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STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
DRINKING WATER AND ENVIRONMENTAL HEALTH DIVISION

In the matter of: DWEHD Order No: ACO-399-03-2024

Name:
Clyde D. Edwards, City Administrator
City of Flint
1101 South Saginaw Street
Flint, Michigan 48502
_____/

ADMINISTRATIVE CONSENT ORDER

This document results from allegations by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) (formerly known as the Michigan Department of Environmental Quality), Drinking Water and Environmental Health Division (DWEHD) (formerly known as the Drinking Water and Municipal Assistance Division). EGLE alleges the city of Flint (City), located at 1101 South Saginaw Street, Flint, Michigan 48502, is in violation of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), and the administrative rules promulgated thereunder, being 2009 ACS R 325.10101 *et seq.*, Title XIV of the Public Health Service Act: Safety of Public Water Systems (Safe Drinking Water Act), Title 42 of the United States Code (USC), §300f *et seq*. (collectively referred to as the SDWA). The City is a supplier of water as defined under the SDWA through the City's ownership and operation of a Class D1 water treatment system and S1 water distribution system. The City and EGLE agree to resolve the violations set forth herein through entry of this Administrative Consent Order (Consent Order).

I. STIPULATIONS

The City and EGLE stipulate as follows:

1.1 The SDWA includes requirements for providing safe and reliable public drinking water.

1.2 The City owns and operates a Type I community public water supply in the city of Flint, Michigan (Supply) that is identified by Water Supply Serial Number (WSSN) 02310. The Supply is a community supply as defined by Section 2 of the SDWA, MCL 325.1002.

1.3 The City consents to the issuance and entry of this Consent Order and stipulates that the entry of this Consent Order constitutes a final order of EGLE and is enforceable as such under Section 15 of the SDWA, MCL 325.1015. The City agrees not to contest the issuance of this Consent Order, and that the resolution of this matter by the entry of this Consent Order is appropriate and acceptable. It is also agreed that this Consent Order shall become effective on the date it is signed by the director of EGLE, or delegate of the EGLE director.

1.4 The City and EGLE agree that the signing of this Consent Order is for settlement purposes only and does not constitute an admission by the City that the law has been violated.

1.5 The signatory to this Consent Order certifies that they are fully authorized by the City to enter into the terms and conditions of this Consent Order and to execute and legally bind the City to this document. The City hereby agrees to comply with the requirements of this Consent Order to resolve the violations stated in Section II of this Consent Order and agrees to achieve compliance with the SDWA by fulfilling the terms of Section III of this Consent Order.

II. FINDINGS

2.1 On August 7, 2017, EGLE, DWEHD staff conducted a sanitary survey of the City's drinking water system to evaluate the water supply distribution, storage, pumping, and limited treatment systems with respect to the SDWA. On August 11, 2017, EGLE issued a Significant Deficiency Violation Notice (SDVN) to the City, listing a summary of the sanitary survey's significant deficiencies, minor deficiencies, and recommendations applicable to the City's water system (Attachment A).

2.2 On October 22, 2018, EGLE issued an Order to the City (Order) to address the outstanding significant deficiencies and minor deficiencies from the sanitary survey (Attachment B).

2.3 On December 17, 2018, EGLE and the City executed the Voluntary Agreement (Attachment C) to replace the October 22, 2018, Order. The Voluntary Agreement includes deadlines for several corrective actions.

2.4 On November 12, 2020, EGLE staff conducted a sanitary survey of the City's drinking water system. On January 6, 2021, EGLE notified the City of the sanitary survey findings. The findings included significant deficiencies, deficiencies, required actions, and recommendations (Attachment D). Because the December 17, 2018, Voluntary Agreement was still in effect, a new Consent Order was not executed.

2.5 On November 6, 2023, EGLE staff conducted a sanitary survey of the City's drinking water system. On December 13, 2023, EGLE issued a SDVN to the City, listing a summary of the sanitary survey's significant deficiencies, deficiencies,

required actions, and recommendations applicable to the City's water system (Attachment E).

2.6 The City and EGLE agree that a new Consent Order is in the best interest of both parties. Upon its effective date, this Consent Order will supersede the Voluntary Agreement.

III. COMPLIANCE PROGRAM

IT IS THEREFORE AGREED AND ORDERED THAT the City shall take the following actions to comply with and prevent further violations of the SDWA:

3.1 Cross Connection Control Program Implementation

a. Not later than September 30, 2024, hire (or execute a professional services contract for) staff, as referenced in 3.9 (a) below, to implement the Cross Connection Control Program.

b. Not later than November 30, 2024, submit an implementation plan to EGLE, for review and approval, for the City's approved Cross Connection Control Program for all customer classes. The implementation plan shall list the number of water accounts in each customer class; the estimated number of accounts categorized as high hazard, low hazard, or other; and the frequency of inspections for each category. The implementation plan must include an estimate of the staffing, time, and resources required to meet the inspection, program administration, and recordkeeping requirements.

c. Not later than October 31, 2024, begin preparing monthly cross connection control program updates. The updates shall be submitted to EGLE not later than the tenth day following the month covered by the update. The update reports shall indicate the following:

- The number of high hazard, low hazard, and other inspections completed.
- The number of backflow prevention assembly test reports received.
- The number of inspection or testing notification letters sent.
- The number of unprotected cross connections discovered.
- The number of unprotected cross connections corrected.
- General notes related to program implementation.

3.2 Dort Reservoir and Booster Pumping Station (Pump Station 4)

a. Not later than March 31, 2024, complete the required improvements to the Dort Pumping Station authorized by SDWA construction permit ACT-197225. The City shall notify EGLE, in writing, within 14 days of completion of the required improvements.

b. Not later than June 30, 2024, install a removable plug or removable 24-mesh screen on the Dort Reservoir drain line and develop a Standard Operating Procedure to ensure the Dort Reservoir drain outlet chamber is not obstructed and will not be surcharged while operating the drain. The City shall notify EGLE, in writing, within 14 days of installation.

3.3 Cedar Street Reservoir, Treatment System, and Booster Pumping Station

a. Not later than 18 months after the Dort Pumping Booster Station (Station 4) meets all temperature and vibration standards, complete the required upgrades to the Cedar Street reservoir, treatment system, and booster pumping station identified in EGLE's December 13, 2023, sanitary survey letter. Required upgrades to the treatment system and booster pumping station were authorized by SDWA construction permit ACT-261816 and required upgrades to the reservoir were authorized by

SDWA construction permit ACT-263870. The City shall notify EGLE, in writing, within 14 days of completion of the required upgrades.

b. Not later than 20 months after the Dort Pumping Booster Station (Station 4) meets all temperature and vibration standards, place the Cedar Street Reservoir, treatment system, and booster pumping station upgrades into service. Within 14 days of placing the upgrades into service, notify EGLE in writing. The City shall notify EGLE, in writing, within 14 days of completion of the required upgrades.

c. Not later than 20 months after the Dort Pumping Booster Station (Station 4) meets all temperature and vibration standards, begin reporting to EGLE the measured (not estimated) volume of treatment chemicals added and the actual calculated chemical dosage at the Cedar Street Reservoir in the monthly operating report.

3.4 Torrey Road Booster Pumping Station

a. Not later than March 18, 2024, eliminate the potential for freezing of exterior piping and valves at the Torrey Road Booster Pumping Station. The City shall notify EGLE, in writing, within 14 days of completion.

b. Not later than December 31, 2024, complete an evaluation of upgrade and replacement options for the station and submit a copy of the evaluation to EGLE.

c. Not later than December 31, 2027, complete the necessary upgrades or replacement of the station. The City shall notify EGLE, in writing, within 14 days of completion of the required upgrades.

3.5 Distribution System Valves

Not later than December 31, 2024, submit a valve report to EGLE. The report

shall identify critical valves (and the criteria used to classify them as critical) and confirm their location and accessibility. The report shall also include a routine schedule of operation for critical valves and a repair or replacement schedule for critical valves determined to be inoperable.

3.6 Recordkeeping

Not later than June 30, 2024, provide documentation to EGLE, in writing, that the City has obtained the original or copies of missing records identified in EGLE's December 13, 2023, sanitary survey letter.

3.7 Bulk Chemical Storage

Not later than December 31, 2024, provide documentation to EGLE, in writing, that bulk chemical storage tanks for phosphoric acid, sodium hydroxide, and sodium hypochlorite are vented to the outside atmosphere.

3.8 Northwest Transmission Main

Not later than November 30, 2026, complete the remaining sections of the Northwest Transmission Main as identified in the 2018 Arcadis Distribution System Optimization Plan. The City shall notify EGLE, in writing, within 14 days of completing the transmission main.

3.9 Not later than the dates indicated in the sub-bullets below, hire (or execute a professional services contract for) the following positions identified as high priority in the 2018 Arcadis Distribution System Optimization Plan. The City shall provide proof of hire or contract to EGLE, in writing, within 14 days of the hire or contract agreement. If any positions are proposed to be eliminated or

consolidated, provide EGLE with the rationale for that action and obtain EGLE concurrence.

a. Cross Connection Program: (2 positions) not later than September 30, 2024.

b. Water Center Administrator: (1 position) not later than June 30, 2024, update Water Distribution Supervisor Position Description. EGLE acknowledges that the current Water Distribution System supervisor is currently fulfilling the requirements of this position but requests that position description be updated specifically to fulfill these requirements in case of staff turnover.

c. Customer Service Staff: (2 positions) not later than June 30, 2025.

d. Construction Inspector: (2 positions) not later than June 30, 2025.

e. Deputy Supervisor: (1 position) not later than June 30, 2025.

f. Water Distribution Valve Crew: (2 positions) not later than June 30, 2025.

g. Enterprise Asset Management Manager: (1 position) not later than June 30, 2026.

h. Geographic Information Systems Specialist/Hydraulic Modeler: (1 position) not later than June 30, 2026.

3.12 Not later than the dates indicated in the sub-bullets below, implement the following Standard Operating Procedures (SOP):

a. SOP #351 Meter Inspection and Testing not later than June 30, 2025.

b. SOP #421 Customer Complaint Tracking – provide the functions of the call center staff not later than June 30, 2025. Provide full implementation of SOP #421 not later than June 30, 2028.

c. SOP #431 Conventional Flushing for Water Turnover not later than June 30, 2025.

d. SOP #432 Unidirectional Flushing not later than June 30, 2027.

e. SOP #442 Water Age Management not later than June 30, 2027.

f. SOP #443 Pressure Management not later than June 30, 2027.

3.13 Demonstration of Sufficient Technical, Managerial, and Financial (TMF) Capacity Not later than 12 months from the effective date of this Consent Order, submit to EGLE, for review and approval, an updated asset management plan (AMP) and revised Capital Improvement Plan (CIP) that includes a sufficient rate and financial structure to fully implement the CIP (ensure rates and the financial structure continue to adequately fund water system operation and maintenance). The CIP shall include, but is not limited to, all water mains which have reached the end of their service life or will reach the end of their service life by 2044. If the necessary rate and financial structure cannot be immediately implemented, provide a schedule for implementation and a proposal for addressing revenue shortfalls.

IV. EGLE APPROVAL OF SUBMITTALS

For any work plan, proposal, or other document, excluding applications for permits or licenses, that are required by this Consent Order to be submitted to EGLE by the City, the following process and terms of approval shall apply.

4.1 All work plans, proposals, and other documents required to be submitted by this Consent Order shall include all of the information required by the applicable statute and/or rule, and all of the information required by the applicable paragraph(s) of this Consent Order.

4.2 In the event EGLE disapproves a work plan, proposal, or other document, it will notify the City, in writing, specifying the reasons for such disapproval. The City shall submit, within 60 days of receipt of such disapproval, a revised work plan, proposal, or other document which adequately addresses the reasons for EGLE's disapproval. If the revised work plan, proposal, or other document is still not acceptable to EGLE, EGLE will notify the City of this disapproval.

4.3 In the event EGLE approves specific modifications to a work plan, proposal, or other document, it will notify the City, in writing, specifying the modifications required to be made to such work plan, proposal, or other document prior to its implementation and the specific reasons for such modifications. EGLE may require the City to submit, prior to implementation and within 60 days of receipt of such approval with specific modifications, a revised work plan, proposal, or other document which adequately addresses such modifications. If the revised work plan, proposal, or other document is still not acceptable to EGLE, EGLE will notify the City of this disapproval.

4.4 Upon EGLE approval, or approval with modifications, of a work plan, proposal, or other document, such work plan, proposal, or other document shall be incorporated by reference into this Consent Order and shall be enforceable in accordance with the provisions of this Consent Order.

4.5 Failure by the City to submit an approvable work plan, proposal, or other document, within the applicable time periods specified above, constitutes a violation of this Consent Order and shall subject the City to the enforcement provisions of this Consent Order, including the stipulated penalty provisions specified in Paragraph 9.3.

4.6 Any delays caused by the City‘s failure to submit an approvable work plan, proposal, or other document when due shall in no way affect or alter the City’s responsibility to comply with any other deadline(s) specified in this Consent Order.

4.7 No informal advice, guidance, suggestions, or comments by EGLE regarding reports, work plans, plans, specifications, schedules, or any other writing submitted by the City will be construed as relieving the City of its obligation to obtain written approval, if and when required by this Consent Order.

V. EXTENSIONS

5.1 The City and EGLE agree that EGLE may grant the City a reasonable extension of the specified deadlines set forth in this Consent Order, and such extension shall not be unreasonably withheld. Any extension shall be preceded by a written request to EGLE, DWEHD, Enforcement Unit, P.O. Box 30817, Lansing, Michigan 48909-8311, no later than ten business days prior to the pertinent deadline, and shall include:

a. Identification of the specific deadline(s) of this Consent Order that will not be met.

b. A detailed description of the circumstances that will prevent the City from meeting the deadline(s).

c. A description of the measures the City has taken and/or intends to take to meet the required deadline.

d. The length of the extension requested and the specific date on which the obligation will be met.

The DWEHD Engineering Section supervisor or a designee, in consultation with Enforcement Unit staff, shall respond in writing to such requests. No change or modification to this Consent Order shall be valid unless in writing from EGLE and, if applicable, signed by both parties.

VI. REPORTING

6.1 The City shall verbally report any violation(s) of the terms and conditions of this Consent Order to the DWEHD Engineering Section supervisor by no later than the close of the next business day following detection of such violation(s) and shall follow such notification with a written report within five business days following detection of such violation(s). The written report shall include a detailed description of the violation(s), as well as a description of any actions proposed or taken to correct the violation(s). The City shall report any anticipated violation(s) of this Consent Order to the above-referenced individual in advance of the relevant deadlines whenever possible.

VII. RETENTION OF RECORDS

7.1 Upon request by an authorized representative of EGLE, the City shall make available to EGLE all records, plans, logs, and other documents required to be maintained under this Consent Order or pursuant to the SDWA. All such documents shall be retained by the City for at least a period of three years from the date of generation of the record unless a longer period of record retention is required by the SDWA.

VIII. RIGHT OF ENTRY

8.1 The City shall allow any authorized representative or contractor of EGLE, upon presentation of proper credentials, to enter upon the premises of the Supply at all reasonable times for the purpose of monitoring compliance with the provisions of this Consent Order. This paragraph in no way limits the authority of EGLE to conduct tests and inspections pursuant to the SDWA promulgated thereunder, or any other applicable statutory provision.

IX. PENALTIES

9.1 For each failure to comply with a provision contained in Section III of this Consent Order, the City shall pay a stipulated penalty of $5,000. If, after 30 days from the original deadline, the City has not fully corrected the violation, the City shall pay stipulated penalties of $200 per violation per day for one to seven days of violation, $300 per violation per day for eight to 14 days of violation, and $500 per violation per day for each day of violation thereafter. Payments shall be made in accordance with Paragraph 9.5.

9.2 For each failure to comply with any provision of this Consent Order other than the provisions contained in Section III of this Consent Order, the City shall pay

stipulated penalties of $200 per violation per day for one to seven days of violation, $300 per violation per day for eight to 14 days of violation, and $500 per violation per day for each day of violation thereafter. Payments shall be made in accordance with Paragraph 9.3

9.3 The City shall pay all stipulated penalties within 30 days after receipt of the demand for payment of stipulated penalties from EGLE. The City agrees to pay all funds due pursuant to this Consent Order by check made payable to the State of Michigan and delivered to the Accounting Services Division, Cashier's Office for EGLE, P.O. Box 30657, Lansing, Michigan 48909-8157. To ensure proper credit, all payments made pursuant to this Consent Order must include the **Payment Identification Number RMD90037**.

9.4 The City agrees not to contest the legality of any stipulated penalties assessed pursuant to Paragraphs 9.1 or 9.2, above, but reserves the right to dispute the factual basis upon which a demand by EGLE for stipulated penalties is made.

9.5 EGLE reserves its rights to seek interest on any unpaid sums due pursuant to the terms of the Consent Order. Subject to the other provisions of this Section IX, EGLE may waive, in its unreviewable discretion, any portion of stipulated penalties and interest that has accrued pursuant to this Consent Order. This interest penalty shall be based on the rate set forth at MCL 600.6013(8), using the full increment of amount due as principal, and calculated from the due date for the payment until the delinquent payment is finally made in full.

X. FORCE MAJEURE

10.1 The City shall perform the requirements of this Consent Order within the time limits established herein, unless performance is prevented or delayed by events

that constitute a “Force Majeure.” Any delay in the performance attributable to a “Force Majeure” shall not be deemed a violation of the City’s obligations under this Consent Order in accordance with this section.

10.2 For the purpose of this Consent Order, “Force Majeure” means an occurrence or nonoccurrence arising from causes not foreseeable, beyond the control of, and without the fault of the City such as: an Act of God, or state declared health emergency, untimely review of permit applications or submissions by EGLE or other applicable authority, and acts or omissions of third parties that could not have been avoided or overcome by the City’s diligence and that delay the performance of an obligation under this Consent Order. “Force Majeure” does not include, among other things, unanticipated or increased costs, changed financial circumstances, or failure to obtain a permit or license as a result of the City’s actions or omissions.

10.3 The City shall notify EGLE, by telephone, within 48 hours of discovering any event that may cause a delay in its compliance with any provision of this Consent Order. Verbal notice shall be followed by written notice within ten calendar days and shall describe, in detail, the anticipated length of delay, the precise cause or causes of delay, the measures taken by the City to prevent or minimize the delay, and the timetable by which those measures shall be implemented. The City shall adopt all reasonable measures to avoid or minimize any such delay. Nothing in this paragraph obviates the need to report violations as required by Paragraph 6.1 of this Consent Order.

10.4 Failure to comply with the notice requirements and time provisions under Paragraph 10.3 shall render this Section X void and of no force and effect as to the particular incident involved. EGLE may, at its sole discretion and in

appropriate circumstances, waive, in writing, the notice requirements of Paragraph 10.3.

10.5 If the parties agree that the delay or anticipated delay was beyond the control of the City, this may be so stipulated, and the parties to this Consent Order may agree upon an appropriate modification of this Consent Order. However, EGLE is the final decision-maker on whether or not the matter at issue constitutes a "Force Majeure." The burden of proving that any delay was beyond the reasonable control of the City, and that all the requirements of this Section X have been met by the City, rests with the City.

10.6 An extension of one compliance date based upon a particular incident does not necessarily mean that the City qualifies for an extension of a subsequent compliance date without providing proof regarding each incremental step or other requirement for which an extension is sought.

XI. GENERAL PROVISIONS

11.1 With respect to any violations not specifically addressed and resolved by this Consent Order, EGLE reserves the right to pursue any remedies to which it is entitled for any failure on the part of the City to comply with the requirements of the SDWA and its rules.

11.2 EGLE and the City consent to enforcement of this Consent Order in the same manner and by the same procedures for all final orders entered pursuant to the SDWA.

11.3 This Consent Order in no way affects the City's responsibility to comply with any other applicable state, federal, or local laws or regulations.

11.4 The parties agree to diligently and in good faith pursue informal negotiations to resolve any disputes arising out of this Consent Order prior to resorting to judicial enforcement. Such negotiations shall proceed in a timely manner.

11.5 Nothing in this Consent Order is or shall be considered to affect any liability the City may have for natural resource damages caused by the City's ownership and/or operation of the supply. The State of Michigan does not waive any rights to bring an appropriate action to recover such damages to the natural resources.

11.6 In the event the City sells or transfers the Supply, it shall advise any purchaser or transferee of the existence of this Consent Order in connection with such sale or transfer. Before a change in ownership occurs, the City shall notify and receive approval from the EGLE, DWEHD, Engineering Section supervisor, as required by R 325.11711(1) of the SDWA Rules. Within 30 calendar days, the City shall also notify the DWEHD's Engineering Section supervisor, in writing, of such sale or transfer, the identity and address of any purchaser or transferee, and confirm the fact that notice of this Consent Order has been given to the purchaser and/or transferee. The purchaser and/or transferee of this Consent Order must agree, in writing, to assume all of the obligations of this Consent Order. A copy of that agreement shall be forwarded to the DWEHD's Engineering Section supervisor within 30 days of assuming the obligations of this Consent Order.

