C	3	0.28	71159
2130 Flushing Rd.	6/28/15	1	L	C,P	6	0.05	71160
2202 Flushing Rd.	6/29/15	1	L	C,P	2	0.06	71162
2429 Flushing Rd.	6/30/15	1	L	C,P	N.D.	0.06	71163
4013 Brownell Blvd.	6/29/15	1	L	C,P	2	0.08	71165
2414 Flushing Rd.	6/30/15	1	L	P	N.D.	N.D.	71166
1914 Penbrook Ln	6/29/15	1	L	P	2	N.D.	71167
3901 Leedra St.	6/26/15	1	L	P	N.D.	N.D.	71168
3142 McClure	6/26/15	1	L	P	3	N.D.	71169
2114 Flushing Rd.	6/30/15	1	L	C,P	5	0.05	71170
709 Frost St.	6/30/15	1	L	P	2	N.D.	72033

[1] Sample Category: Enter a number 1 through 6 to designate the category of tap sample site. For more information see *Instructions* paragraph 11, subparagraph "Sample Category."

[2] Materials used for service line and building plumbing: Enter C = copper; G = galvanized; L = lead; or P = plastic.

TO BE DETERMINED BY DEQ

	90th percentile	Ave	Max	# > AL
Pb				
Cu				

Consumer Notice of Lead Result in Drinking Water DRAFT

Water Supply Name:	City of Flint		
County:	Genesee	WSSN:	**2310**
Sample Location:	401 E. Newall St.	Date Sampled:	**3/2/15**

Thank you for participating in the lead and copper monitoring of drinking water. The levels of lead and copper found at your location are in the table below.

Key to Table	Contaminant	AL	MCLG	Your Result
Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow. **Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety. **ppb:** parts per billion or micrograms per liter.	Lead (ppb)	15	0	5
	Copper (ppb)	1300	1300	Not Detected

Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and it can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and it can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development.

To reduce exposure to lead in drinking water:

- *Run your water to flush out lead.* Run the water until it becomes cold.
- *Use cold water for cooking and preparing baby formula.* Do not cook with or drink water from the hot water tap; lead dissolves more easily in hot water.
- *Do not boil water to remove lead.* Boiling water will not reduce lead levels.
- *Look for alternative sources or treatment of water.* If your lead result is above 15 ppb, you may want to consider purchasing bottled water or a water filter. Read the package to be sure the filter is approved to reduce lead or contact NSF International at 800-NSF-8010, or www.nsf.org for information on performance standards for water filters.
- *Identify if your plumbing fixtures contain lead.* New faucets, fittings, and valves, may contain up to 8 percent lead including those advertised or labeled as "lead-free" and may contribute lead to drinking water. Consumers should be aware of this when choosing fixtures and take appropriate precautions.

Although the primary sources of lead exposure for most children are deteriorating lead-based paint, lead-contaminated dust, and lead-contaminated soil, the U.S. EPA estimates that 10 to 20 percent of human exposure to lead may come from drinking water.

For more information, contact us at: City of Flint Water Plant (810) 787-6537.
For more information on reducing lead exposure around your home and the health effects of lead, visit the U.S. EPA's Web site at www.epa.gov/lead, call the National Lead Information Center at 800-424-LEAD, or contact your health care provider.

Certification: WSSN: 2310
I certify that this public water supply has provided the consumer notice of lead result to persons served at each of the taps that was tested, either by mail or by another method approved by the DEQ, within 30 days of knowing the result. The Notice includes required content.

Michael Glasgow — Signature
UTILITIES ADMINISTRATOR — Title
3/17/15 — Date Sent to Consumer

Reminder to water supplier: Complete this certification on only one (1) example copy of a notice sent to a consumer and submit it to the DEQ.