11.7 The provisions of this Consent Order shall apply to and be binding upon the parties to this action, and their successors and assigns.

11.8 This Consent Order constitutes a civil settlement and satisfaction as to the resolution of the violations specifically addressed herein; however, it does not resolve any criminal action that may result from these same violations.

11.9 The effective date of this Consent Order is the date it is signed by the director of the DWEHD.

XII. TERMINATION

12.1 This Consent Order shall remain in full force and effect until terminated by a written Termination Notice (TN) issued by EGLE. Prior to issuance of a written TN, the City shall submit a request consisting of a written certification that the City has fully complied with the requirements of this Consent Order and has made payment of any fines, including stipulated penalties, required in this Consent Order. A suggested form for providing the required written certification is appended as Attachment F. Specifically, an acceptable certification shall include:

a. The date of compliance with each provision of the compliance program in Section III, and the date any fines or penalties were paid.
b. A statement that all required information has been reported to the district supervisor.
c. Confirmation that all records required to be maintained pursuant to this Consent Order are being maintained at the Supply.

EGLE may also request additional relevant information. EGLE shall not unreasonably withhold issuance of a TN.

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Signatories

The undersigned CERTIFY they are fully authorized by the party they represent to enter into this Consent Order to comply by consent and to EXECUTE and LEGALLY BIND that party to it.

DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

_____
By: Eric J. Oswald, Director
Drinking Water and Environmental Health Division

_____
Date

CITY OF FLINT

_____
By: Clyde D. Edwards
City Administrator

_____
Date

APPROVED AS TO FORM:

_____
By: Margaret Bettenhausen**,** Assistant Attorney General
Environment, Natural Resources, and Agriculture Division
Michigan Department of Attorney General

_____
Date

Attachment A

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
SAGINAW BAY DISTRICT OFFICE

C. HEIDI GRETHER
DIRECTOR

August 11, 2017

SIGNIFICANT DEFICIENCY
VIOLATION NOTICE

Mr. Sylvester Jones, Administrator
City of Flint
1101 South Saginaw Street
Flint, Michigan 48502

Dear Mr. Jones:

SUBJECT: Water System Sanitary Survey, WSSN: 2310
Significant Deficiency Violation Notice

The Department of Environmental Quality (DEQ) has completed a sanitary survey of the city of Flint (City) drinking water system. The purpose of the survey is to evaluate the water system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399). In addition, the enclosed sanitary survey form was updated to gather information on the City water distribution, storage, pumping, and limited treatment systems. The sanitary survey does not include an evaluation of the water filtration plant. A complete engineering evaluation of the water filtration plant was recently completed by CDM Smith and others, and would form the basis of any future recommendations if the City elects to operate the water filtration plant.

The following table summarizes our findings from our survey of the water system:

Survey Element	Findings
Source	**Significant Deficiencies noted**
Treatment	Recommendations made
Distribution System	**Significant Deficiencies noted**
Finished Water Storage	**Deficiencies noted**
Pumps	Recommendations made
Monitoring & Reporting	Recommendations made
Management & Operations	**Significant Deficiencies noted**
Operator Compliance	**Deficiencies noted**
Security	**Deficiencies noted**
Financial	**Significant Deficiencies noted**
Other	---

A summary of the significant deficiencies, minor deficiencies, and recommendations applicable to your water system is enclosed for your information.

Our investigation is considered complete. This significant deficiency begins as of the date of receipt of this letter and will continue until you complete corrective action. **You must complete corrective action within 120 days of receipt of this letter or be in compliance with a corrective action plan and schedule approved by this office. You are directed to contact us within 30 days of receipt of this letter to discuss appropriate corrective action.** You must also notify us in writing within 30 days of correcting the significant deficiency.

If you have any factual information you would like us to consider regarding the significant deficiencies identified in this Significant Deficiency Violation Notice please provide it in a written response by September 8, 2017.

If you have any questions or wish to discuss the sanitary survey or Significant Deficiency Violation Notice, please contact me at the phone number listed below or by email to londonr@michigan.gov.

Sincerely,

Robert A London

Robert A. London, P.E.
Surface Water Treatment Engineer
Engineering Unit
Drinking Water and Municipal Assistance Division
989-450-7834

bl/snh
Enclosures
cc/enc: Mr. Robert Jones, F&V Operations
Mr. Mark Adas, City of Flint
Mr. Rob Bincsik, City of Flint
cc: Mr. Eric Oswald, DEQ
Ms. Sue Maul, DEQ

1. **Source** – The city has failed to select a long-term water supply source (***significant deficiency***). In a June 15, 2017 letter from Director C. Heidi Grether, the city was directed by the DEQ to either enter into the long-term water service agreement negotiated by Mayor Karen W. Weaver with the Great Lakes Water Authority (GLWA), or offer a reasonable alternative proposal by June 26, 2017 that was protective of public health. The city's failure to do so resulted in legal action by the DEQ. The lack of a long-term source agreement has prevented the city from moving forward with several important initiatives, including infrastructure improvements, establishing water rates, securing outside funding for critical projects, ensuring reliable delivery of drinking water, and recruiting/hiring water department staff.
2. **Source** – An evaluation of the reliability of utility power and the need for an on-site emergency generator should be completed (***recommendation***). It is noted that, although the city currently purchases treated water from the GLWA, additional treatment is required at the city's Control Station II (CS-II).
3. **Treatment** – Additional features should be added to the treatment system currently in operation at CS-II to enhance treatment reliability and consistency, as well as operator safety (***recommendation***). The current treatment system was designed to be temporary in nature until a final water source decision was made, and therefore does not have standard features such as scales (for determining the weight of chemical fed). It is recommended that, if the city selects the GLWA as its long-term, primary water source, an upgraded chemical feed and storage facility should be constructed. The facility should include adequate safety features and a SCADA control system that is capable of monitoring incoming water quality from the GLWA, water quality after the city's supplemental chemical feed, flow rates, and chemical feed rates.
4. **Distribution System** – The city's cross connection control program is not being implemented in a satisfactory manner (***significant deficiency***). A cross connection is a piping arrangement where contaminated water may enter the potable water supply. A water utility is required to implement a program, including inspections and testing of backflow prevention devices, to protect the public water supply. The person responsible for implementing the program has reportedly been assigned other duties and has not conducted the required inspections for at least the last three years. Adequate staff time and resources must be allocated to this essential program.
5. **Distribution System** – The city has not provided details about maintenance and replacement programs and/or Standard Operating Procedures for hydrants, valves, meters, and galvanized service lines (***significant deficiency***). The Distribution System Optimization Study being completed by Arcadis Group should address some or all of these concerns. Under normal circumstances, a community water system should consider replacing 1.5 to 2 percent of its fire hydrants and valves, and 1 to 1.5 percent of its water mains each year. Unfortunately, in the past, the city has fallen far short of these recommended replacement rates. During the past few years, the city has implemented an aggressive hydrant and valve program, which has significantly improved distribution system reliability. Also, the city has applied for funding assistance for a major water main replacement program. Despite the city's recent increase in hydrant and valve maintenance and replacement activities, a significant amount

of infrastructure replacement/upgrade will be necessary for the city to be completely aligned with industry best practices.

6. **Distribution System** – The city should plan financially for periodic updates of the General Plan, Asset Management Plan, and Capital Improvement Plan (***recommendation***). These documents assist the city with planning and prioritizing infrastructure improvements. The current version of these documents is being completed with the assistance of the DEQ and/or State contractors. Future updates will be the responsibility of the city.
7. **Distribution System** – The city's Drinking Water Revolving Fund (DWRF) Project Plan cites water age and the presence of oversized water mains as contributors to water quality concerns in the distribution system. The city's water system was designed for much higher population and demands than exist currently. The design of future water main replacement projects should strongly consider water age/water main sizing (***recommendation***).
8. **Storage** – The Cedar Street Reservoir requires an inspection; however, it cannot reasonably be inspected until the West Side Reservoir is returned to service (***minor deficiency***). Because there is uncertainty about the long-term need for the West Side Reservoir (due to water age concerns), the city has removed it from service indefinitely. Unfortunately, this prevents the city from conducting a thorough inspection of the Cedar Street Reservoir.
9. **Storage** – A backup power supply should be provided for the Cedar Street Reservoir booster pumps (***recommendation***). Routine use of the Cedar Street Reservoir is necessary to manage water quality throughout the distribution system, and the reservoir also serves as an emergency supply of treated water in the event the supply from the GLWA is interrupted. To improve system reliability, backup power should be provided.
10. **Pumps** – Upgrades to the Torrey Road and Cedar Street booster pumps should be completed (***recommendation***). Replacement pumps have been purchased for Torrey Road but not installed. Variable Frequency Drive (VFD) controls have been recommended for the Cedar Street pumps to reduce pressure fluctuations and water main breaks in the distribution system.
11. **Monitoring and Reporting** – The city should begin planning financially for staff to complete all monitoring and reporting requirements (**recommendation**). Lead and copper monitoring, and preparation of the Consumer Confidence Report, have been completed with assistance from DEQ staff. The city will be fully responsible for these tasks in the future.
12. **System Management and Operations** – The city has failed to select a long-term water source (***significant deficiency***), which has prevented several important water system initiatives from occurring. The DEQ does not have confidence that the city can continue to demonstrate the Technical, Managerial, and Financial (TMF) capacity necessary to consistently operate the water system in accordance with Act 399 after the current technical and training assistance contracts expire.
13. **Operator Compliance** – The treatment system is currently under the supervision of a contract operations firm. The city has been unable to recruit and retain a properly-certified operator-in-charge, and is also having difficulty reaching desired staffing levels. Staffing problems (***minor deficiency***) are due, in part, to uncertainty about the city's long-term source and treatment requirements.

14. **Security** – The city has not provided an updated Emergency Response Plan (***minor deficiency***) for DEQ review. Significant changes have occurred since the plan was last reviewed.
15. **Financial** – The DEQ previously notified the city that continued failure to enter into a long-term water service agreement with GLWA or offer a reasonable alternative proposal would place the city in further financial stress. The city's failure to do so has affected the budgeting process, planning, and development of appropriate water rates (***significant deficiency***). The city should adopt an appropriate rate structure and administrative policies for the water system. The recommendations of the Flint Water Interagency Coordinating Committee (FWICC) should be used as a guideline.

Community Water Supply Section
Engineering Unit
Phone: 989-450-7834
Fax: 989-891-9213

WSSN: 02310

Drinking Water and Municipal Assistance Division

Water System Sanitary Survey

City of Flint Water System

(Distribution System, Limited Treatment, Storage, and Pumping)

August 7, 2017

Sanitary Survey of Community Water Supply - Review Summary

Water Supply: City of Flint
County: Genesee
Evaluator: Bob London

WSSN: 02310
District: 92
Date: 8/7/2017

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source							X
Construction & Maintenance	*No long-term decision on primary/backup sources*						X
Standby Power	*Appropriate level of standby power is dependent on source selection*				X		
Isolation	*No concerns with current GLWA or potential KWA/GCDC sources*			X			
Source Water Protection	*No formal source water protection program, but no concerns*			X			
Capacity	*Lack of decision on source affects planning, finances,staffing, etc.*						X
Treatment	*Survey does not include filtration facilities (use is to be determined)*				X		
Disinfection	*Permanent facilities and improved SCADA if GLWA water used*				X		
Fluoride		X					
Phosphate Addition	*Permanent facilities and improved SCADA if GLWA water used*				X		
Softening		X					
Iron/Manganese Removal		X					
Arsenic Removal		X					
Pretreatment		X					
Filtration (gravity or membranes)		X					
C*T		X					
Other	*Permanent facilities and improved SCADA if GLWA water used*				X		
Distribution System							X
Interconnections w/ Other WS	*A mutual aid agreement is recommended with nearby utilities*				X		
Hydrants & Valves	*Recent efforts very good, but formal long-term program needed*						X
Service Lines & Metering	*Programs for meter and galvanized service replacement are needed*						X
General Plan	*Prepared through State contract - City needs to assume responsibility*				X		
Cross Connections	*No inspections conducted, inadequate administration*						X
Construction & Maintenance	*Age of system, water accountability, number of breaks*						X
Capacity	*Water age is a concern due to oversized mains/reduced demands*				X		
Finished Water Storage	*Does not include Dort Reservoir and CWH4 (use is to be determined)*					X	
Construction & Maintenance	*Cedar St. needs inspection, West Side off line due to condition*					X	
Controls				X			
Capacity	*Backup Power rec. at Cedar Street; Arcadis evaluating volumes*				X		
Pumps (All Pumping Facilities)	*Does not include pumps at water plant site (use is to be determined)*				X		
Construction & Maintenance	*Torrey Road pump upgrade has been delayed*				X		
Controls	*Electrical gear/control upgrades recommended/VFDs recommended*				X		
Capacity				X			
Monitoring & Reporting					X		
Bacteriological Monitoring				X			
Chemical Monitoring	*Completed with State assistance - City needs to assume responibility*				X		
MOR or Annual Pumpage Repor				X			
Consumer Confidence Report	*Prepared with State assistance - City needs to assume responibility*				X		
Analytical Capabilities				X			
System Management & Operation							X
Owner Responsibility	*Lack of decision on source affects planning, finances,staffing, etc.*						X
Capacity Development	*Concerns with long-term source, budget, staffing/cert., plans/studies*					X	
Reliability Study	*Prepared with State assistance - City needs to assume responibility*				X		
Operations Oversight	*Treatment - contract w/F&V Operation; Distribution - in-house staff*				X		
Permits				X			
Operator Compliance						X	
Operator Certification	*Difficulty hiring/retaining certified operators*					X	
Technical Knowledge & Training	*Training*				X		
Security						X	
Emergency Response Plan	*Status of ERP is unknown*					X	
Site Security (Fences, Alarms...)				X			
Financial							X
Rates	*Raftelis Study predicts a revenue vs. expenses gap*				X		
Budget & Capital Imp. Plan	*Lack of decsion on source affects budget, planning, financing*						X
Other							

N/A - Not Applicable
NotEv - Not Evaluated
NoD/R - No Deficiencies/Recommendations Made
Rec - Recommendations Made
Def - Deficiencies Identified
SigDef - Significant Deficiencies Identified

WATER SYSTEM SANITARY SURVEY

GENERAL

Basic Information

WSSN:	02310	Supply:	City of Flint	County:	Genesee
Date:	8/7/2017	Reviewed by:	Bob London	District	RAL/North

Primary Contact:	Sylvester Jones	Copy To:	Mark Adas
SDWIS Role:	AC, FC	SDWIS Role:	
Title:	City Administrator	Title:	City Engineer
Telephone:	810-766-7346 x 2025	Telephone	
Cell Phone:		Cell Phone:	810-610-7771
Fax:		Fax:	
e-mail:	sjones@cityofflint.com	e-mail:	madas@cityofflint.com
Address:	1101 S. Saginaw Street	Address:	1101 S. Saginaw Street
	Flint, MI 48502		Flint, MI 48502

Population:	98,310	Year:	2015	Basis:	Census update

Operator Training and Certification - Treatment

Treatment Capacity:	18 MGD			
Treatment Classification:	D-1			
		Certification	Op. #	Exp. Date
Operator in Charge:	Robert Jones (F&V Operations)	D-1, F-2, S-1	5026	7/15/2018
Backup Operators:	Catherine Garnham (F&V)	F-1, S-1	5194	7/15/2019
	Stewart Beach (F&V)	F-1, S-1	2273	1/15/2019
Operations Supervisor:	Vacant			
Operations Foreman (4):	Scott Dungee	F-3, S-4	5550	7/15/2019
	Chris Wilcox	F-4	18586	1/15/2018
	Dominic Smoot	D-3	20034	1/15/2020
	Vacant			
Operator/Maintainer (4):	Scott Ball	F-4	18394	1/15/2018
	Jeff Maksymowski	None	20033	
	Josh Pickett	None		
	Robert Stinson	None		
Maintenance Supv. (2):	Mike Beckley	F-4, S-4	13782	7/15/2018
	Chris Koryciak	F-4, S-4	4653	1/15/2020
Maintainer/Operator (2):	Vacant			
	Vacant			
Instrument Technician:	Vacant			
Lab Supervisor:	Will Bradley	F-3	11941	7/15/2017
Lab Technicians:	Heather Kot	D-4	20031	1/15/2020
	Vacant			

Do the operators receive adequate technical training? Yes

If not, explain:

Comments on Training and Certification:

The City entered into a contractual agreement with Fleis and Vandenbrink Operations (F&V) for Operator-In-Charge and Certified Backup Operator services for the treatment system on June 22, 2017. F&V is responsible for providing training and certification of contract operations staff.

The City is investigating a contract service agreeement with Hach for analytical equipment maintenance due to the vacant Instrument Techncian position. The instrument technician at the wastewater plant may also be available to provide limited assistance.

The State of Michigan has entered into several agreements for training and technical assistance for City of Flint personnel, and has provided training on several occasions at the water treatment plant for City personnel. A comprehensive list of training is contained in Appendix A. The City is responsible for providing adequate training in the future to maintain a competent and properly-certified staff.

WATER SYSTEM SANITARY SURVEY

GENERAL

Operator Training and Certification - Distribution

Distribution Classification:	S-1	Certification	Op. #	Exp. Date
Operator in Charge:	Robert Bincsik	F-4, S-1	13784	1/15/2020
Backup Operator:				
Water Dist. Formen:	Howard Swickard	S-2	5091	1/15/2019
	Paul Simpson	S-2	4849	1/15/2018
	Jeff Church	S-3	12559	4/15/2020
	Curtis Brooks	None		
Senior Water Dist. Operators:	Jason Bradley	None		
	Dave Hurt	None	17277	
	Rich Johnson	None		
	Jeremy Keefer	None	16060	
	Chris Kennedy	None		
	Phil Kuczera	None		
	Brandon McNiel	None		
	Jon Mochty	None		
	Mark Pavwoski	None	13288	
	Keith Ross	None		
	Juan Sattiewhite	None		
	Don Thompson	None		
	Dan Wells	None	18922	
Water Dist. Operators:	Clarence Scott	None		
	Greg Sumner	None		
	Fabian Villareal	None		
	Nancy Prieur	None		
	Lester Muma	None	14567	
Water Dist. Op. Trainee:	Marc Arter	None		
	Jason Gutierrez	None		
	Ben Gutierrez	None	4366	
	Mark May	None		
	Vacant (8 positions)			

Do the operators receive adequate technical training? Yes

If not, explain:

Comments on Training and Certification:

The State of Michigan has entered into several agreements for training and technical assistance for City of Flint personnel, and has provided training on several occasions at the water treatment plant for City personnel. A comprehensive list of training is contained in Appendix A. The City is responsible for providing adequate training in the future to maintain a competent and properly-certified staff.

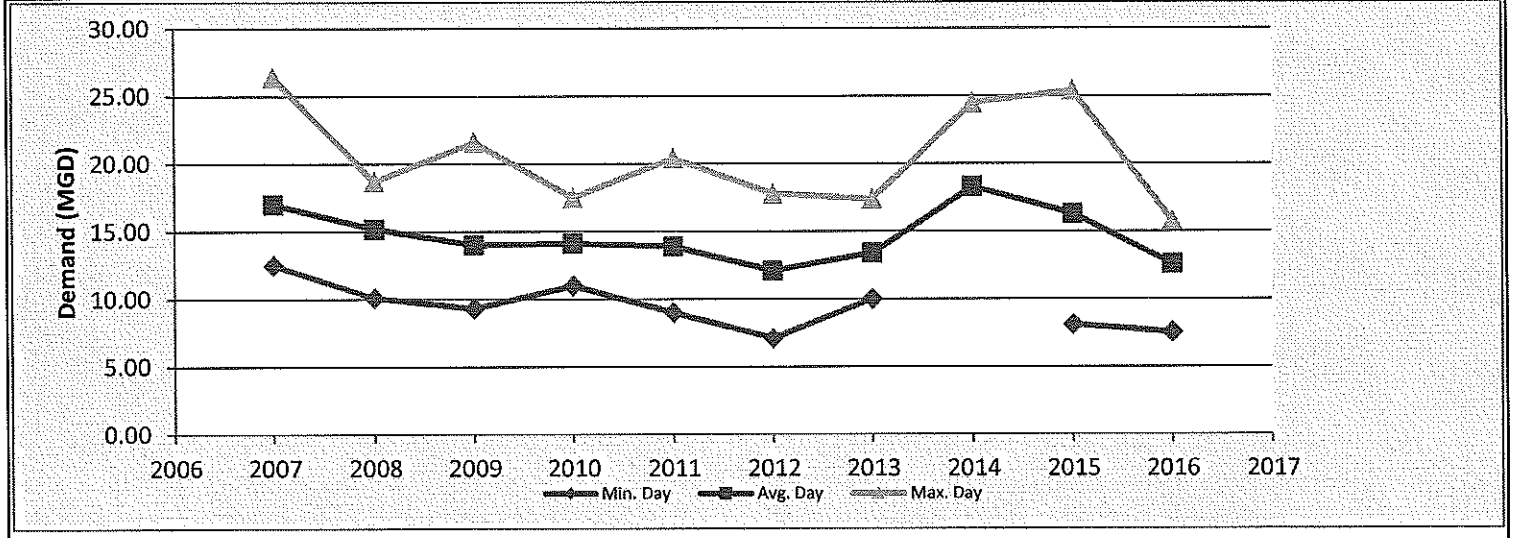
Ownership

Ownership:	City
Consent Agreement:	NA
Escrow Account:	NA
Annual Fee:	Active
Comments:	

SOURCE

Capacity

Year	Demand (MGD) Max. Day	Date	Avg. Day	Min. Day	Date	Max/Avg	Population History	G/C/D	% unacct. H_2O
2007	26.4		17.0	12.50		1.55			
2008	18.7		15.2	10.10		1.23			
2009	21.6		14.0	9.30		1.54			
2010	17.5		14.1	11.00		1.24			43%
2011	20.4		13.9	9.00		1.47			39%
2012	17.8		12.1	7.10		1.47			40%
2013	17.4		13.4	10.00		1.30			50%
2014	24.5		18.3			Data from 2014/2015 includes WTP operation. Do not use for capacity determination.			
2015	25.4		16.3	8.10					
2016	15.8		12.6	7.54		1.25			



Five Year Max. Day	17.8	(Excludes 2014 and 2015, which reflects WTP operation)
Ten year Max. Day	26.4	
Five Year Avg. Day	12.7	(Excludes 2014 and 2015, which reflects WTP operation)
Max Day for capacity requirements:	18.0	(Based on original raw water contract with KWA and anticipated reduction in lost water from DWRF project)

Purchase Contract

Principal Parties of Contract: GLWA, City of Flint

Date of Contract:	10/16/2015	
Expiration Date:	9 months from execution, but extendable based on circumstances	
	The contract was officially extended July 11, 2016	
Annual Volume Available by Contract:	593,000	Mcf (= 4.436 Bgal)
Maximum Day Available by Contract:	21.4	MGD
Maximum Hour Available by Contract:	22.4	MGD measured over one hour
Maximum Delivery Pressure Cited in Contract:	60	PSI
Minimum Delivery Pressure Cited in Contract:	40	PSI

Comments on the Purchase Contract:
A short-term agreement was reached with the Great Lakes Water Authority (GLWA) in 2015 to allow the City of Flint to discontinue routine use of its water treatment plant. The agreement with GLWA was based on the previous agreement with the Detroit Water and Sewerage Department (DWSD). The agreement was set to expire within 9 months of execution, but included provisions to extend it as necessary based on local circumstances. A 30-year purchase agreement was proposed by GLWA, but Flint City Council has not approved it as of the date of this survey. The City was required to approve the proposed agreement or propose a reasonable alternative that was protective of public health by June 26, 2017, and failed to do so. The DEQ has determined that the City's failure to act presents an immediate threat to public health. The City does not have a secure, long-term source agreement at this time.

STORAGE

Ground Level Storage - Construction, Controls & Maintenance

Identification	Dort Reservoir	Clearwell No. 4
Location	Water Treatment Plant	Water Treatment Plant
Function	Finished Water Storage (currently off line but is intended for routine use)	High Service Pump Suction
Type	Concrete, 2-cell	Concrete
Nominal Volume (Gallons)	20,000,000	3,000,000
Calculated Usable Volume (Gallons)		
Date Constructed	1952	1954
Date Inspected		
Buried/At Grade	At grade	Buried
Floor Slab, Elevation		
Floor Relief Valves-Float Prevention (Y/N)		
Sump Area (Y/N)		
Floor Slopes to Sump (Y/N)		
Sump Floor Elevation		
Sump Dimensions		
Date Painted/Coated Inside		
Paint/Coating System		
NSF Std 61 Compliant (Y/N)		
Cathodic Protection		
Leaks (Y/N)		
Reservoir Isolation Valve		
Basin Drain (Hydrant/Pumps)		
High Alarm		
Low Alarm		
Alarm Type		
Normal High Water Level		
Normal Low Water level		
Range of Operation		
Chart recorder		
Telemetering System	Wireless/SCADA	Wireless/SCADA
Vents Screened		
Overflow Screened		
Access Hatches Locked		
Hatches Watertight and Overlap		
Overflow Splash Pad		
Site Fenced/Locked	Locked - at WTP	Locked - at WTP
Usable Storage	0	0

Comments on Ground Level Storage: At present, and as GLWA water is currently being received, the City is not capable of using the Dort Reservoir or Clearwell No. 4. A thorough inspection, and completion of any necessary maintenance/repairs, would be necessary before returning these reservoirs to service.

STORAGE

Ground Level Storage - Construction, Controls & Maintenance

Identification	Cedar Street Reservoir	West Side Reservoir
Location	Cedar St./Fenton Rd.	Dupont St./Jean Ave.
Function	Distribution Storage	Distribution Storage
Type	Concrete, 2-cell	Concrete, 2-cell
Nominal Volume (Gallons)	20,000,000	12,000,000
Calculated Usable Volume (Gallons)	14,000,000	0 (off line at this time)
Date Constructed	1948	1970
Date Inspected	~2000	2017
Buried/At Grade	At grade	At grade
Floor Slab, Elevation		
Floor Relief Valves-Float Prevention (Y/N)		
Sump Area (Y/N)		
Floor Slopes to Sump (Y/N)		
Sump Floor Elevation		
Sump Dimensions		
Date Painted/Coated Inside	N/A (concrete)	N/A (concrete)
Paint/Coating System	---	---
NSF Std 61 Compliant (Y/N)	---	---
Cathodic Protection	No	No
Leaks (Y/N)	No	Yes
Reservoir Isolation Valve	Yes	Yes
Basin Drain (Hydrant/Pumps)		
High Alarm	Yes	Yes
Low Alarm	Yes	Yes
Alarm Type	Noted on SCADA	Noted on SCADA
Normal High Water Level	20'	
Normal Low Water level	6'/16' (summer/winter)	
Range of Operation	Depends on season	Depends on season
Chart recorder	SCADA at WTP	SCADA at WTP
Telemetering System	Wireless/SCADA	Wireless/SCADA
Vents Screened	Yes	Yes
Overflow Screened		Yes
Access Hatches Locked		Yes
Hatches Watertight and Overlap	Yes	
Overflow Splash Pad	Storm drain w/air gap	Storm drain w/air gap
Site Fenced/Locked	Yes	Yes
Usable Storage	14,000,000	0

Comments on Ground Level Storage:
The West Side Reservoir (WSR) was inspected in 2017. The reservoir was shut down several months ago due to a leaking link seal/coupling through the wall on the influent line. The inspection report recommends approximately $90,000 of miscellaneous repairs such as brick work and tuck pointing, repainting of pipes and metal surfaces, replacement of downspouts, replacement of the influent line link seal, etc., to prevent the reservoir from deteriorating. There were no other major structural or sanitary concerns. The Arcadis Group will be providing a recommendation on the long-term need for the WSR. Until that recommendation is received, the City will not make a decision on whether to proceed with the repairs. The City has experienced a significant drop in the number of water main breaks since the West Side Reservoir was removed from service. Several sources have recommended that Soft Starts or VFDs be installed on the West Side booster pumps to reduce or eliminate pressure spikes within the distribution system, which may be related to main breaks.

STORAGE

Elevated Storage - Construction, Controls & Maintenance	
Location	WTP (elevated)
SDWIS Facility ID (Site Code)	
Volume	2,000,000
Type	Elevated, multi-leg
Material	Steel
O.F. Elevation	
Date Constructed	1952
Date Inspected	2009
Date Painted Inside	2009
Paint System	
NSF Std 61 Compliant (Y/N)	Yes
Date Painted Outside	
Cathodic Protection	Yes
Tank Isolation Valve	Yes
Tank Drain (Hydrant)	Yes
Altitude Valve	Yes
Mud Valve	Yes
High Alarm	Yes
Low Alarm	Yes
Alarms Received By	Operations center
Total Head Range (Feet)	
Normal High Water Level	
Normal Low Water level	
Normal/Average Pressure	74
Data Recording System	SCADA
Control Signal Type	Wireless/SCADA
Auxiliary Power for Controls?	
Control System Adequate?	Yes
Vents Screened	
Overflow Screened	
Access Hatches Locked	
Expansion Collar Lubricated	
Mixing System	None
Overflow Splash Pad	
Adequate Security?	Yes - at WTP
Operator Visit Frequency	Daily - at WTP
Comments:	

Total Usable Storage Capacity - Ground + Elevated)			
Usable Storage	2,000,000		
Total Usable Storage (gal)	16,000,000	16.0	Mgal
Total Usable Storage/Max Day	61%		
Total Usable Storage/Avg. Day	126%		
Comments:			

Pumping

Pumping Stations - Construction, Controls & Maintenance						
Location:	Pump Station 4 (Water Treatment Plant)					
Function:	Pumping water from the Dort Reservoir and the 3 MG reservoir to the Distribution System					
Pump Number	1	2	7	8	9	
Year Installed						
Type	Horiz. Cent.	Horiz. Cent.	Horiz. Cent.	Horiz. Cent.	Horiz. Cent.	
Current Capacity (MGD)	0	0	20	20	6	
Current Capacity (GPM)	0	0				
Basis	Inoperable	Inoperable				
Current TDH (FT)						
HP	800	1000	800	800		
Original Name Plate GPM						
Corresponding MGD						
Original Name Plate TDH (FT)						
Pump NPSH (FT)						
Centerline of Pump Intake Elev.						
Floor Elevation						
Electrical Controls Elevation						
Pumps/Motors Subject to Flood?						
Pump Efficiency						
Motor Efficiency						
Min. Reservoir WL						
Cavitation Problems (Y/N)						
VFDs (Y/N)						
Maintenance History	Refer to next page for maintenance history of pumps and motors					

Comments on Booster Pumping:
A number of improvements would be required if the water plant is returned to operation or if the City elects to routinely use the Dort Reservoir. The improvements are included in the CDM Smith Engineering Report on the Water Treatment Plant.

AUXILIARY POWER

Power Type	Dual primary feeds with auto-transfer		
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	
Total Pump Capacity (gpm)			mgd
Firm Pump Capacity (gpm)			mgd
Auxiliary Power Capacity (gpm)			mgd
Max Day Demand @ this location			mgd
Peak Hour @ this location			gpm (Hydropneumatic Stations)
Avg Day Demand @ this location			mgd
Firm Pump Capacity/Max Day			%
Peak Hour/Firm Pumping Capacity			% (Hydropneumatic Stations)
Aux. Power Capacity/Avg Day			%

Comments:
Dual primary electrical feeds are not truly independent. If routine use of Control Station 4 is desired, on-site auxiliary power is recommended.

Pumping

Pumping Stations - Construction, Controls & Maintenance				
Location:	Pump Station 4 (Water Treatment Plant)			
Function:	Pumping water from the Dort Reservoir and the 3 MG reservoir to the Distribution System			
Pump Station 4 Pump 1	Pump Station 4 Pump 2	Pump Station 4 Pump 7	Pump Station 4 Pump 8	Pump Station 4 Pump 9

Pumping

Pumping Stations - Construction, Controls & Maintenance						
Location:	Cedar Street Reservoir					
Function:	Pump from the Cedar Street Reservoir to supply the south and west areas of the City					
Pump Number	1	2	3			
Year Installed	1948	1948	1948			
Type	Horiz. Cent.	Horiz. Cent.	Horiz. Cent.			
Current Capacity (MGD)						
Current Capacity (GPM)	12	9	9			
Basis						
Current TDH (FT)	160'	160'	160'			
HP	500	350	350			
Original Name Plate GPM						
Corresponding MGD						
Original Name Plate TDH (FT)						
Pump NPSH (FT)						
Centerline of Pump Intake Elev.						
Floor Elevation						
Electrical Controls Elevation						
Pumps/Motors Subject to Flood?	No	No	No			
Pump Efficiency						
Motor Efficiency						
Min. Reservoir WL						
Cavitation Problems (Y/N)						
VFDs (Y/N)	No	No	No			
Maintenance History	Refer to next page for maintenance history of pumps and motors					

Comments on Booster Pumping:
Some electrical components are from the 1940's and an upgrade is needed. SCADA improvements and switchgear replacement were recently completed. A permit was issued in 2012 to upgrade the pumping station to accept a portable generator feed, but the work was not completed. The pumps are controlled remotely from the Operations Center at the water plant. Filling and emptying the Cedar Street and West Side Reservoirs is controlled by Operations staff to manage flow patterns, pressures, chlorine residuals, and water age.

AUXILIARY POWER

Power Type	None		
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)			mgd
Firm Pump Capacity (gpm)			mgd
Auxiliary Power Capacity (gpm)			mgd

Max Day Demand @ this location		mgd	
Peak Hour @ this location		gpm	(Hydropneumatic Stations)
Avg Day Demand @ this location		mgd	
Firm Pump Capacity/Max Day		%	
Peak Hour/Firm Pumping Capacity		%	(Hydropneumatic Stations)
Aux. Power Capacity/Avg Day		%	

Comments:
In case of interruption of the GLWA supply, the Cedar Street Reservoir and booster pumping station is currently the primary source of water. Auxiliary power or, as a minimum, portable generator compatibility is strongly recommended.

Pumping

Pumping Stations - Construction, Controls & Maintenance

Location:	Cedar Street Reservoir
Function:	Pump from the Cedar Street Reservoir to supply the south and west areas of the City

Pumps and motors are on a routine Preventive Maintenance (PM) schedule consisting of visual inspection, checking oil levels, and greasing bearings and fittings. On an as-needed basis, oil is changed, packing is adjusted, bearings are replaced, etc. Recent, non-routine work is shown below:

Cedar Street Station Pump 1	Cedar Street Station Pump 2	Cedar Street Station Pump 3
10/30/13 - installed new pump bearings and packing, rebalanced impeller	**2/1/10** - rebuilt motor	
12/5/16 - serviced discharge valve control cylinder	**1/26/16** - uncoupled pump and motor for motor testing	
	11/16/16 - tested switchgear and recoupled pump and motor	
	12/5/16 - serviced discharge valve control cylinder, placed pump back in service	

TREATMENT

Disinfection (sodium hypochlorite addition)

Point of Treatment		Cedar St. Booster Sta.		
Injection Point:		Reservoir inlet line		
SDWIS Facility ID (Site Code)				
Purpose:		See comments		
Year Initiated		2016		
Product:		Havasan LB-12		
Manufacturer:		Haviland		
Chemical Strength:		14-15% (12.5% nominal)		
Dilution:		N/A		
ANSI/NSF Standard 60 Approval? (Y/N)		Yes	NSF max dose:	84 mg/L
Normal Feed Rate/Dosage		See comments	mg/L	
Avg Residual (Plant Tap) (mg/L)	free:	1.5	(goal)	
Avg Distribution Residual (mg/L)	free:			
Frequency of Residual testing	Plant Tap:	Continuous	Distribution:	Weekly
Analytical Method Used		Hach CL-17 (DPD)		
Any Overfeed Instances? (Y/N)		No	Date(s):	
Any Low Feed Instances? (Y/N)		No	Date(s):	
Pump Type:		Diaphragm	Model:	LMI C721-71FS
Number of Pumps:		1		
Pump Capacity		4 gph	gpd min:	
	psi:	100		
Chemical Storage Tank Type		55 gallon drums	Volume:	
Weight/Level Reading Method		None (relies on expected usage and visual inspection)		

SAFETY

Separate Room	Yes	Cylinder Repair Kit	N/A
Exhaust fan		Extra Chlorinator or repair kit	N/A
Fresh Air Vent		Ammonia Bottle	N/A
Door Opens Out With Panic Bar		Self Contained Air Packs	N/A
More than 1500 # Cl_2 onsite	N/A	Training Programs	
Electrical Protected from Gas?	N/A	Shower/Eye Wash	

Comments:
The free chlorine residual of water entering and leaving the Cedar Street Reservoir (CSR) is monitored continuously and is visible on the SCADA display in the Operations Center. Chlorine is added to the water when filling the CSR as appropriate to help meet the City's distribution system free chlorine residual goals. As of July 11, 2017, the chlorine feed system has flow-pacing capability, which will reduce the operational burden on City staff.

Pumping

Pumping Stations - Construction, Controls & Maintenance						
Location:	West Side Reservoir					
Function:	Pump from the West Side Reservoir to supply areas on the west side of the City during peak demand periods					
Pump Number	1	2	3	4		
Year Installed	1970	1970	1970	1970		
Type	VT	VT	VT	VT		
Current Capacity (MGD)	4	4	8	8		
Current Capacity (GPM)						
Basis						
Current TDH (FT)						
HP	100	100	200	200		
Original Name Plate GPM						
Corresponding MGD						
Original Name Plate TDH (FT)	142'	142'	142'	142'		
Pump NPSH (FT)						
Centerline of Pump Intake Elev.						
Floor Elevation						
Electrical Controls Elevation						
Pumps/Motors Subject to Flood?						
Pump Efficiency						
Motor Efficiency						
Min. Reservoir WL						
Cavitation Problems (Y/N)						
VFDs (Y/N)						
Maintenance History	Refer to next page for maintenance history of pumps and motors					

Comments on Booster Pumping: The City has experienced a significant significant drop in the number of water main breaks since the West Side Reservoir was removed from service. Several sources have suggested that Soft Starts or VFDs be installed on the West Side booster pumps to reduce or eliminate pressure spikes within the distribution system, which may be related to main breaks.

AUXILIARY POWER

Power Type	None		
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)			mgd
Firm Pump Capacity (gpm)			mgd
Auxiliary Power Capacity (gpm)			mgd

Max Day Demand @ this location		mgd	
Peak Hour @ this location		gpm	(Hydropneumatic Stations)
Avg Day Demand @ this location		mgd	
Firm Pump Capacity/Max Day		%	
Peak Hour/Firm Pumping Capacity		%	(Hydropneumatic Stations)
Aux. Power Capacity/Avg Day		%	

Comments:

Pumping

Pumping Stations - Construction, Controls & Maintenance

Location:	West Side Reservoir
Function:	Pump from the West Side reservoir to supply area of the west side of the City during peak demand periods

Pumps and motors are on a routine Preventive Maintenance (PM) schedule consisting of visual inspection, checking oil levels, and greasing bearings and fittings. On an as-needed basis, oil is changed, packing is adjusted, bearings are replaced, etc. Recent, non-routine work is shown below:

West Side Station Pump 1	West Side Station Pump 2	West Side Station Pump 3	West Side Station Pump 4
6/7/05 - replaced motor bearings	**9/1/11** - replaced upper and lower motor bearings	**4/28/15** - rebuilt discharge valve control cylinder	**5/26/16** - replaced 4-way valve
	4/9/12 - rebuilt motor, installed new upper shaft and coupling		

TREATMENT

Disinfection (sodium hypochlorite addition)

Point of Treatment	West Side Booster Sta.			
Injection Point:				
SDWIS Facility ID (Site Code)				
Purpose:	See comments			
Year Initiated	2016			
Product:	NaOCl			
Manufacturer:	~14-15%			
Chemical Strength:				
Dilution:	NA			
ANSI/NSF Standard 60 Approval? (Y/N)	Yes	NSF max dose:	84	mg/L
Normal Feed Rate/Dosage		mg/L		
Avg Plant Tap Residual (mg/L)	total:		free:	
Avg Distribution Residual (mg/L)	total:		free:	
Frequency of Residual testing	Plant Tap:		Distribution:	
Analytical Method Used				
Instrument:				
Any Overfeed Instances? (Y/N)	No	Date(s):		
Any Low Feed Instances? (Y/N)	No	Date(s):		
Pump Type:		Model:		
Number of Pumps:				
Pump Capacity	gpd max:		gpd min:	
	psi:			
Chemical Storage Tank Type		Volume:	220 gallons	
Weight/Level Reading Method				

SAFETY

Separate Room	No	Cylinder Repair Kit	NA
Exhaust fan	No	Extra Chlorinator or repair kit	NA
Fresh Air Vent	No	Ammonia Bottle	NA
Door Opens Out With Panic Bar	Roll-up door	Self Contained Air Packs	NA
More than 1500 # Cl_2 onsite	NA	Training Programs	NA
Electrical Protected from Gas?	NA	Shower/Eye Wash	Eye wash

Comments:

Pumping

Booster Pumping Stations - Construction, Controls & Maintenance						
Location:	Torrey Road Booster Station					
Function:	Boost pressure to the southwest portion of the City, including the Hospital area					
Pump Number	1	2				
Year Installed	1954	1954				
Type						
Current Capacity (MGD)						
Current Capacity (GPM)						
Basis						
Current TDH (FT)						
HP	40	125				
Original Name Plate GPM						
Corresponding MGD	2.8	4				
Original Name Plate TDH (FT)	65'	100'				
Pump NPSH (FT)						
Centerline of Pump Intake Elev.						
Floor Elevation						
Electrical Controls Elevation						
Pumps/Motors Subject to Flood?						
Pump Efficiency						
Motor Efficiency						
Min. Reservoir WL						
Cavitation Problems (Y/N)						
VFDs (Y/N)	No	No				
Maintenance History	Refer to next page for maintenance history of pumps and motors					

Comments on Booster Pumping:
Permit 120173 was issued in 2012 for signficant upgrades to the Torrey Road Booster Station. Electrical upgrades have been completed. New pumps were purchased but were not installed as planned. The City will reportedly move forward with pump installation in the near future.