Rosenthal, Adam (DEQ)

From: Rosenthal, Adam (DEQ)
Sent: Monday, August 03, 2015 9:57 AM
To: 'Michael Glasgow'
Subject: RE: PbCu Cert form

Morning Mike, I also need copies of all 68 consumer notices. I have 1 from 401 E. Newall St., so 67 more.

thanks,

Adam Rosenthal, EQA
MDEQ – Office of Drinking Water and Municipal Assistance
Lansing District – Constitution Hall 1SW
PO Box 30242
Lansing, MI 48909
517-284-6644
fax: 517-241-3571

For MORs, Lab Results & Reporting Forms:
DEQ-DWMA-Lansing@michigan.gov

From: Michael Glasgow [mailto:mglasgow@cityofflint.com]
Sent: Friday, July 31, 2015 10:28 AM
To: Rosenthal, Adam (DEQ)
Subject: Re: PbCu Cert form

Adam,

Here is the lead & copper report. I have also sent a hard copy out via USPS.

On Thu, Jul 30, 2015 at 9:33 AM, Rosenthal, Adam (DEQ) <ROSENTHALA@michigan.gov> wrote:

Morning Mike, I'm preparing the 90th percentile letter and I need your lead copper certification form with the cert of notification to the customers. What I have are 68 results that are routine from 1/1 – 6/30/15. The link below is for the form if you don't have one.

http://www.michigan.gov/deq/0,4561,7-135-3313_3675_3691-61640--,00.html

thanks,

Adam Rosenthal, EQA

MDEQ – Office of Drinking Water and Municipal Assistance

Lansing District – Constitution Hall 1SW

PO Box 30242

Lansing, MI 48909

517-284-6644

fax: 517-241-3571

For MORs, Lab Results & Reporting Forms:

DEQ-DWMA-Lansing@michigan.gov

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Mike Glasgow
Utilities Administrator
City of Flint
1101 S. Saginaw St.
Flint, MI 48502
(810)766-7135 ext. 2602

Rosenthal, Adam (DEQ)

From: Rosenthal, Adam (DEQ)
Sent: Friday, July 10, 2015 11:28 AM
To: 'Michael Glasgow'
Cc: Brent Wright
Subject: RE: lead/copper

we are discussing options regarding this and future rounds of monitoring and will get back with you.

thanks,

Adam Rosenthal, EQA
MDEQ – Office of Drinking Water and Municipal Assistance
Lansing District – Constitution Hall 1SW
PO Box 30242
Lansing, MI 48909
517-284-6644
fax: 517-241-3571

For MORs, Lab Results & Reporting Forms:
DEQ-DWMA-Lansing@michigan.gov

From: Michael Glasgow [mailto:mglasgow@cityofflint.com]
Sent: Thursday, July 09, 2015 2:19 PM
To: Rosenthal, Adam (DEQ)
Cc: Brent Wright
Subject: Re: lead/copper

Adam,

I just sent the last of the samples to the lab today. Unfortunately we did not reach 100 samples. I believe the count I have is 76 total. Since we have had a few more hits this round, we are going to continue to solicit samples for our own informational purposes. I am disappointed in the turnout of sampling, we distributed close to 200 sample bottles. With this monitoring violation will we be required to collect another round of 100 samples?

Also, I have attached a copy of our June bromate test results.

On Thu, Jul 9, 2015 at 9:55 AM, Rosenthal, Adam (DEQ) <ROSENTHALA@michigan.gov> wrote:

Morning Mike, do you have a count on how many lead/copper samples were turned in? I know they all haven't been run at the lab yet, but if I can verify how many there will be, that would be good. So far I have 70 results and the City is below the AL for lead – current 90th = 13 ppb. All the copper results are below.

thanks,

Adam Rosenthal, EQA

MDEQ – Office of Drinking Water and Municipal Assistance

Lansing District – Constitution Hall 1SW

PO Box 30242

Lansing, MI 48909

517-284-6644

fax: 517-241-3571

For MORs, Lab Results & Reporting Forms:

DEQ-DWMA-Lansing@michigan.gov

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Mike Glasgow
Utilities Administrator
City of Flint
1101 S. Saginaw St.
Flint, MI 48502
(810)766-7135 ext. 2602