AUXILIARY POWER

Power Type	None	Power Rating (kWh)	
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)			mgd
Firm Pump Capacity (gpm)			mgd
Auxiliary Power Capacity (gpm)			mgd

Max Day Demand @ this location		mgd	
Peak Hour @ this location		gpm	(Hydropneumatic Stations)
Avg Day Demand @ this location		mgd	
Firm Pump Capacity/Max Day		%	
Peak Hour/Firm Pumping Capacity		%	(Hydropneumatic Stations)
Aux. Power Capacity/Avg Day		%	

Comments:

Pumping

Booster Pumping Stations - Construction, Controls & Maintenance	
Location:	Torrey Road Booster Pumping Station
Function:	Boost pressure to the southwest portion of the City, including the Hospital area

Pumps and motors are on a routine Preventive Maintenance (PM) schedule consisting of visual inspection, checking oil levels, and greasing bearings and fittings. On an as-needed basis, oil is changed, packing is adjusted, bearings are replaced, etc. Recent, non-routine work is shown below:

Torrey Road Station 2000 gpm pump	Torrey Road Station

DISTRIBUTION

Interconnections with Other Supplies

Is water purchased from other supplies? _____

If yes, list WSSN number (s): _____

No. of Emergency Connections: _____

Location	Main Size	Capacity	Metered?	Status (Regular/Emergency)	WSSN of Connection

Are valves at the interconnections exercised annually? _____

Are the interconnected mains routinely flushed? _____

Comments: Water is sold to the City of Flint by the Great Lakes Water Authority (GLWA). Flint is making a decision whether to continue purchasing water from GLWA or to upgrade the water treatment plant and treat raw water purchased from the Karegnondi Water Authority (KWA). Currently, water is tranmitted from GLWA to the water plant site, and is master-metered through Control Station 2 (CS-2). At CS-2, the City adds NaOH, orthophosphate, and sodium hypochlorite.

Distribution Piping

Mains by Material	
Cast Iron	96.64%
Ductile Iron	2.64%
Steel	0.46%
Concrete	0.22%
Other	0.03%
Galvanized	0.01%

Mains by Size	
2"	0.11%
3"	0.26%
4"	4.47%
6"	51.59%
8"	23.74%
10"	0.59%
12"	8.11%
14"	0.81%
16"	3.52%
18"	1.90%
20"	0.00%
24"	3.88%
30"	0.58%
36"	0.35%
42"	0.06%
48"	0.01%
72"	0.02%

Mains by Date of Installation			
1900	to	1910	3.50%
1911	to	1920	25.90%
1921	to	1930	34.00%
1931	to	1940	6.30%
1941	to	1950	1.20%
1951	to	1960	25.00%
1961	to	1970	2.10%
1971	to	1980	0.30%
1981	to	1990	1.70%
1991	to	2000	0.20%
2001	to	Present	10.80%

Estimated percent of piping with coal tar lining _____ %

Comments:

Distribution piping data is taken from the 6/28/16 draft Asset Management Report by Rowe PSC and is based on 3,079,442 feet (583.2 miles) of water main.

DISTRIBUTION

Operational Concerns & Maintenance

Are there areas where water main breaks are frequent? Yes
If yes, identify locations: See comments

Comments:
From 2010 - 2013, the City averaged about 155 breaks per year. In 2014 - 2015, which includes the period when the water plant was in full-time operation, the City averaged about 300 breaks per year. There has been a significant reduction in the number of breaks in 2017, which may be related to taking the West Side Reservoir and pumping station off line for inspection (it is believed that surges associated with operation of pumps and valves at West Side are a significant factor in water main breaks).

Year	Number of Breaks
2012	159
2013	153
2014	316
2015	277
2016	138

The City is working toward the Partnership for Safe Water goal of not more than 15 breaks per year per 100 miles of main, which equates to 85-90 breaks per year.

Leak Detection and Condition Assessment:

The City contracted with Echologics LLC in 2015 and 2016 to conduct a leak assessment of the majority of water main in the distrbution system and a condition assessment on 24 miles of critical mains (road, railroad, and waterway crossings). A water audit was also completed, GIS data points were collected, and GIS training was provided.

The leak assessment work was divided into standard "listening" at most locations and "correlation" on 15 miles of critical mains. The "listening" portion of the leak assessment identified 82 leaks with an estimated total loss of 327 gpm. The "corrleation" portion of the assessment found no confirmed leaks, but identified four "Points of Interest (potential leak sites)" that require further investigation.

The condition assessment found that, of the critical pipes tested, 31% appeared to be in good condition, 15% were in moderate condition, 8% were in poor condition, and 46% did not return a result.

Are there areas where aesthetic water quality complaints are frequent?
If yes, identify locations: _____

Comments:
Operators are currently doing a good job of meeting treatment goals, and there is a significant amount of flushing and other distrbution maintenance practices taking place in an attempt to meet distribution system water quality goals; therefore, distribution system water quality is improving. Many members of the public have not regained confidence in the water system, however.

Do you receive complaints alleging illness due to the water? Yes
If yes, identify locations: _____
Comments:
There have been complaints of lead-related and Legionella-related illnesses during and since the water crisis began.

DISTRIBUTION

Operational Concerns & Maintenance

Are there areas where customers complain of low pressure? No

If yes, identify locations:

Comments:

What is the procedure to respond to and track these complaints?
Comments:
There are a number of personal and online resources available to track and address complaints.

Distribution System Capacity

Are there areas where peak flows (including fire flow) cannot be maintained? No

If yes, identify locations:

Comments:

Last ISO report date? Rating

Proposed distribution system improvements (Location and Estimated Completion Date):
Several neighborhoods were identified for water main replacment in a 2016 DWRF Project Plan. Proposed work areas were prioritized based on several factors including occupancy, service line material, and break history. The project is in the DWRF Fundable Range, but the City must demonstrate a long-term, secure water source to qualify for funding. If funded, work would begin in 2017 or 2018.

Distribution System Optimization

An *Assessment of Current Practices and Gap Analysis Technical Memorandum* is being completed by Arcadis Group. The document compares existing conditions and practices to industry best practices, identifies "gaps" where best practices are not being achieved, and recommends improvements. The evaluation includes water quality integrity, physical integrity, and hydraulic integrity. The completed analysis is expected to provide valuable operational advice.

DISTRIBUTION

Hydrants		
Number of Hydrants	3605	(from 2013 Rowe Reliability Study)
Number Without Auxiliary Shut-Off Valves		
Number that are Self-Draining		
Number of Inoperable Hydrants	See comments	
Frequency of Hydrant inspection:		
Inspection Staff:		
Are there areas where additional hydrants are needed?		
If yes, list locations:		
Hydrant location system		Accurate?
Are hydrants color coded for capacity?	No	
Has this information been provided to the fire department?		
Frequency and seasons of hydrant flushing	Annual (fall)	
Purpose of flushing	Maintain water quality	
Is the public notified prior to flushing?	No	
Does flushing follow a specific format?	No, but a UDF program is being developed	
Is the volume of water used during flushing estimated?	No	
Do hydrants receive maintenance painting?	No	
Is a record maintained of hydrant activities?	No	

Hydrant records should include: Hydrant number, location of the hydrant, type of hydrant, size of barrel, size of bottom valve, size of lead, direction of turn, operable or inoperable, auxiliary valve type and size, weep holes plugged or unplugged, condition of hydrant (caps, chains, valve operation, operating nut, leakage & etc.), color coded capacity, flow data (gpm & psi) flushing dates, inspection dates.

Comments:

The City reported approximately 35% of hydrants being inoperable or needing repair. Recent hydrant upgrades are as follows: 2013 - 30 replaced, 11 repaired; 2014 - 12 replaced, 7 repaired; 2015 - 53 replaced, 19 repaired. Recent efforts are very good, but a high percentage still require repair or replacement.

Valves		
Number of Valves	8228	(From 2016 Rowe Reliability Study)
Number of inoperable valves	100	(See comments)
Are there areas where additional valves are needed?		
If yes, list locations:		
Valve location system	Map	Accurate?
Valve Turning Frequencies	Primary:	
	Others:	
Records Maintained?		

Valve records should include: valve number, location of valve(with witness points), type of valve, size of valve, normal operating status (open or closed), condition of valve (operable or inoperable), direction of turn, number of turns, and dates of operation.

Comments:

The City has been aggressively identifying and repairing or replacing inaccessible and inoperable valves. The City has reported that 57 valves were replaced in 2015, 85 were replaced in 2016, and 27 were replaced through March 2017. Valve boxes have been located and cleaned out. According to the Distribution System manager, a 2015 valve study identified 900 inaccessible/inoperable/problem valves, and the City is reporting that it has addressed 800 of those, leaving about 100 in need of maintenance/repair/replacement. The City has applied for DWRF funding to replace a significant amount of water main, which would result in additional valve replacement. Recent efforts are very good; however, continued progress and a long-term plan are still needed.

DISTRIBUTION

Customer Service Information

Number of service connections	56,038	(number of parcels in City)
Occupied parcels	43,406	(estimated number currently occupied)
Number of metered service connections		

Percentage of service line materials (all parcels):	
Copper	48.0%
Galvanized or lead	52.0%
Unknown	
Other	---

Ownership of Service (CWS/Customer)	
From Corp Stop to Curb Stop	City
From Curb Stop to Property Line	City
From Property Line to Meter	Customer
Meter	City

Comments: The City's FAST Start Program conservatively estimates there are 29,100 lead/galvanized service lines needing replacement. Sites with suspected lead/galvanized lines are investigated, and non-copper portions of the lines are replaced. From July 1, 2016 to June 30, 2017, the City replaced 2150 service lines. This represents slightly over 7 percent of all targeted service lines, which meets the EPA's requirement of at least 7 percent replacement each year after a lead action level exceedance.

CUSTOMER METERS

Types of meters Used	
Number of Meters with Remote Reading Devices	
Residential Meter Sizes	
Industrial/Commercial Meter Sizes	
Meter Testing/Maintenance Program	
Average Age of Meter in System	
Criteria for Changeout	
Number or Percent Changeout per Year	
Master Meter Locations	
Calibration of Master Meters	
Meter Reading Staff/Contract:	

Detailed information regarding the city's water meters and replacment program was not available at the time of the survey, and therefore the meter program could not be evaluated.

Percent of Usage by Customer Type	
% Residential	80%
% Other	20%

Large Users - % of Use	
McLaren Regional Medical Center	1%
Genesee County Jail	<1%
Hurley Medical Center (6th and Begole)	<1%
Hurley Medical Center (One Hurley Place)	<1%

Comments:
General Motors was a former customer that is now purchasing water from Genesee County, but may reconnect to the City's water system. The City is concentrating on the replacement of lead service lines. Approximately 1200 lead lines have been replaced in the last few years.

Water System Activity

Year	# of Construction Permits Issued	Permitted Amount of WM Feet
2007	6	16,556
2008	4	2698
2009	4	35,273
2010	3	10,355
2011	1	13,854
2012	2	0
2013	1	31,418
2014	2	0
2015	4	18,100
2016	3	10,300

A detailed breakdown of water main permits by purpose (new vs. replacement) was not available at the time of the survey. A review of records indicates that the majority of these permitted mains are for the replacement of existing mains. Most new main is associated with transmission of raw water. Some permits included here are for pumps, controls, storage, and other improvements.

Comments:
Some of the above-permitted main was not constructed.

DISTRIBUTION

Water Rates

What is your current rate schedule?	See comments
Are current rates adequate to support O&M and CIPS?	See comments
When was last time rates were adjusted?	2015
Has a water rate study been performed? When?	
Is there a meter charge or ready to serve charge?	Yes
Is a copy of the water rate schedule and ordinance available?	

Comments:

A rate analysis was completed in 2016 by Raftelis Financial Consultants, which indicated a "typical" monthly water bill of $53.84 for 5 ccf of water consumption. The bill includes commodity charges, operating costs, capital costs, personnel costs, etc. The Raftelis survey indentifies the commodity charge portion of a typical bill as $15.89/month, or $3.18/ccf ($4.25/1000 gallons). The Raftelis survey further indicates that the current rate structure is not sufficient to meet future expenses due to a number of factors. The actual future gap between revenue and expenses is dependent on the City's final Source Selection and associated costs. The current rate was established in 2015 through a court decision.

Repair Parts Inventory

Extra Mains (Sections for Each Size in Service)	
Repair Clamps (2 or more for each size)	
Tees, Crosses & Elbows	
Hydrants	
Valves	
Services (Corp & Curb Stops, Clamps and Lines)	
Other	

Comments:

Information about repair parts and equipment was not available at the time of the survey.

Safety Programs

Confined Space Entry Program	
Trench Safety Program	

Comments:

Information about the city's safety program was not available at the time of the survey.

PROGRAM COMPLIANCE

Cross Connection Program

Ordinance No.	Ch. 46, Art. II, Div. 4	Date:	Various
Approved Program (Y/N)?		Date:	
Staff Assigned to Program, (No., Dept and/or who)			
Is Annual Cross Connection report required (Y/N)?			Yes
Was previous year's annual report received (Y/N)?			No Date:
Was previous year's annual report acceptable (Y/N)?			No
Inspection Status:	Inactive		
Assembly Testing Frequency		High Hazard:	Low Hazard:
Assembly Testing Performance			
Recordkeeping:			
Private Well Isolation/Abandonment Procedure:			

Comments:
Annual Cross Connection Report forms have not been received for 2015 or 2016. The Cross Connection Inspector has been working primarily on plumbing permits, and inspections are not being completed.

Annual Pumpage Report

Is Annual Pumpage Report required (Y/N)?	No	
Was previous year's annual report received (Y/N)?		Date:

Comments:

Monthly Operation Reports

Are Monthly Operation Reports required (Y/N)?	Yes	
Were all previous year's reports received (Y/N)?	Yes	Timely? Yes
Are previous year's reports acceptable (Y/N)?	Yes	

If no, describe problems:

Comments:
The monthly operation report includes water purchased from GLWA, chemicals added at CS-II, water qualilty data at the water plant tap, and water quality data from the distribution system. Chemical treatment at the Cedar Street and West Side Reservoirs is reported on daily summary reports. Chemical feed data from the reservoirs should be included on the monthly operation reports once it is determined that daily summary reports are no longer required.

Consumer Confidence Report

Is the annual CCR required? (Y/N)	Yes	
Was the previous year's report received? (Y/N)	Yes	Date: 6/13/2017
Was the previous year's acceptable? (Y/N)	Yes	
Was the previous year's certification form received? (Y/N)	Due 10/1/17	Date:

Comments:

Emergency Response Plan

Date of ERP	2013	Acceptable?	
Filed where?			

Comments:
The most recent Emergency Response Plan on record with the DEQ is from 2013. The 2013 Sanitary Survey recommended an update Emergency Response Plan due to changes in operations. Since then, signficant changes to city and DEQ staffing and operational practices have occurred, and an updated plan is now required. If an updated plan exists, the DEQ should be notified of its availability.

PROGRAM COMPLIANCE

General Plan

Date of Most Recent Plan:	Various, up to 2016	
Filed Where?	Part of Rel. Study/Asset Mgt.	Acceptable?
	General Layout	Yes
	Facility locations & capacities	See comments
	Water Main Inventory	Yes
	Identification of Service Areas	In Contract w/GLWA
	Hydraulic Analysis	See comments
	Capital Improvement Plan	In DWRF Project Plan

Comments:
There is an existing hydraulic model of the distribution system, but fire flow contours or similar data were not provided. The U.S. EPA is in the process of developing and calibrating a new model. A draft Asset Management report was completed in 2016, which focused on the distribution system only, pending a selection of water source. Facility locations and storage and pumping capcities are included in the Reliability Study. Treatment capacities are available in this Sanitary Survey. A limited Capital Improvement Plan was also completed by Imagine Flint in 2105.

Reliability Study

Date of Most Recent Study:	2016	
Filed Where?	City, MDEQ	Acceptable?
Contents:	5 & 20 Year Demand Projections	Yes
	Source Production Totals (Monthly)	
	Customer Supply Usage (Annual)	
	Res/Comm/Ind Usage (Annual)	Residential vs.other
	Water Shortage Response Plan	See comments
	Recommended Improvements	

Comments:
The Reliability Study projects a 20 percent population loss between 2015 and 2040, which would further affect the City's ability to raise adequate revenue through water rates. The study includes a detailed water shortage response plan, and water shortage is also addressed in Chapter 46, Article 1 of the City Ordinances. The water shortage response plan may need modification once the long-term and backup supply selection is made.

Permits

Applies for and obtains permits prior to construction (Y/N):	Yes	
Reviews plans prior to submittal to DEQ (Y/N):	Yes	
Standard specifications on file at CWS (Y/N):		
If applicable, adheres to contract with supplier regarding plan submittal (Y/N):	See comments	Date:
Follows master plan for any construction (Y/N):		
Develops as-built plans (Y/N):		
Updates general plans (Y/N):		

Comments:
The water contract with GLWA allows for review and approval of projects related to: new metering facilities, water mains sized 24 inches or larger, pump stations, reservoirs, water towers, and projects in proximity to GLWA facilities. It is not known whether GLWA routinely excercises its right to do so.

PROGRAM COMPLIANCE

Capacity Development

Comments on Capacity Development: The EPA has required (in its Administrative Order) that the City must demonstrate adequate Technical, Financial, and Managerial capacity (TMF) prior to switching to another water source (i.e., other than treated water purchased from the Great Lakes Water Authority (GLWA)). The decision whether to continue to purchase water from GLWA, begin treating raw water from the KWA, or select another source has not been finalized. Because the City's source water selection decision is not finalized, it is not known whether a formal TMF demonstration will be required. However, certain aspects of a TMF demonstration are necessary regardless of source selection.

The following components of a TMF capacity assessment warrant further discussion:

Technical Capacity:
1. Source - a water system must have an adequate quantity of water available to meet demands, either through its own production facilities or secured through contract and capable of delivery from another water system. At this time, the City only has a short-term agreement with GLWA for the purchase of treated water. The DEQ had instructed the City to either approve the long-term agreement with GLWA that was negotiated by Mayor Karen Weaver, or offer a reasonable alternaivte proposal to provide drinking water from another source, by June 26, 2017. The City has not done so, and therefore does not have satifactory Technical Capacity with regard to its source.

Financial Capacity:
1. Budget - a water system must have adequate revenue to operate its water system, including operational costs, personnel costs, capital improvements, and debt retirement. As stated in the Flint Water Rate Analysis by Raftelis, operational costs and staffling levels are highly dependent on the City's final selection of a water source. Raftelis projects a future gap between revenue and expenses, although the analysis was based on routine operation of the City's water plant and other conservative assumptions. The actual future gap, if any, is dependent on source selection, the terms of any water service agreements, efforts to improve water accountability (currently around 50 percent unaccounted), availability of grants and alternative funding sources, relative levels of automation and staffing, water rates, etc. Once the source determination is made, water rates should be reviewed and, if necessary, adjusted to ensure adequate financial capcity with regard to budget. It should be noted that, in addition to other duties, water treatment/operations staff are responsible for operation of five dams on the Flint River. The time and resources needed to manage the dams must be accounted for when developing staffing and budget plans for water treatment/pumping.
Also, it has been mentioned that a low pay scale is reportedly contributing to the City's difficulty in recruting, hiring , and retaining staff.

Managerial Capacity:
1. Maintaining Certified Operators - a water system must place its treatment and distribution systems under the supervision of properly-certified operators. Operations staff may either be City employees or contractors. The operator currently supervising the distribution system is a City of Flint permanent employee. The operator in charge of the treatment system is a contractor with Fleis & Vandenbrink Operations. The City may attempt to recruit an internal or external candidate to supervise the treatment system.
2. Sampling Plans - a water system must prepare sampling plans, and follow the plans when conducting compliance monitoring under the Safe Drinking Water Act. The City's Total Coliform Rule sampling plan must be revised to include an additional five (5) routine sites, with associated repeat sites. The Disinfection Byproducts sampling plan is satisfactory, but may need future revisions based on the Arcadis Group distribution system optimization study. The lead and copper sampling plan is revised as necessary as additional information is obtained regarding service line materials.
3. Cross Connection Control - a water system must implement a program for the elimination of cross connections within its distribution system. It appears that due to personnel shortages, adequate time is not being devoted to cross connection control, and inspections and program administration are lacking.
4. Other Plans and Studies - a water system must complete other plans and studies as required by the Safe Drinking Water Act. The City completed a draft Reliablity Study and a draft Asset Management Plan in 2016. These studies should be finalized. Their contents are used to justify the City's Drinking Water Revolving Fund (DWRF) Project Plan and funding application. Also, an Asset Management Plan, and a 5-year and 20-year Capital Improvement Plan are required components of a Water System General Plan.

MONITORING

Bacteriological

Date of Approved Site Sampling Plan :	2/21/2017		
Number of samples required each month:	100	Basis:	Population
Certified Lab Used:	City of Flint water plant		
MCL, Monitoring or Reporting Violation(s) in past 3 years? (Y/N)	Yes	Date:	2014
Number & Type of Violations	3 MCL violations in 2014		
Public Notice Issued according to regulations? (Y/N)	Yes	Date:	Various

Comments:
The RTCR sampling plan was approved on 3/2/17 based on 20 routine sampling sites. Five more potential routine sites, with assoicated repeat sites, have been identified. The suitability of the sites will be confirmed, and the sampling plan will be expanded to 25 routine sites in the near future.

Chemical

Date of Monitoring Schedule:	5/12/2017
MCL, Monitoring or Reporting Violations(s)? (Y/N)	No
Public Notice Issued according to regulations? (Y/N)	NA
Detects for inorganics > 50% of MCL? (Y/N)	No
Detects for VOCs (Y/N)	No
Detects for SOCs (Y/N)	No
DBP Sampling Done According to Approved Plan? (Y/N/Waived)	Yes
Date of Approved Disinfection Byproduct Monitoring Plan:	7/12/2016

Comments:
The DBP Monitoring Plan may need to be updated based on the distribution system optimization study (in progress).

Lead and Copper Monitoring

No. of Samples Required:	60		
Frequency (Semi Annual/Annual/Triennial)	See comments		
Exceedance of lead or copper action level (Y/N)	See comments		
If yes, was public education issued? (Y/N)	See comments	Date:	
Next Monitoring Period:	1/1/17 - 6/30/17	(final reporting in progress)	
Corrosion Control Program Status, if applicable	See comments		
Lead service line replacement status, if applicable	Active - see Customer Sevice Information page of this sanitary survey for details		

Comments:
The city has collected two consecutive, 6-month rounds of samples (in 2016 and 2017) meeting the lead and copper action levels. The last monitoring period that exceeded the lead action level was January-June 2016. All required responses were completed in response to exceeding the action level. Samples are collected by the City, sentinel teams, and the public, and all valid tier 1 site results are used to calculate the 90th percentile lead and copper concentrations and determine compliance. The city is practicing corrosion control treatment for the incoming water from the GLWA. A corrosion control study is currently being conducted by Cornwell Engineering Group to evaluate current conditions and evaluate future possible situations (continued purchase of finished water from GLWA, purchase of water from Genesee County, treatment of KWA raw water at the Flint Water Plant, and combinations/mixing of those sources).

Radiological Monitoring

Date of Monitoring Schedule	Not Required		
Alpha, beta, radium, uranium		Date:	
Radon		Date:	
Tritium		Date:	
Detects for Rads > 50% of MCL? (Y/N)			
If yes, list		Date:	

Comments:
Radiological monitoring is the responsibility of the wholesale supplier (Great Lakes Water Authority)

Analytical Capabilities

Parameter	Analytical Method(s)	Calibration Frequency	Instruments Used	Method of Data Recording	Frequency of Measurements	Sampling Location	Location for Water Source	Analysis Run by
Alkalinity	SM 2320B Titration	Per batch of titrant	Standard burettes	Manual	Weekly Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Total Hardness	SM 2340C	Per batch of titrant	Standard burettes	Manual	Weekly Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Calcium Hardness	SM 3500 Ca D	Per batch of titrant	Standard burettes	Manual	Weekly Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
pH	SM 4500 H+B Electrometric	Daily	Hach HQ440d Hach SL1000 Hach HQ440d	Manual	Daily Daily Weekly Every 2 Hours Every 2 Hours	CS-II Lab Tap Distribution CS-II Mini Lab Tap	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan GLWA Supply Main In-Plant Piping	Lab staff Operations staff
Conductivity	SM 2510B	Monthly	Mettler Toledo Hach SL1000	Manual	Daily Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Temperature	SM 2550B	Annually	Grade 1 Thermometer	Manual	Daily Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Fluoride	SM 4500 F-C ISE	Daily	Hach HQ440d	Manual	Daily Daily	CS-II Lab Tap	GLWA Supply Main In-Plant Piping	Lab staff
Chlorine Residual		Daily	Hach SL1000	Manual	Twice per day Twice per day Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
		Periodic Checks by Lab Manager	Hach Pocket Colorimeter II	Manual	Every 4 Hours Every 2 Hours	CS-II Mini Lab Tap	GLWA Supply Main In-Plant Piping	Operations staff
			Hach CL-17	Manual Manual	Continuous Continuous	CS-II WTP Basement	GLWA Supply Main In-Plant Piping	Operations staff
Chloride	SM 4500 Cl-B Argentometric	Per batch of titrant	Standard burettes	Manual	Weekly Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Turbidity	SM 2130B Nephelometric	Monthly - primary Daily - secondary	Hach 2100 N	Manual	Twice per day Twice per day Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Total Colform	SM 9223 B-04 Colilert	Biannual PE		Manual	Twice per day Twice per day Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
HPC	SM 9215 B IDEXX Simplate	Annual PE		Manual	Weekly Weekly Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Iron			Hach DR 3900	M	Daily Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff

Analytical Capabilities

Parameter	Analytical Method(s)	Calibration Frequency	Instruments Used	Method of Data Recording	Frequency of Measurements	Sampling Location	Location for Water Source	Analysis Run by
Sulfate			Hach DR 3900	Manual	Daily	Lab Tap	In-Plant Piping	Lab Staff
Phosphate			Hach DR 3900	Manual	Daily Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab Staff

Other Notes/Observations on Laboratory Practices/Capabilities

1. The lab is certified for Total Coliform, E. Coli, HPC, and fluoride.
2. Based on inspections and conversations between lab staff and DEQ field personnel, lab practices are generally satisfactory.
   Minor issues brought to the attention of the Lab Manager are addressed promptly.
3. Lab QA/QC appears to be greatly improved under the current Lab Manager, who is working on plans for further imprrovement.
4. The laboratory balance was last calibrated in December 2016. Scale accuracy is checked monthly using certified weights..
5. The laboratory is successfully running extra performance evaluation/proficiency testing samples each quarter for all parameters being reported to the DEQ/EPA.

TREATMENT

Disinfection (sodium hypochlorite addition)

Point of Treatment	Control Station 2			
Injection Point:	42-inch supply main			
SDWIS Facility ID (Site Code)				
Purpose:	See comments			
Year Initiated	2016			
Product:	Havasan LB-12			
Manufacturer:	Haviland			
Chemical Strength:	12%			
Dilution:	NA			
ANSI/NSF Standard 60 Approval? (Y/N)	Yes	NSF max dose:	84	mg/L
Target Feed Rate/Dosage	1.0 - 1.3	mg/L		
Basis for Target Feed Rate	See comments			
Range of Incoming (GLWA) Residual	0.6 - 1.4	mg/L		
Range of Plant Tap Free Residual	0.8 - 2.0	mg/L		
Range of Distribution System Free Residual	0.2 - 2.0	mg/L		
Frequency of residual testing — Incoming:	Continuous plus 2 confirmation grabs/day			
Plant Tap:	Continuous plus 2 confirmation grabs/day			
Distribution:	Several per week			
Analytical Method Used:	DPD			
Instrument:	Hach CL-17, Hach SL1000, Hach Pocket Colorimeter			
Any Overfeed Instances? (Y/N)	No	Date(s):		
Any Low Feed Instances? (Y/N)	No	Date(s):		

Feed Pumps:

Type:	Diaphragm	Model:	Milton Roy SD46-88P
Number of Pumps:	2		
Capacity:	10 gph each	Discharge Head:	150 psi

Type:	Diaphragm	Model:	LMI C721-71FS
Number of Pumps:	1		
Capacity:	4 gph	Discharge Head:	100 psi

(Note: this model is no longer manufactured, but repair parts are believed to be readily available)

Chemical Storage Tank Type	Totes (from supplier)	Volume:	220 gallons
Weight/Level Reading Method	Staff gage on tank wall		

Comments on Sodium Hypochlorite Feed: The City purchases treated water from the GLWA, and adds sodium hypochlorite, phosphoric acid, and sodium hydroxide to meet the plant tap free chlorine residual (1.7 mg/l), orthophosphate residual (3.6 mg/l), and pH (7.5 units) goals established by the U.S. EPA's technical team. The incoming, Plant Tap, and Distribution pH ranges shown above are for the period of time when sodium hypochloride has been fed. The feed pumps now have flow-paced controls to help maintain consistent feed rates.

The existing treatment system was designed and installed as a temporary measure while long-term treatment decisions are being made. Chemical scales may be installed at a later date. An SOP for chemical feed has been developed for both existing (temporary) and future (permanent) treatment at CS-II. Because the City has not selected a long-term water source, final decisions have not been made regarding the future treatment layout at CS-II.

Safety: The sodium hydroxide tote and sodium hypochlorite tote are stored together in a garage structure with air conditioning, a portable eye wash station, and face shield/gloves/PPE.

TREATMENT

Corrosion Inhibitor (phosphoric acid addition)

Point of Treatment	Control Station 2			
Injection Point:	42-inch supply main			
SDWIS Facility ID (Site Code)				
Purpose:	See comments			
Year Initiated	2015 (December)			
Product	Phosphoric Acid			
Manufacturer:	Brenntag			
Chemical Strength	75%			
Dilution:	None			
ANSI/NSF Standard 60 Approval? (Y/N)	Yes (NSF)	NSF max dose:	13	mg/L
Target Feed Rate/Dosage	2.4 - 2.7	mg/L		
Basis for Target Feed Rate	See comments			
Range of Incoming (GLWA) PO4	1.0 -2.2	mg/L		
Range of Plant Tap PO4	3.5 - 3.9	mg/L		
Range of Distribution System PO4	2.9 - 3.9			
Frequency of residual testing Incoming:	Daily			
Plant Tap:	Daily			
Distribution:	Several per week			
Analytical Method Used:	Spectrophotometry			
Instrument:	Hach DR3900			
Any Overfeed Instances? (Y/N)	No	Date(s):		
Any Low Feed Instances? (Y/N)	No	Date(s):		
Feed Pumps:				
Type:	Diaphragm	Model:	LMI C921-362SI	
Number of Pumps:	2			
Capacity:	4 gph each	Discharge Head:	100	
Chemical Storage Tank Type	PE Shipping Totes	Volume:	220 gallons	
Weight/Level Reading Method	Scale markings on tote			

Comments on Phosphoric Acid Feed: The City began feeding phosphoric acid in December 2015 to improve lead corrosion control by re-establishing an orthophosphate scale on lead surfaces within the distribution system/individual plumbing systems. The EPA has established a distribution system orthophosphate residual goal of 3.5 mg/l, and the City appears to be meeting the goal more consistently since May 2017. The incoming, Plant Tap, and Distribution PO4 residual ranges shown above are for the 12-month period covering June 1, 2016 to May 31, 2017.

The existing treatment system was designed and installed as a temporary measure while long-term treatment decisions are being made. Chemical scales may be installed at a later date. An SOP for chemical feed has been developed for both existing (temporary) and future (permanent) treatment at CS-II. Because the City has not selected a long-term water source, final decisions have not been made regarding the future treatment layout at CS-II.

Safety: The phosphoric acid tote is stored in a different bay from the sodium hydroxide and sodium hypochlorite storage/feed area in a garage structure with a portable eye wash station.

TREATMENT

pH Adjustment (sodium hydroxide addition)

Point of Treatment	Control Station 2			
Injection Point:	42-inch supply main			
SDWIS Facility ID (Site Code)				
Purpose:	pH adjustment			
Year Initiated	2017 (February)			
Product	Sodium hydroxide			
Manufacturer:	Brenntag			
Chemical Strength	25%			
Dilution:	None			
ANSI/NSF Standard 60 Approval? (Y/N)	Yes (NSF)	NSF max dose:	200	mg/L
Target Feed Rate/Dosage	2.6	mg/L		
Basis for Target Feed Rate	To meet the point-of-entry pH minimum goal of 7.5 units, and the distribution system goal of 7.5 +/- 0.3 units			
Range of Incoming (GLWA) pH	7.18 - 7.47			
Range of Plant Tap pH	7.17 - 7.50			
Range of Distribution System pH	7.14 - 7.59			
Frequency of pH testing – Incoming:	Every 2 hours plus daily confirmation grab by lab staff			
Plant Tap:	Every 2 hours plus daily confirmation grab by lab staff			
Distribution:	Several per week			
Analytical Method Used:	Electrode			
Instrument:	Hach HQ440d, Hach SL1000			
Any Overfeed Instances? (Y/N)	No	Date(s):		
Any Low Feed Instances? (Y/N)	No	Date(s):		

Feed Pumps:

Type:	Diaphragm	Model:	Milton Roy SD46-88P
Number of Pumps:	2		
Capacity:	10 gph each	Discharge Head:	150 psi

Type:	Diaphragm	Model:	LMI C721-71FS
Number of Pumps:	1		
Capacity:	4 gph	Discharge Head:	100 psi

(Note: this model is no longer manufactured, but repair parts are believed to be readily available)

Chemical Storage Tank Type	PE Shipping Totes	Volume:	220 gallons
Weight/Level Reading Method	Scale markings on tote		

Comments on Sodium Hydroxide Feed: The City began feeding sodium hydroxide in February 2017 to stabilize pH levels in the distribution system. Beginning in June 2017, the sodium hydroxide dosage was gradually increased to meet the EPA's recommended distribution system pH goal of approximately 7.5 units. The incoming, Plant Tap, and Distribution pH ranges shown above are for the period of time when sodium hydroxide has been fed. The feed pumps now have flow-paced controls to help maintain consistent feed rates.

The existing treatment system was designed and installed as a temporary measure while long-term treatment decisions are being made. Chemical scales may be installed at a later date. An SOP for chemical feed has been developed for both existing (temporary) and future (permanent) treatment at CS-II. Because the City has not selected a long-term water source, final decisions have not been made regarding the future treatment layout at CS-II.

Safety: The sodium hydroxide tote and sodium hypochlorite tote are stored together in a garage structure with air conditioning, a portable eye wash station, and face shield/gloves/PPE.

TREATMENT

Corrosion Control Treatment - General Comments

As part of the U.S. EPA's Emergency Administrative Order, the City's Optimal Corrosion Control plan must be reviewed and, if necessary, revised. To accomplish this, a contract was awarded to Arcadis Group to complete a Water Distribution System Optimization study, including a Corrosion Control Plan (CCP). The CCP is being completed by Cornwell Engineering Group as a subcontractor to Arcadis Group.

The proposed scope of the CCP (dated 12/19/16) included:
- -An evaluation of the existing Flint system (purchase of treated water from Great Lakes Water Authority)
- -The potential conversion to Genesee County as water supplier
- -A plan for treating KWA raw water at the Flint Water Treatment Plant
- -An evaluation of the interface (blending) between two sources of treated water

The DEQ recommended that the scope be flexible enough to consider other scenarios
The final CCP has not been finalized, in part due to delays caused by the City failing to select a permanent water source.

Appendix A

Classes offered at the Flint Water Treatment Plant, 2016-2017:

Safe Drinking Water Act Overview: September 27, 28, and 29, 2016 (2 hours each day) – Bryce Feighner (DEQ)
Basic Math and Hydraulics (condensed course): October 18, 19, and 20 (2 hours each day)
– Bob London and Jon Bloemker (DEQ)
Filtration: November 29, 30, and December 1, 2016 (2 hours each day) – Nick Pizzi
Rapid Mix, Flocculation, and Sedimentation: January 10 and 11, 2017 (2 hours each day) – Nick Pizzi
Jar Test Calculations: March 14, 2017 (2 Hours) – Nick Pizzi
Hands-on Jar Testing: March 15, 2017 (2 Hours) – Nick Pizzi
Chemical Feed: April 18, 2017 (2 Hours) – Nick Pizzi
Distribution Math: April 19, 2017 (2 Hours) – Nick Pizzi
Lime Softening Practice Math: April 19, 2017 (2 Hours) – Nick Pizzi
Ion Exchange Practice Math: April 20, 2017 (2 Hours) – Nick Pizzi
Basic Math: July 17, 2017 (2 Hours) – Nick Pizzi
Chemical Feed: July 18, 2017 (2 Hours) – Nick Pizzi

Attachment B

STATE OF MICHIGAN

DEPARTMENT OF ENVIRONMENTAL QUALITY

LANSING

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

October 22, 2018

VIA E-MAIL

The Honorable Karen Williams Weaver
Mayor of Flint
1101 South Saginaw Street
Flint, Michigan 48502

Dear Mayor Weaver:

SUBJECT: Order Under MCL 325.1015(2) of Michigan's Safe Drinking Water Act

An Order under MCL 325.1015(2) of Michigan's Safe Drinking Water Act, 1976 PA 399, as amended, is enclosed with this letter. The Michigan Department of Environmental Quality (MDEQ) does not often issue orders unilaterally because the MDEQ and the entity in question nearly always agree to the content of a stipulated order entered with the consent of both parties. The MDEQ has been unable to reach a stipulated order with the city of Flint (City).

I strongly emphasize that the quality of the City's water is high. The City's water system is perhaps the most monitored system in the country. For more than two years, that monitoring has proven that the City's water system is stable. From the perspective of lead and copper control, the quality of the City's water matches or exceeds that of comparable water systems in Michigan.

The enclosed Order addresses long-term technical and managerial issues with the City's water system, not the current quality of the City's water. The City relies heavily on state and federal technical support to manage its water system. The reliance on outside entities for long-term technical support is not the preference of either the City or the MDEQ. The MDEQ shares the City's goal that the City achieve long-term self-reliance. The purpose of the enclosed Order is to establish firm deadlines that chart the path toward achieving that goal.

On August 11, 2017, the MDEQ identified several deficiencies in the City's water system related primarily to its technical, managerial, and financial capacity to sustainably produce high-quality water on a long-term basis without significant outside support. The MDEQ and the City have worked informally since that time to address the outstanding deficiencies, with some success. For example, the City has strengthened its existing contract with a private firm to ensure there is a qualified operator in charge of the City's water plant; has designated an employee to be a cross connection control manager; has updated its emergency response plan; and has adopted several recommended standard operating procedures.

Notwithstanding those improvements, some deficiencies remain outstanding. The MDEQ has attempted to negotiate a consent order with the City that contains enforceable deadlines by which the City will resolve those outstanding deficiencies. For example, the City still needs to adopt several standard operating procedures; fill vacant positions; and implement its plan to fully achieve technical, managerial, and financial capacity. The City has repeatedly committed informally to resolve the outstanding deficiencies, but it has been unwilling to agree to enforceable deadlines. Experience has shown that enforceable deadlines are necessary to ensure that the City's water system can provide adequate and healthful water to the City's residents, in compliance with state and federal law, on a sustainable, long-term basis.

Under MCL 325.1015(2), the Order will be effective 30 days from the date of this letter. Within those 30 days, the City can request a public hearing [not a contested case hearing because this Order is not issued under MCL 325.1015(3)], but the request must comply with Rule 325.10202 of the Michigan Administrative Code. If the City requests a public hearing, then the Order will not be effective until the public hearing is complete, at which time the MDEQ will notify the City by letter of the effective date of the Order.

Once the Order is effective, the City can appeal it to either the Genesee County Circuit Court or the Ingham County Circuit Court, if it so chooses. Michigan's Safe Drinking Water Act does not contain a method of judicial review specific to the Order, and the Order is not the result of a contested case hearing under the Administrative Procedures Act, 1969 PA 306, as amended, so any appeal by the City would be under MCL 600.631. Note that an appeal under MCL 600.631 would not automatically stay the Order, and the procedure for filing the appeal would be governed by MCR 7.123, including a strict 21-day deadline to file a claim of appeal.

Again, I strongly emphasize that the quality of the City's water is high. The enclosed Order is intended to enable the City to reach the shared goal of the City and the MDEQ that the City achieve long-term self-reliance.

If you have any questions regarding this matter, please contact Mr. Eric J. Oswald, Director, Drinking Water and Municipal Assistance Division, at 517-284-6544; oswalde1@michigan.gov; or MDEQ, P.O. Box 30817, Lansing, Michigan 48909-8311; or you may contact me.

Sincerely,

C. Heidi Grether

C. Heidi Grether
Director
517-284-6700

Enclosure

cc/enc: Ms. Cathy Stepp, Regional Administrator, United States Environmental Protection Agency (USEPA), Region 5
Ms. Linda Holst, Acting Director, Water Division, USEPA, Region 5
Mr. Keith Creagh, Director, Michigan Department of Natural Resources
Mr. Richard Baird, Governor's Office
Mr. S. Peter Manning, Michigan Department of Attorney General
Mr. Aaron B. Keatley, Chief Deputy Director, MDEQ
Mr. Eric J. Oswald, MDEQ

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY

In the matter of:
City of Flint
1101 South Saginaw Street
Flint, Michigan 48502
_____/

DWMAD Order No. 399-09-2018

ORDER

This document results from findings by the Department of Environmental Quality (DEQ), Drinking Water and Municipal Assistance Division (DWMAD). The DEQ found that the city of Flint (City) located at 1101 South Saginaw Street, Flint, Michigan, is in violation of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), and the administrative rules promulgated thereunder, being 2009 ACS, R 325.10101 *et seq.* and Title XIV of the Public Health Service Act: Safety of Public Water Systems (Safe Drinking Water Act), Title 42 of the United States Code (USC), §300f *et seq.* (SDWA). The City is a supplier of water as defined under Act 399 and the SDWA through the City's ownership and operation of a Class D1 water treatment system and S1 water distribution system. The DEQ orders the City to resolve the violations set forth herein.

I. BACKGROUND

1.1 The SDWA establishes national primary drinking water regulations that apply to each public water system in each state.

1.2 Section 1420 of the SDWA establishes that a State must develop a program to ensure that all new community water systems demonstrate technical, managerial, and financial capacity to comply with all national primary drinking water regulations in effect on the date of commencement of operations and that a State shall develop and implement a strategy to assist public water systems in acquiring and maintaining technical, managerial, and financial capacity. 42 USC, §300g-9.

1.3 Section 1452(a)(3) of the SDWA provides:

> (A) In General - Except as provided in subparagraph (B), no assistance under this section shall be provided to a public water system that--
> (i) does not have the technical, managerial, and financial capability to ensure compliance with the requirements of this title; or
> (ii) is in significant noncompliance with any requirement of a national primary drinking water regulation or variance.
> (B) Restructuring - A public water system described in subparagraph (A) may receive assistance under this section if--
> (i) the use of the assistance will ensure compliance; and
> (ii) if subparagraph (A)(i) applies to the system, the owner or operator of the system agrees to undertake feasible and appropriate changes in operations (including ownership, management, accounting, rates, maintenance, consolidation, alternative water supply, or other procedures) if the State determines that the measures are necessary to ensure that the system has the technical, managerial, and financial capability to comply with the requirements of this title over the long term. 42 USC, §300j-12(a)(3).

1.4 The DEQ has been delegated primary responsibility for the implementation and enforcement of the public water system program in Michigan by the United States Environmental Protection Agency. The DEQ has regulatory power over public water supplies and suppliers of water under MCL 325.1003 and 42 USC, §300g-2.

1.5 Act 399 and its corresponding rules, along with the SDWA and its corresponding rules, are pertinent to providing safe and reliable public drinking water.

1.6 MCL 325.1003b and MCL 325.1004(2)(b) authorize the DEQ to conduct capacity assessments and determine if a water system has technical, financial, and managerial capacity to meet all the requirements of Act 399 and the SDWA.

1.7 MCL 325.1015(2) provides that the DEQ "may order the supplier of water to make alterations in the waterworks system or its method of operation as may be required or considered advisable by the department [DEQ] to ensure the public water supply is adequate, healthful, and in conformance with state drinking water standards."

1.8 Section 1431(a) of the SDWA provides that "the Administrator, upon receipt of information that a contaminant which is present in or is likely to enter a public water system or an underground source of drinking water may present an imminent and substantial endangerment to the health of persons, and that appropriate State and local

authorities have not acted to protect the health of such persons, may take such actions as he may deem necessary in order to protect the health of such persons." 42 USC, §300i(a).

1.9 Section 1419 of the SDWA requires States to implement a program for the certification of operators of community and nontransient noncommunity public water systems. 42 USC, §300g-8.

1.10 In accordance with R 325.10504 and R 325.11905, a Type I public water supply is required to obtain certified operators of treatment systems and distribution systems.

1.11 R 325.10504(c) provides that Type I public water supplies shall "Submit waterworks system operation reports and maintain records" and R 325.11111 provides "A public water supply shall maintain adequate records on the operation of the water distribution system, on the location and type of maintenance performed, and on the type of materials and appurtenances used."

1.12 Unless specifically waived by the DEQ, a Type I public water supply shall prepare, or cause to be prepared, an emergency response plan. Michigan Administrative Code (MAC), R 325.12302(1); 42 USC, §300i-2.

1.13 In accordance with R 325.11404(1), a water utility shall develop a comprehensive control program for the elimination and prevention of all cross connections. The plan for the program shall be submitted to the DEQ for review and approval. Public water supplies may use the Cross Connections Rules Manual prepared by the DEQ, Water Bureau, under R 325.10113 as guidance when developing a cross connection control program. When the plan is approved, the water utility shall implement the program for removal of all existing cross connections and prevention of all future cross connections.

1.14 This Order constitutes a final order of the DEQ pursuant to Michigan Compiled Laws (MCL) 325.1015(2), enforceable in accordance with MCL 325.1021, MCL 325.1022, 42 USC, §300g-3, and 42 USC, §300j-8. The City must achieve compliance with the aforementioned regulations in accordance with the requirements contained in Section III, Compliance Program, of this Order.

II. FINDINGS

2.1 On August 7, 2017, DWMAD staff conducted a sanitary survey of the City's drinking water system to evaluate the City water distribution, storage, pumping, and limited treatment systems with respect to Act 399 and the SDWA.

2.2 On August 11, 2017, the DWMAD issued a Significant Deficiency Violation Notice (SDVN) to the City, listing a summary of significant deficiencies, minor deficiencies, and recommendations applicable to the City's water system (Attachment A). The SDVN directed the City to either complete corrective action or be in compliance with a corrective action plan and schedule within 120 days.

2.3 The City failed to correct the significant deficiencies identified in the SDVN within 120 days and did not enter into a corrective action plan.

2.4 The City provided a written response to the SDVN on September 8, 2017 (Attachment B).

2.5 A follow-up letter dated March 21, 2018, was sent to the City by the DWMAD, summarizing corrective actions that had been completed and providing dates to complete other corrective actions (Attachment C).

2.6 **Correction of the significant deficiencies and deficiencies listed in the SDVN and March 21, 2018, letter is necessary to ensure the public water supply in Flint is adequate, healthful, and in compliance with state and federal drinking water standards, to prevent contaminants from entering the water supply, and to prevent imminent and substantial endangerment of public health.**

III. COMPLIANCE PROGRAM

IT IS, THEREFORE, ORDERED THAT the City shall undertake the following actions to ensure that Flint's water system can provide safe drinking water to the public on a long-term, sustainable basis:

3.1 The City shall, not later than **December 31, 2018**, select and approve one of the cross connection control model programs from the DEQ's Cross Connection Rules Manual and submit the approved model to the DEQ for review and approval.

3.2 If the City does not get a cross connection control program approved as required in paragraph 3.1, the City shall, not later than **December 31, 2018**, submit to the DEQ an updated list of water accounts classified as high hazard, low hazard, and other, and a schedule for conducting inspections at those accounts.

3.3 If the City does not get a cross connection control program approved as required in paragraph 3.1, the City shall, not later than **June 30, 2019**, conduct and document at least 100 cross connection inspections required in 2019 at high-hazard accounts and at least 100 cross connection inspections required in 2019 at low-hazard accounts.

3.4 The City shall, within **five days** of entry of this Order, submit a time line indicating when it will approve of those Standard Operating Procedures submitted by the Arcadis Group on June 4, 2018, that the City has not already approved as of the date this Order is entered.

3.5 The City provided a July 25, 2018, Technical, Management, and Financial Capacity proposal in which it explains its plan to achieve its technical, managerial, and financial (TMF) capacity by fiscal year (FY) 2023 (Attachment D). The City acknowledges that the revenue generated by the City's Water Department is not sufficient to support the operating costs of the City's water system but does not believe it would be politically or financially possible to increase customer rates until several years from now. So the proposal describes several steps the City plans to take leading up to FY 2023 to achieve TMF capacity without raising customer rates. **Beginning on the date this Order is effective, and every six months thereafter until the City achieves TMF capacity**, the City shall provide a signed certification to the DEQ that demonstrates the City's progress towards completing its plan to achieve TMF capacity (Certified Progress Report). **Beginning on the date 12 months from the date this Order is effective, and every 12 months thereafter**, the City's Certified Progress Report must include an evaluation showing that the City can still achieve TMF capacity by FY 2023 without increasing customer rates.

3.6 **By no later than March 31, 2019**, the City shall complete a preliminary inspection of the Cedar Street Reservoir using a remotely operated vehicle (which does not require taking the reservoir out of service) or, preferably, a method by which the City can inspect one chamber of the reservoir at a time without taking the reservoir completely out of service. The City shall then submit to the DEQ, for review and approval, an inspection report and plan for promptly completing any necessary improvements of the Cedar Street Reservoir identified by the preliminary inspection. The City shall then complete a full inspection of the Cedar Street Reservoir **within 45 days of the date the Dort Reservoir is brought into service**. The City shall then submit to the DEQ, for review and approval, an inspection report and plan for completing any necessary improvements of the Cedar Street Reservoir identified by the full inspection.

3.7 On October 15, 2018, the City produced an updated organizational chart for its Utilities Water Division (Attachment E). **Within 30 days of the effective date of this Order**, the City shall produce a plan that (1) identifies which position is filled by which specific F&V contractor; (2) specifically identifies how many vacant spots remain for each position, if any;(3) a schedule for filling each open spot that requires all spots to be filled no later than **December 31, 2018;** and (4) a written commitment that the City's contractor who serves as the operator in charge of the City's water plant is fully authorized to direct city employees not employed by that contractor to make any changes to plant operations required by the contractor.

3.8 The City shall complete and submit the design of chemical feed system improvements by no later than **March 31, 2019**, for DEQ review and approval and complete construction of the chemical feed system improvements by no later than **December 31, 2019**.

3.9 By no later than **December 31, 2018**, the City shall purchase a generator that is compatible with the Cedar Street Reservoir's electrical system or execute a contract for emergency services at that reservoir that will guarantee the provision of a generator that is compatible with the reservoir's electrical system. The DEQ recognizes that if the City successfully implements its redundancy plan involving the Dort Reservoir and Genesee County, the requirement in this paragraph will likely not be necessary. But the DEQ

remains concerned about the potential impact a significant emergency would have on the City's water system in the interim period before the City's redundancy plan is implemented. The City has acknowledged the risk during the interim period but has declined to mitigate that risk because it considers mitigating the risk to be too expensive.

3.10 By no later than **December 31, 2018**, the City shall install pumps at Torrey Road and complete design of upgrades to the Cedar Street Reservoir pumps for DEQ review and approval. Upgrades to the Cedar Street Reservoir pumps shall be completed by **March 31, 2020**.

3.11 By no later than **December 31, 2018**, the City shall produce a plan explaining how it will have the TMF capacity necessary to consistently operate its water system once the State-funded contracts for technical assistance (John Young) and training assistance (Nick Pizzi) expire. Also by that date, the City shall submit a detailed plan containing an implementation schedule for the items listed in the plan previously provided to the City by Arcadis Group in the June 4, 2018, Flint Drinking Water Distribution System Optimization Plan.

3.12 The City shall submit all reports, work plans, specifications, schedules, or any other writing required by this section to the DWMAD Director at DEQ, DWMAD, P.O. Box 30817, Lansing, Michigan 48909-8311. The cover letter with each submittal shall identify the specific paragraph and requirement of this Order that the submittal is intended to satisfy.

IV. DEQ APPROVAL OF SUBMITTALS

4.1 For any work plan, proposal, or other document, excluding applications for permits or licenses, that are required by this Order to be submitted to the DEQ by the City for DEQ review and approval, the following process and terms of approval shall apply.

4.2 All work plans, proposals, and other documents required to be submitted by this Order shall include all of the information required by the applicable statute and/or rule and all of the information required by the applicable paragraph(s) of this Order.

4.3 In the event the DEQ disapproves a work plan, proposal, or other document, it will notify the City, in writing, specifying the reasons for such disapproval. The City shall submit, within 30 days of the date of such disapproval, a revised work plan, proposal, or other document that adequately addresses the reasons for the DEQ's disapproval. If the revised work plan, proposal, or other document is still not acceptable to the DEQ, the DEQ will notify the City of this disapproval.

4.4 In the event the DEQ approves with specific modifications, a work plan, proposal, or other document, it will notify the City, in writing, specifying the modifications required to be made to such work plan, proposal, or other document prior to its implementation and the specific reasons for such modifications. The DEQ may require the City to submit, prior to implementation and within 30 days of the date of such approval with specific modifications, a revised work plan, proposal, or other document that adequately addresses such modifications. If the revised work plan, proposal, or other document is still not acceptable to the DEQ, the DEQ will notify the City of this disapproval.

4.5 Upon DEQ approval, or approval with modifications, of a work plan, proposal, or other document, such work plan, proposal, or other document shall be incorporated by reference into this Order and shall be enforceable in accordance with the provisions of this Order.

4.6 Failure by the City to submit an approvable work plan, proposal, or other document within the applicable time periods specified above, constitutes a violation of this Order and shall subject the City to the enforcement provisions of this Order.

4.7 Any delays caused by the City's failure to submit an approvable work plan, proposal, or other document when due shall in no way affect or alter the City's responsibility to comply with any other deadline(s) specified in this Order.

4.8 No informal advice, guidance, suggestions, or comments by the DEQ regarding reports, work plans, plans, specifications, schedules, or any other writing submitted by the City will be construed as relieving the City of its obligation to obtain written approval, if and when required by this Order.

V. EXTENSIONS

5.1 The City and the DEQ agree that the DEQ may grant the City a reasonable extension of the specified deadlines set forth in this Order. Any extension shall be preceded by a written request to the DWMAD Director at the address in paragraph 3.12 no later than ten (10) business days prior to the pertinent deadline, and shall include:

a. Identification of the specific deadline(s) of this Order that will not be met.
b. A detailed description of the circumstances that will prevent the City from meeting the deadline(s).
c. A description of the measures the City has taken and/or intends to take to meet the required deadline(s).
d. The length of the extension requested and the specific date on which the obligation will be met.

The DWMAD Director shall respond in writing to such requests. No change or modification to this Order shall be valid unless in writing from the DEQ and, if applicable, signed by both Parties.

VI. REPORTING

6.1 The City shall verbally report any violation(s) of the terms and conditions of this Order to the DWMAD Director by no later than the close of the next business day following detection of such violation(s) and shall send a written report to the DWMAD Director within five (5) business days following detection of such violation(s). The written report shall include a detailed description of the violation(s), as well as a description of any actions proposed or taken to correct the violation(s). The City shall report any anticipated violation(s) of this Order to the DWMAD Director in advance of the relevant deadlines whenever possible.

VII. RETENTION OF RECORDS

7.1 Upon request by an authorized representative of the DEQ, the City shall make available to the DEQ all records, plans, logs, and other documents required to be maintained

under this Order or pursuant to Act 399, the SDWA, or their respective rules. All such documents shall be retained by the City for at least a period of three (3) years from the date of generation of the record unless a longer period of record retention is required by Act 399, the SDWA, or their respective rules.

VIII. RIGHT OF ENTRY

8.1 The City shall allow any authorized representative or contractor of the DEQ, upon presentation of proper credentials, to enter upon the premises of the facility at all reasonable times for the purpose of monitoring compliance with the provisions of this Order. This paragraph in no way limits the authority of the DEQ to conduct tests and inspections pursuant to the SDWA or any other applicable statutory provision.

IX. ENFORCEMENT

9.1 This Order is enforceable under both the criminal provisions of MCL 325.1021 and the civil provisions of MCL 325.1022.

X. GENERAL PROVISIONS

10.1 This Order in no way affects the City's responsibility to comply with any other applicable local, state, or federal laws or regulations.

10.2 Nothing in this Order is or shall be considered to affect any liability the City may have for natural resource damages caused by the City's ownership and/or operation of the facility. The State of Michigan does not waive any rights to bring an appropriate action to recover such damages to the natural resources.

10.3 In the event the City sells or transfers the facility, it shall advise any purchaser or transferee of the existence of this Order in connection with such sale or transfer and condition the sale or transfer of the facility on the agreement of the purchaser or transferee to comply with this Order. Within 30 calendar days, the City shall also notify the DWMAD Director, in writing, of such sale or transfer, the identity and address of any purchaser or transferee, and confirm the fact that notice of this Order has been given to

the purchaser and/or transferee. The purchaser and/or transferee of this Order must agree, in writing, to assume all of the obligations of this Order. A copy of that agreement shall be forwarded to the DWMAD Director within 30 days of assuming the obligations of this Order.

10.4 This Order does not resolve any criminal action that may result from the violations identified in this Order.

XI. TERMINATION

11.1 This Order shall remain in full force and effect until terminated by a written Termination Notice (TN) issued by the DEQ. Prior to issuance of a written TN, the City shall submit a request consisting of a written certification that the City has fully complied with the requirements of this Order. Specifically, this certification shall include:

a. The date of compliance with each provision of the compliance program in Section III and the date any fines or penalties were paid.
b. A statement that all required information has been reported to the DWMAD Director.
c. Confirmation that all records required to be maintained pursuant to this Order are being maintained at the facility.

The DEQ may request additional relevant information after receiving the City's certification and request but before issuing a TN.

{Remainder of page intentionally left blank}

This ORDER is hereby issued against the city of Flint under MCL 325.1015(2).

C. Heidi Grether

By: C. Heidi Grether, Director
Michigan Department of Environmental Quality

10.22.18

Date

APPROVED AS TO FORM:

Nate Gambill

By: Nathan Gambill (P75506)
Assistant Attorney General
Environment, Natural Resources, and
Agriculture Division
Department of Attorney General
P.O. Box 30755
Lansing, Michigan 48909

October 22, 2018

Date

Attachment A

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
SAGINAW BAY DISTRICT OFFICE

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

August 11, 2017

SIGNIFICANT DEFICIENCY VIOLATION NOTICE

Mr. Sylvester Jones, Administrator
City of Flint
1101 South Saginaw Street
Flint, Michigan 48502

Dear Mr. Jones:

SUBJECT: Water System Sanitary Survey, WSSN: 2310
Significant Deficiency Violation Notice

The Department of Environmental Quality (DEQ) has completed a sanitary survey of the city of Flint (City) drinking water system. The purpose of the survey is to evaluate the water system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399). In addition, the enclosed sanitary survey form was updated to gather information on the City water distribution, storage, pumping, and limited treatment systems. The sanitary survey does not include an evaluation of the water filtration plant. A complete engineering evaluation of the water filtration plant was recently completed by CDM Smith and others, and would form the basis of any future recommendations if the City elects to operate the water filtration plant.

The following table summarizes our findings from our survey of the water system:

Survey Element	Findings
Source	**Significant Deficiencies noted**
Treatment	Recommendations made
Distribution System	**Significant Deficiencies noted**
Finished Water Storage	**Deficiencies noted**
Pumps	Recommendations made
Monitoring & Reporting	Recommendations made
Management & Operations	**Significant Deficiencies noted**
Operator Compliance	**Deficiencies noted**
Security	**Deficiencies noted**
Financial	**Significant Deficiencies noted**
Other	---

A summary of the significant deficiencies, minor deficiencies, and recommendations applicable to your water system is enclosed for your information.

Our investigation is considered complete. This significant deficiency begins as of the date of receipt of this letter and will continue until you complete corrective action. **You must complete corrective action within 120 days of receipt of this letter or be in compliance with a corrective action plan and schedule approved by this office. You are directed to contact us within 30 days of receipt of this letter to discuss appropriate corrective action.** You must also notify us in writing within 30 days of correcting the significant deficiency.

If you have any factual information you would like us to consider regarding the significant deficiencies identified in this Significant Deficiency Violation Notice please provide it in a written response by September 8, 2017.

If you have any questions or wish to discuss the sanitary survey or Significant Deficiency Violation Notice, please contact me at the phone number listed below or by email to londonr@michigan.gov.

Sincerely,

Robert A London

Robert A. London, P.E.
Surface Water Treatment Engineer
Engineering Unit
Drinking Water and Municipal Assistance Division
989-450-7834

bl/snh
Enclosures
cc/enc: Mr. Robert Jones, F&V Operations
Mr. Mark Adas, City of Flint
Mr. Rob Bincsik, City of Flint
cc: Mr. Eric Oswald, DEQ
Ms. Sue Maul, DEQ

Community Water Supply Section
Engineering Unit
Phone: 989-450-7834
Fax: 989-891-9213

WSSN: 02310

Drinking Water and Municipal Assistance Division

Water System Sanitary Survey

City of Flint Water System

(Distribution System, Limited Treatment, Storage, and Pumping)

August 7, 2017

Sanitary Survey of Community Water Supply - Review Summary

Water Supply: City of Flint — WSSN: 02310
County: Genesee — District: 92
Evaluator: Bob London — Date: 8/7/2017

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source							X
Construction & Maintenance	*No long-term decision on primary/backup sources*						X
Standby Power	*Appropriate level of standby power is dependent on source selection*				X		
Isolation	*No concerns with current GLWA or potential KWA/GCDC sources*			X			
Source Water Protection	*No formal source water protection program, but no concerns*			X			
Capacity	*Lack of decision on source affects planning, finances,staffing, etc.*						X
Treatment	*Survey does not include filtration facilities (use is to be determined)*				X		
Disinfection	*Permanent facilities and Improved SCADA if GLWA water used*				X		
Fluoride		X					
Phosphate Addition	*Permanent facilities and improved SCADA if GLWA water used*				X		
Softening		X					
Iron/Manganese Removal		X					
Arsenic Removal		X					
Pretreatment		X					
Filtration (gravity or membranes)		X					
C*T		X					
Other	*Permanent facilities and Improved SCADA if GLWA water used*				X		
Distribution System							X
Interconnections w/ Other WS	*A mutual aid agreement is recommended with nearby utilities*				X		
Hydrants & Valves	*Recent efforts very good, but formal long-term program needed*						X
Service Lines & Metering	*Programs for meter and galvanized service replacement are needed*						X
General Plan	*Prepared through State contract - City needs to assume responsibility*				X		
Cross Connections	*No inspections conducted, inadequate administration*						X
Construction & Maintenance	*Age of system, water accountability, number of breaks*						X
Capacity	*Water age is a concern due to oversized mains/reduced demands*				X		
Finished Water Storage	*Does not include Dort Reservoir and CWI#4 (use is to be determined)*					X	
Construction & Maintenance	*Cedar St. needs Inspection, West Side off line due to condition*					X	
Controls				X			
Capacity	*Backup Power rec. at Cedar Street; Arcadis evaluating volumes*				X		
Pumps (All Pumping Facilities)	*Does not include pumps at water plant site (use is to be determined)*				X		
Construction & Maintenance	*Torrey Road pump upgrade has been delayed*				X		
Controls	*Electrical gear/control upgrades recommended/VFDs recommended*				X		
Capacity				X			
Monitoring & Reporting					X		
Bacteriological Monitoring				X			
Chemical Monitoring	*Completed with State assistance - City needs to assume responibility*				X		
MOR or Annual Pumpage Repor				X			
Consumer Confidence Report	*Prepared with State assistance - City needs to assume responibility*				X		
Analytical Capabilities				X			
System Management & Operation							X
Owner Responsibility	*Lack of decision on source affects planning, finances,staffing, etc.*						X
Capacity Development	*Concerns with long-term source, budget, staffing/cert., plans/studies*					X	
Reliability Study	*Prepared with State assistance - City needs to assume responibility*				X		
Operations Oversight	*Treatment - contract w/F&V Operation; Distribution - In-house staff*				X		
Permits				X			
Operator Compliance						X	
Operator Certification	*Difficulty hiring/retaining certified operators*					X	
Technical Knowledge & Training	*Training*				X		
Security						X	
Emergency Response Plan	*Status of ERP is unknown*					X	
Site Security (Fences, Alarms...)				X			
Financial							X
Rates	*Raftelis Study predicts a revenue vs. expenses gap*				X		
Budget & Capital Imp. Plan	*Lack of decsion on source affects budget, planning, financing*						X
Other							

N/A - Not Applicable
NotEv - Not Evaluated
NoD/R - No Deficiencies/Recommendations Made
Rec - Recommendations Made
Def - Deficiencies Identified
SigDef - Significant Deficiencies Identified

WATER SYSTEM SANITARY SURVEY

GENERAL

Basic Information

WSSN:	02310	Supply:	City of Flint	County:	Genesee
Date:	8/7/2017	Reviewed by:	Bob London	District:	RAL/North

Primary Contact:	Sylvester Jones	Copy To:	Mark Adas
SDWIS Role:	AC, FC	SDWIS Role:	
Title:	City Administrator	Title:	City Engineer
Telephone:	810-766-7346 x 2025	Telephone	
Cell Phone:		Cell Phone:	810-610-7771
Fax:		Fax:	
e-mail:	sjones@cityofflint.com	e-mail:	madas@cityofflint.com
Address:	1101 S. Saginaw Street	Address:	1101 S. Saginaw Street
	Flint, MI 48502		Flint, MI 48502

Population:	98,310	Year:	2015	Basis:	Census update

Operator Training and Certification - Treatment

Treatment Capacity:	18 MGD			
Treatment Classification:	D-1	Certification	Op. #	Exp. Date
Operator in Charge:	Robert Jones (F&V Operations)	D-1, F-2, S-1	5026	7/15/2018
Backup Operators:	Catherine Garnham (F&V)	F-1, S-1	5194	7/15/2019
	Stewart Beach (F&V)	F-1, S-1	2273	1/15/2019
Operations Supervisor:	Vacant			
Operations Foreman (4):	Scott Dungee	F-3, S-4	5550	7/15/2019
	Chris Wilcox	F-4	18586	1/15/2018
	Dominic Smoot	D-3	20034	1/15/2020
	Vacant			
Operator/Maintainer (4):	Scott Ball	F-4	18394	1/15/2018
	Jeff Maksymowski	None	20033	
	Josh Pickett	None		
	Robert Stinson	None		
Maintenance Supv. (2):	Mike Beckley	F-4, S-4	13782	7/15/2018
	Chris Koryciak	F-4, S-4	4653	1/15/2020
Maintainer/Operator (2):	Vacant			
	Vacant			
Instrument Technician:	Vacant			
Lab Supervisor:	Will Bradley	F-3	11941	7/15/2017
Lab Technicians:	Heather Kot	D-4	20031	1/15/2020
	Vacant			

Do the operators receive adequate technical training? Yes
If not, explain:

Comments on Training and Certification:
The City entered into a contractual agreement with Fleis and Vandenbrink Operations (F&V) for Operator-In-Charge and Certified Backup Operator services for the treatment system on June 22, 2017. F&V is responsible for providing training and certification of contract operations staff.

The City is investigating a contract service agreeement with Hach for analytical equipment maintenance due to the vacant Instrument Techncian position. The instrument technician at the wastewater plant may also be available to provide limited assistance.

The State of Michigan has entered into several agreements for training and technical assistance for City of Flint personnel, and has provided training on several occasions at the water treatment plant for City personnel. A comprehensive list of training is contained in Appendix A. The City is responsible for providing adequate training in the future to maintain a competent and properly-certified staff.

WATER SYSTEM SANITARY SURVEY

GENERAL

Operator Training and Certification - Distribution

Distribution Classification:	S-1	Certification	Op. #	Exp. Date
Operator In Charge:	Robert Bincsik	F-4, S-1	13784	1/15/2020
Backup Operator:				
Water Dist. Formen:	Howard Swickard	S-2	5091	1/15/2019
	Paul Simpson	S-2	4849	1/15/2018
	Jeff Church	S-3	12559	4/15/2020
	Curtis Brooks	None		
Senior Water Dist. Operators:	Jason Bradley	None		
	Dave Hurt	None	17277	
	Rich Johnson	None		
	Jeremy Keefer	None	16060	
	Chris Kennedy	None		
	Phil Kuczera	None		
	Brandon McNiel	None		
	Jon Mochty	None		
	Mark Pavwoski	None	13288	
	Keith Ross	None		
	Juan Sattiewhite	None		
	Don Thompson	None		
	Dan Wells	None	18922	
Water Dist. Operators:	Clarence Scott	None		
	Greg Sumner	None		
	Fabian Villareal	None		
	Nancy Prieur	None		
	Lester Muma	None	14567	
Water Dist. Op. Trainee:	Marc Arter	None		
	Jason Gutierrez	None		
	Ben Gutierrez	None	4366	
	Mark May	None		
	Vacant (8 positions)			

Do the operators receive adequate technical training? Yes

If not, explain:

Comments on Training and Certification:

The State of Michigan has entered into several agreements for training and technical assistance for City of Flint personnel, and has provided training on several occasions at the water treatment plant for City personnel. A comprehensive list of training is contained in Appendix A. The City is responsible for providing adequate training in the future to maintain a competent and properly-certified staff.

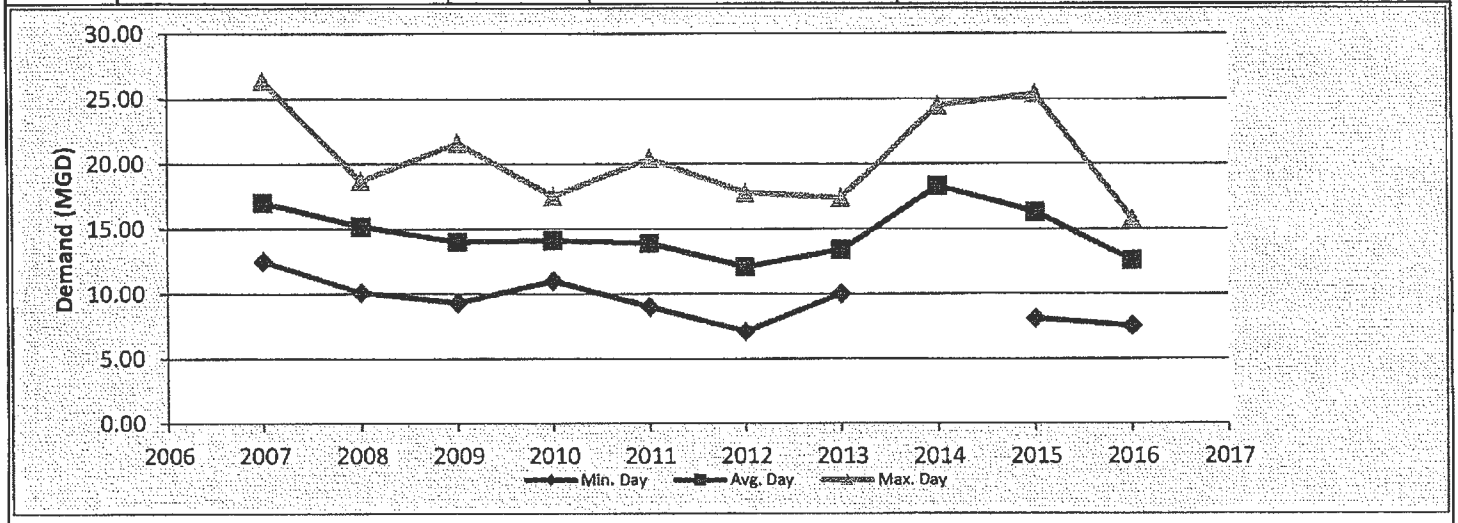
Ownership

Ownership:	City
Consent Agreement:	NA
Escrow Account:	NA
Annual Fee:	Active
Comments:	

SOURCE

Capacity

Year	Demand (MGD) Max. Day	Date	Avg. Day	Min. Day	Date	Max/Avg	Population History	G/C/D	% unacct.H_2O
2007	26.4		17.0	12.50		1.55			
2008	18.7		15.2	10.10		1.23			
2009	21.6		14.0	9.30		1.54			
2010	17.5		14.1	11.00		1.24			43%
2011	20.4		13.9	9.00		1.47			39%
2012	17.8		12.1	7.10		1.47			40%
2013	17.4		13.4	10.00		1.30			50%
2014	24.5		18.3			Data from 2014/2015 includes WTP operation. Do not use for capacity determination.			
2015	25.4		16.3	8.10					
2016	15.8		12.6	7.54		1.25			



Five Year Max. Day	17.8	(Excludes 2014 and 2015, which reflects WTP operation)
Ten year Max. Day	26.4	
Five Year Avg. Day	12.7	(Excludes 2014 and 2015, which reflects WTP operation)
Max Day for capacity requirements:	18.0	(Based on original raw water contract with KWA and anticipated reduction in lost water from DWRF project)

Purchase Contract

Principal Parties of Contract: GLWA, City of Flint

Date of Contract: 10/16/2015

Expiration Date: 9 months from execution, but extendable based on circumstances
The contract was officially extended July 11, 2016

Annual Volume Available by Contract:	593,000	Mcf (= 4.436 Bgal)
Maximum Day Available by Contract:	21.4	MGD
Maximum Hour Available by Contract:	22.4	MGD measured over one hour
Maximum Delivery Pressure Cited in Contract:	60	PSI
Minimum Delivery Pressure Cited in Contract:	40	PSI

Comments on the Purchase Contract:
A short-term agreement was reached with the Great Lakes Water Authority (GLWA) in 2015 to allow the City of Flint to discontinue routine use of its water treatment plant. The agreement with GLWA was based on the previous agreement with the Detroit Water and Sewerage Department (DWSD). The agreement was set to expire within 9 months of execution, but included provisions to extend it as necessary based on local circumstances. A 30-year purchase agreement was proposed by GLWA, but Flint City Council has not approved it as of the date of this survey. The City was required to approve the proposed agreement or propose a reasonable alternative that was protective of public health by June 26, 2017, and failed to do so. The DEQ has determined that the City's failure to act presents an immediate threat to public health. The City does not have a secure, long-term source agreement at this time.

STORAGE

Ground Level Storage - Construction, Controls & Maintenance

Identification	Dort Reservoir	Clearwell No. 4
Location	Water Treatment Plant	Water Treatment Plant
Function	Finished Water Storage (currently off line but is intended for routine use)	High Service Pump Suction
Type	Concrete, 2-cell	Concrete
Nominal Volume (Gallons)	20,000,000	3,000,000
Calculated Usable Volume (Gallons)		
Date Constructed	1952	1954
Date Inspected		
Buried/At Grade	At grade	Buried
Floor Slab, Elevation		
Floor Relief Valves-Float Prevention (Y/N)		
Sump Area (Y/N)		
Floor Slopes to Sump (Y/N)		
Sump Floor Elevation		
Sump Dimensions		
Date Painted/Coated Inside		
Paint/Coating System		
NSF Std 61 Compliant (Y/N)		
Cathodic Protection		
Leaks (Y/N)		
Reservoir Isolation Valve		
Basin Drain (Hydrant/Pumps)		
High Alarm		
Low Alarm		
Alarm Type		
Normal High Water Level		
Normal Low Water level		
Range of Operation		
Chart recorder		
Telemetering System	Wireless/SCADA	Wireless/SCADA
Vents Screened		
Overflow Screened		
Access Hatches Locked		
Hatches Watertight and Overlap		
Overflow Splash Pad		
Site Fenced/Locked	Locked - at WTP	Locked - at WTP
Usable Storage	0	0

Comments on Ground Level Storage: At present, and as GLWA water is currently being received, the City is not capable of using the Dort Reservoir or Clearwell No. 4. A thorough inspection, and completion of any necessary maintenance/repairs, would be necessary before returning these reservoirs to service.

STORAGE

Ground Level Storage - Construction, Controls & Maintenance

Identification	Cedar Street Reservoir	West Side Reservoir
Location	Cedar St./Fenton Rd.	Dupont St./Jean Ave.
Function	Distribution Storage	Distribution Storage
Type	Concrete, 2-cell	Concrete, 2-cell
Nominal Volume (Gallons)	20,000,000	12,000,000
Calculated Usable Volume (Gallons)	14,000,000	0 (off line at this time)
Date Constructed	1948	1970
Date Inspected	~2000	2017
Buried/At Grade	At grade	At grade
Floor Slab, Elevation		
Floor Relief Valves-Float Prevention (Y/N)		
Sump Area (Y/N)		
Floor Slopes to Sump (Y/N)		
Sump Floor Elevation		
Sump Dimensions		
Date Painted/Coated Inside	N/A (concrete)	N/A (concrete)
Paint/Coating System	---	---
NSF Std 61 Compliant (Y/N)	---	---
Cathodic Protection	No	No
Leaks (Y/N)	No	Yes
Reservoir Isolation Valve	Yes	Yes
Basin Drain (Hydrant/Pumps)		
High Alarm	Yes	Yes
Low Alarm	Yes	Yes
Alarm Type	Noted on SCADA	Noted on SCADA
Normal High Water Level	20'	
Normal Low Water level	6'/16' (summer/winter)	
Range of Operation	Depends on season	Depends on season
Chart recorder	SCADA at WTP	SCADA at WTP
Telemetering System	Wireless/SCADA	Wireless/SCADA
Vents Screened	Yes	Yes
Overflow Screened		Yes
Access Hatches Locked		Yes
Hatches Watertight and Overlap	Yes	
Overflow Splash Pad	Storm drain w/air gap	Storm drain w/air gap
Site Fenced/Locked	Yes	Yes
Usable Storage	14,000,000	0

Comments on Ground Level Storage:
The West Side Reservoir (WSR) was inspected in 2017. The reservoir was shut down several months ago due to a leaking link seal/coupling through the wall on the influent line. The inspection report recommends approximately $90,000 of miscellaneous repairs such as brick work and tuck pointing, repainting of pipes and metal surfaces, replacement of downspouts, replacement of the influent line link seal, etc., to prevent the reservoir from deteriorating. There were no other major structural or sanitary concerns. The Arcadis Group will be providing a recommendation on the long-term need for the WSR. Until that recommendation is received, the City will not make a decision on whether to proceed with the repairs. The City has experienced a significant drop in the number of water main breaks since the West Side Reservoir was removed from service. Several sources have recommended that Soft Starts or VFDs be installed on the West Side booster pumps to reduce or eliminate pressure spikes within the distribution system, which may be related to main breaks.

STORAGE

Elevated Storage - Construction, Controls & Maintenance	
Location	WTP (elevated)
SDWIS Facility ID (Site Code)	
Volume	2,000,000
Type	Elevated, multi-leg
Material	Steel
O.F. Elevation	
Date Constructed	1952
Date Inspected	2009
Date Painted Inside	2009
Paint System	
NSF Std 61 Compliant (Y/N)	Yes
Date Painted Outside	
Cathodic Protection	Yes
Tank Isolation Valve	Yes
Tank Drain (Hydrant)	Yes
Altitude Valve	Yes
Mud Valve	Yes
High Alarm	Yes
Low Alarm	Yes
Alarms Received By	Operations center
Total Head Range (Feet)	
Normal High Water Level	
Normal Low Water level	
Normal/Average Pressure	74
Data Recording System	SCADA
Control Signal Type	Wireless/SCADA
Auxiliary Power for Controls?	
Control System Adequate?	Yes
Vents Screened	
Overflow Screened	
Access Hatches Locked	
Expansion Collar Lubricated	
Mixing System	None
Overflow Splash Pad	
Adequate Security?	Yes - at WTP
Operator Visit Frequency	Daily - at WTP
Comments:	

Total Usable Storage Capacity - Ground + Elevated)			
Usable Storage	2,000,000		
Total Usable Storage (gal)	16,000,000	16.0	Mgal
Total Usable Storage/Max Day	61%		
Total Usable Storage/Avg. Day	126%		
Comments:			

Pumping

Pumping Stations - Construction, Controls & Maintenance						
Location:	Pump Station 4 (Water Treatment Plant)					
Function:	Pumping water from the Dort Reservoir and the 3 MG reservoir to the Distribution System					
Pump Number	1	2	7	8	9	
Year Installed						
Type	Horiz. Cent.	Horiz. Cent.	Horiz. Cent.	Horiz. Cent.	Horiz. Cent.	
Current Capacity (MGD)	0	0	20	20	6	
Current Capacity (GPM)	0	0				
Basis	Inoperable	Inoperable				
Current TDH (FT)						
HP	800	1000	800	800		
Original Name Plate GPM						
Corresponding MGD						
Original Name Plate TDH (FT)						
Pump NPSH (FT)						
Centerline of Pump Intake Elev.						
Floor Elevation						
Electrical Controls Elevation						
Pumps/Motors Subject to Flood?						
Pump Efficiency						
Motor Efficiency						
Min. Reservoir WL						
Cavitation Problems (Y/N)						
VFDs (Y/N)						
Maintenance History	Refer to next page for maintenance history of pumps and motors					

Comments on Booster Pumping:
A number of improvements would be required if the water plant is returned to operation or if the City elects to routinely use the Dort Reservoir. The improvements are included in the CDM Smith Engineering Report on the Water Treatment Plant.

AUXILIARY POWER

Power Type	Dual primary feeds with auto-transfer		
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)			mgd
Firm Pump Capacity (gpm)			mgd
Auxiliary Power Capacity (gpm)			mgd
Max Day Demand @ this location			mgd
Peak Hour @ this location			gpm (Hydropneumatic Stations)
Avg Day Demand @ this location			mgd
Firm Pump Capacity/Max Day			%
Peak Hour/Firm Pumping Capacity			% (Hydropneumatic Stations)
Aux. Power Capacity/Avg Day			%

Comments:
Dual primary electrical feeds are not truly independent. If routine use of Control Station 4 is desired, on-site auxiliary power is recommended.

Pumping

Pumping Stations - Construction, Controls & Maintenance				
Location:	Pump Station 4 (Water Treatment Plant)			
Function:	Pumping water from the Dort Reservoir and the 3 MG reservoir to the Distribution System			
Pump Station 4 Pump 1	Pump Station 4 Pump 2	Pump Station 4 Pump 7	Pump Station 4 Pump 8	Pump Station 4 Pump 9

Pumping

Pumping Stations - Construction, Controls & Maintenance						
Location:	Cedar Street Reservoir					
Function:	Pump from the Cedar Street Reservoir to supply the south and west areas of the City					
Pump Number	1	2	3			
Year Installed	1948	1948	1948			
Type	Horiz. Cent.	Horiz. Cent.	Horiz. Cent.			
Current Capacity (MGD)						
Current Capacity (GPM)	12	9	9			
Basis						
Current TDH (FT)	160'	160'	160'			
HP	500	350	350			
Original Name Plate GPM						
Corresponding MGD						
Original Name Plate TDH (FT)						
Pump NPSH (FT)						
Centerline of Pump Intake Elev.						
Floor Elevation						
Electrical Controls Elevation						
Pumps/Motors Subject to Flood?	No	No	No			
Pump Efficiency						
Motor Efficiency						
Min. Reservoir WL						
Cavitation Problems (Y/N)						
VFDs (Y/N)	No	No	No			
Maintenance History	Refer to next page for maintenance history of pumps and motors					

Comments on Booster Pumping:
Some electrical components are from the 1940's and an upgrade is needed. SCADA improvements and switchgear replacement were recently completed. A permit was issued in 2012 to upgrade the pumping station to accept a portable generator feed, but the work was not completed. The pumps are controlled remotely from the Operations Center at the water plant. Filling and emptying the Cedar Street and West Side Reservoirs is controlled by Operations staff to manage flow patterns, pressures, chlorine residuals, and water age.

AUXILIARY POWER

Power Type	None		
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	
Total Pump Capacity (gpm)			mgd
Firm Pump Capacity (gpm)			mgd
Auxiliary Power Capacity (gpm)			mgd
Max Day Demand @ this location			mgd
Peak Hour @ this location			gpm (Hydropneumatic Stations)
Avg Day Demand @ this location			mgd
Firm Pump Capacity/Max Day			%
Peak Hour/Firm Pumping Capacity			% (Hydropneumatic Stations)
Aux. Power Capacity/Avg Day			%

Comments:
In case of interruption of the GLWA supply, the Cedar Street Reservoir and booster pumping station is currently the primary source of water. Auxiliary power or, as a minimum, portable generator compatibility is strongly recommended.

Pumping

Pumping Stations - Construction, Controls & Maintenance	
Location:	Cedar Street Reservoir
Function:	Pump from the Cedar Street Reservoir to supply the south and west areas of the City

Pumps and motors are on a routine Preventive Maintenance (PM) schedule consisting of visual inspection, checking oil levels, and greasing bearings and fittings. On an as-needed basis, oil is changed, packing is adjusted, bearings are replaced, etc. Recent, non-routine work is shown below:

Cedar Street Station Pump 1	Cedar Street Station Pump 2	Cedar Street Station Pump 3
10/30/13 - installed new pump bearings and packing, rebalanced impeller	**2/1/10** - rebuilt motor	
12/5/16 - serviced discharge valve control cylinder	**1/26/16** - uncoupled pump and motor for motor testing	
	11/16/16 - tested switchgear and recoupled pump and motor	
	12/5/16 - serviced discharge valve control cylinder, placed pump back in service	

TREATMENT

Disinfection (sodium hypochlorite addition)

Point of Treatment		Cedar St. Booster Sta.		
Injection Point:		Reservoir inlet line		
[redacted]				
Purpose:		See comments		
Year Initiated		2016		
Product:		Havasan LB-12		
Manufacturer:		Haviland		
Chemical Strength:		14-15% (12.5% nominal)		
Dilution:		N/A		
ANSI/NSF Standard 60 Approval? (Y/N)		Yes	NSF max dose:	84 mg/L
Normal Feed Rate/Dosage		See comments	mg/L	
Avg Residual (Plant Tap) (mg/L)	free:	1.5	(goal)	
Avg Distribution Residual (mg/L)	free:			
Frequency of Residual testing	Plant Tap:	Continuous	Distribution:	Weekly
Analytical Method Used		Hach CL-17 (DPD)		
Any Overfeed Instances? (Y/N)		No	Date(s):	
Any Low Feed Instances? (Y/N)		No	Date(s):	
Pump Type:		Diaphragm	Model:	LMI C721-71FS
Number of Pumps:		1		
Pump Capacity		4 gph	gpd min:	
	psi:	100		
Chemical Storage Tank Type		55 gallon drums	Volume:	
Weight/Level Reading Method		None (relies on expected usage and visual inspection)		

SAFETY

Separate Room	Yes	Cylinder Repair Kit	N/A
Exhaust fan		Extra Chlorinator or repair kit	N/A
Fresh Air Vent		Ammonia Bottle	N/A
Door Opens Out With Panic Bar		Self Contained Air Packs	N/A
More than 1500 # Cl_2 onsite	N/A	Training Programs	
Electrical Protected from Gas?	N/A	Shower/Eye Wash	

Comments:

The free chlorine residual of water entering and leaving the Cedar Street Reservoir (CSR) is monitored continuously and is visible on the SCADA display in the Operations Center. Chlorine is added to the water when filling the CSR as appropriate to help meet the City's distribution system free chlorine residual goals. As of July 11, 2017, the chlorine feed system has flow-pacing capability, which will reduce the operational burden on City staff.

Pumping

Pumping Stations - Construction, Controls & Maintenance

Location:	West Side Reservoir					
Function:	Pump from the West Side Reservoir to supply areas on the west side of the City during peak demand periods					
Pump Number	1	2	3	4		
Year Installed	1970	1970	1970	1970		
Type	VT	VT	VT	VT		
Current Capacity (MGD)	4	4	8	8		
Current Capacity (GPM)						
Basis						
Current TDH (FT)						
HP	100	100	200	200		
Original Name Plate GPM						
Corresponding MGD						
Original Name Plate TDH (FT)	142'	142'	142'	142'		
Pump NPSH (FT)						
Centerline of Pump Intake Elev.						
Floor Elevation						
Electrical Controls Elevation						
Pumps/Motors Subject to Flood?						
Pump Efficiency						
Motor Efficiency						
Min. Reservoir WL						
Cavitation Problems (Y/N)						
VFDs (Y/N)						
Maintenance History	Refer to next page for maintenance history of pumps and motors					

Comments on Booster Pumping: The City has experienced a significant significant drop in the number of water main breaks since the West Side Reservoir was removed from service. Several sources have suggested that Soft Starts or VFDs be installed on the West Side booster pumps to reduce or eliminate pressure spikes within the distribution system, which may be related to main breaks.

AUXILIARY POWER

Power Type	None		
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)			mgd
Firm Pump Capacity (gpm)			mgd
Auxiliary Power Capacity (gpm)			mgd
Max Day Demand @ this location			mgd
Peak Hour @ this location			gpm (Hydropneumatic Stations)
Avg Day Demand @ this location			mgd
Firm Pump Capacity/Max Day			%
Peak Hour/Firm Pumping Capacity			% (Hydropneumatic Stations)
Aux. Power Capacity/Avg Day			%

Comments:

Pumping

Pumping Stations - Construction, Controls & Maintenance

Location:	West Side Reservoir
Function:	Pump from the West Side reservoir to supply area of the west side of the City during peak demand periods

Pumps and motors are on a routine Preventive Maintenance (PM) schedule consisting of visual inspection, checking oil levels, and greasing bearings and fittings. On an as-needed basis, oil is changed, packing is adjusted, bearings are replaced, etc. Recent, non-routine work is shown below:

West Side Station Pump 1	West Side Station Pump 2	West Side Station Pump 3	West Side Station Pump 4
6/7/05 - replaced motor bearings	**9/1/11** - replaced upper and lower motor bearings	**4/28/15** - rebuilt discharge valve control cylinder	**5/26/16** - replaced 4-way valve
	4/9/12 - rebuilt motor, installed new upper shaft and coupling		

TREATMENT

Disinfection (sodium hypochlorite addition)

Point of Treatment		West Side Booster Sta.		
Injection Point:				
[redacted]				
Purpose:		See comments		
Year Initiated		2016		
Product:		NaOCl		
Manufacturer:		~14-15%		
Chemical Strength:				
Dilution:		NA		
ANSI/NSF Standard 60 Approval? (Y/N)		Yes	NSF max dose:	84 mg/L
Normal Feed Rate/Dosage			mg/L	
Avg Plant Tap Residual (mg/L)	total:		free:	
Avg Distribution Residual (mg/L)	total:		free:	
Frequency of Residual testing	Plant Tap:		Distribution:	
Analytical Method Used				
Instrument:				
Any Overfeed Instances? (Y/N)		No	Date(s):	
Any Low Feed Instances? (Y/N)		No	Date(s):	
Pump Type:			Model:	
Number of Pumps:				
Pump Capacity	gpd max:		gpd min:	
	psi:			
Chemical Storage Tank Type			Volume:	220 gallons
Weight/Level Reading Method				

SAFETY

Separate Room	No	Cylinder Repair Kit	NA
Exhaust fan	No	Extra Chlorinator or repair kit	NA
Fresh Air Vent	No	Ammonia Bottle	NA
Door Opens Out With Panic Bar	Roll-up door	Self Contained Air Packs	NA
More than 1500 # Cl_2 onsite	NA	Training Programs	NA
Electrical Protected from Gas?	NA	Shower/Eye Wash	Eye wash

Comments:

Pumping

Booster Pumping Stations - Construction, Controls & Maintenance

Location:	Torrey Road Booster Station					
Function:	Boost pressure to the southwest portion of the City, including the Hospital area					
Pump Number	1	2				
Year Installed	1954	1954				
Type						
Current Capacity (MGD)						
Current Capacity (GPM)						
Basis						
Current TDH (FT)						
HP	40	125				
Original Name Plate GPM						
Corresponding MGD	2.8	4				
Original Name Plate TDH (FT)	65'	100'				
Pump NPSH (FT)						
Centerline of Pump Intake Elev.						
Floor Elevation						
Electrical Controls Elevation						
Pumps/Motors Subject to Flood?						
Pump Efficiency						
Motor Efficiency						
Min. Reservoir WL						
Cavitation Problems (Y/N)						
VFDs (Y/N)	No	No				
Maintenance History	Refer to next page for maintenance history of pumps and motors					

Comments on Booster Pumping:
Permit 120173 was issued in 2012 for signficant upgrades to the Torrey Road Booster Station. Electrical upgrades have been completed. New pumps were purchased but were not installed as planned. The City will reportedly move forward with pump installation in the near future.

AUXILIARY POWER

Power Type	None	Power Rating (kWh)	
Fuel Type		Starting Frequency	
Capacity (gpm)		Load Testing Frequency	

Total Pump Capacity (gpm)			mgd
Firm Pump Capacity (gpm)			mgd
Auxiliary Power Capacity (gpm)			mgd
Max Day Demand @ this location			mgd
Peak Hour @ this location			gpm (Hydropneumatic Stations)
Avg Day Demand @ this location			mgd
Firm Pump Capacity/Max Day			%
Peak Hour/Firm Pumping Capacity			% (Hydropneumatic Stations)
Aux. Power Capacity/Avg Day			%

Comments:

Pumping

Booster Pumping Stations - Construction, Controls & Maintenance	
Location:	Torrey Road Booster Pumping Station
Function:	Boost pressure to the southwest portion of the City, including the Hospital area

Pumps and motors are on a routine Preventive Maintenance (PM) schedule consisting of visual inspection, checking oil levels, and greasing bearings and fittings. On an as-needed basis, oil is changed, packing is adjusted, bearings are replaced, etc. Recent, non-routine work is shown below:

Torrey Road Station 2000 gpm pump	Torrey Road Station

DISTRIBUTION

Interconnections with Other Supplies

Is water purchased from other supplies? _____

If yes, list WSSN number (s): _____

No. of Emergency Connections: _____

Location	Main Size	Capacity	Metered?	Status (Regular/Emergency)	WSSN of Connection

Are valves at the interconnections exercised annually? _____

Are the interconnected mains routinely flushed? _____

Comments: Water is sold to the City of Flint by the Great Lakes Water Authority (GLWA). Flint is making a decision whether to continue purchasing water from GLWA or to upgrade the water treatment plant and treat raw water purchased from the Karegnondi Water Authority (KWA). Currently, water is tranmitted from GLWA to the water plant site, and is master-metered through Control Station 2 (CS-2). At CS-2, the City adds NaOH, orthophosphate, and sodium hypochlorite.

Distribution Piping

Mains by Material	
Cast Iron	96.64%
Ductile Iron	2.64%
Steel	0.46%
Concrete	0.22%
Other	0.03%
Galvanized	0.01%

Mains by Size	
2"	0.11%
3"	0.26%
4"	4.47%
6"	51.59%
8"	23.74%
10"	0.59%
12"	8.11%
14"	0.81%
16"	3.52%
18"	1.90%
20"	0.00%
24"	3.88%
30"	0.58%
36"	0.35%
42"	0.06%
48"	0.01%
72"	0.02%

Mains by Date of Installation	
1900 to 1910	3.50%
1911 to 1920	25.90%
1921 to 1930	34.00%
1931 to 1940	6.30%
1941 to 1950	1.20%
1951 to 1960	25.00%
1961 to 1970	2.10%
1971 to 1980	0.30%
1981 to 1990	1.70%
1991 to 2000	0.20%
2001 to Present	10.80%

Estimated percent of piping with coal tar lining _____ %

Comments:

Distribution piping data is taken from the 6/28/16 draft Asset Management Report by Rowe PSC and is based on 3,079,442 feet (583.2 miles) of water main.

DISTRIBUTION

Operational Concerns & Maintenance

Are there areas where water main breaks are frequent? Yes
If yes, identify locations: See comments

Comments:
From 2010 - 2013, the City averaged about 155 breaks per year. In 2014 - 2015, which includes the period when the water plant was in full-time operation, the City averaged about 300 breaks per year. There has been a significant reduction in the number of breaks in 2017, which may be related to taking the West Side Reservoir and pumping station off line for inspection (it is believed that surges associated with operation of pumps and valves at West Side are a significant factor in water main breaks).

Year	Number of Breaks
2012	159
2013	153
2014	316
2015	277
2016	138

The City is working toward the Partnership for Safe Water goal of not more than 15 breaks per year per 100 miles of main, which equates to 85-90 breaks per year.

Leak Detection and Condition Assessment:

The City contracted with Echologics LLC in 2015 and 2016 to conduct a leak assessment of the majority of water main in the distrbution system and a condition assessment on 24 miles of critical mains (road, railroad, and waterway crossings). A water audit was also completed, GIS data points were collected, and GIS training was provided.

The leak assessment work was divided into standard "listening" at most locations and "correlation" on 15 miles of critical mains. The "listening" portion of the leak assessment identified 82 leaks with an estimated total loss of 327 gpm. The "corrleation" portion of the assessment found no confirmed leaks, but identified four "Points of Interest (potential leak sites)" that require further investigation.

The condition assessment found that, of the critical pipes tested, 31% appeared to be in good condition, 15% were in moderate condition, 8% were in poor condition, and 46% did not return a result.

Are there areas where aesthetic water quality complaints are frequent?
If yes, identify locations:

Comments:
Operators are currently doing a good job of meeting treatment goals, and there is a significant amount of flushing and other distrbution maintenance practices taking place in an attempt to meet distribution system water quality goals; therefore, distribution system water quality is improving. Many members of the public have not regained confidence in the water system, however.

Do you receive complaints alleging illness due to the water? Yes
If yes, identify locations:
Comments:
There have been complaints of lead-related and Legionella-related illnesses during and since the water crisis began.

DISTRIBUTION

Operational Concerns & Maintenance

Are there areas where customers complain of low pressure? No

If yes, identify locations: _____ _____

_____ _____

Comments:

What is the procedure to respond to and track these complaints?
Comments:
There are a number of personal and online resources available to track and address complaints.

Distribution System Capacity

Are there areas where peak flows (including fire flow) cannot be maintained? No

If yes, identify locations: _____ _____

_____ _____

Comments:

Last ISO report date? _____ Rating _____

Proposed distribution system improvements (Location and Estimated Completion Date):
Several neighborhoods were identified for water main replacment in a 2016 DWRF Project Plan. Proposed work areas were prioritized based on several factors including occupancy, service line material, and break history. The project is in the DWRF Fundable Range, but the City must demonstrate a long-term, secure water source to qualify for funding. If funded, work would begin in 2017 or 2018.

Distribution System Optimization

An *Assessment of Current Practices and Gap Analysis Technical Memorandum* is being completed by Arcadis Group. The document compares existing conditions and practices to industry best practices, identifies "gaps" where best practices are not being achieved, and recommends improvements. The evaluation includes water quality integrity, physical integrity, and hydraulic integrity. The completed analysis is expected to provide valuable operational advice.

DISTRIBUTION

Hydrants		
Number of Hydrants	3605	(from 2013 Rowe Reliability Study)
Number Without Auxiliary Shut-Off Valves		
Number that are Self-Draining		
Number of Inoperable Hydrants	See comments	
Frequency of Hydrant inspection:		
Inspection Staff:		
Are there areas where additional hydrants are needed?		
If yes, list locations:		
Hydrant location system		Accurate?
Are hydrants color coded for capacity?	No	
Has this information been provided to the fire department?		
Frequency and seasons of hydrant flushing	Annual (fall)	
Purpose of flushing	Maintain water quality	
Is the public notified prior to flushing?	No	
Does flushing follow a specific format?	No, but a UDF program is being developed	
Is the volume of water used during flushing estimated?	No	
Do hydrants receive maintenance painting?	No	
Is a record maintained of hydrant activities?	No	

Hydrant records should include: Hydrant number, location of the hydrant, type of hydrant, size of barrel, size of bottom valve, size of lead, direction of turn, operable or inoperable, auxiliary valve type and size, weep holes plugged or unplugged, condition of hydrant (caps, chains, valve operation, operating nut, leakage & etc.), color coded capacity, flow data (gpm & psi) flushing dates, inspection dates.

Comments:

The City reported approximately 35% of hydrants being inoperable or needing repair. Recent hydrant upgrades are as follows: 2013 - 30 replaced, 11 repaired; 2014 - 12 replaced, 7 repaired; 2015 - 53 replaced, 19 repaired. Recent efforts are very good, but a high percentage still require repair or replacement.

Valves		
Number of Valves	8228	(From 2016 Rowe Reliability Study)
Number of inoperable valves	100	(See comments)
Are there areas where additional valves are needed?		
If yes, list locations:		
Valve location system	Map	Accurate?
Valve Turning Frequencies	Primary:	
	Others:	
Records Maintained?		

Valve records should include: valve number, location of valve(with witness points), type of valve, size of valve, normal operating status (open or closed), condition of valve (operable or inoperable), direction of turn, number of turns, and dates of operation.

Comments:

The City has been aggressively identifying and repairing or replacing inaccessible and inoperable valves. The City has reported that 57 valves were replaced in 2015, 85 were replaced in 2016, and 27 were replaced through March 2017. Valve boxes have been located and cleaned out. According to the Distribution System manager, a 2015 valve study identified 900 inaccessible/inoperable/problem valves, and the City is reporting that it has addressed 800 of those, leaving about 100 in need of maintenance/repair/replacement. The City has applied for DWRF funding to replace a significant amount of water main, which would result in additional valve replacement. Recent efforts are very good; however, continued progress and a long-term plan are still needed.

DISTRIBUTION

Customer Service Information

Number of service connections	56,038	(number of parcels in City)
Occupied parcels	43,406	(estimated number currently occupied)
Number of metered service connections		

Percentage of service line materials (all parcels):	
Copper	48.0%
Galvanized or lead	52.0%
Unknown	
Other	---

Ownership of Service (CWS/Customer)	
From Corp Stop to Curb Stop	City
From Curb Stop to Property Line	City
From Property Line to Meter	Customer
Meter	City

Comments: The City's FAST Start Program conservatively estimates there are 29,100 lead/galvanized service lines needing replacement. Sites with suspected lead/galvanized lines are investigated, and non-copper portions of the lines are replaced. From July 1, 2016 to June 30, 2017, the City replaced 2150 service lines. This represents slightly over 7 percent of all targeted service lines, which meets the EPA's requirement of at least 7 percent replacement each year after a lead action level exceedance.

CUSTOMER METERS

Types of meters Used	
Number of Meters with Remote Reading Devices	
Residential Meter Sizes	
Industrial/Commercial Meter Sizes	
Meter Testing/Maintenance Program	
Average Age of Meter in System	
Criteria for Changeout	
Number or Percent Changeout per Year	
Master Meter Locations	
Calibration of Master Meters	
Meter Reading Staff/Contract:	

Detailed information regarding the city's water meters and replacment program was not available at the time of the survey, and therefore the meter program could not be evaluated.

Percent of Usage by Customer Type	
% Residential	80%
% Other	20%

Large Users - % of Use	
McLaren Regional Medical Center	1%
Genesee County Jail	<1%
Hurley Medical Center (6th and Begole)	<1%
Hurley Medical Center (One Hurley Place)	<1%

Comments:
General Motors was a former customer that is now purchasing water from Genesee County, but may reconnect to the City's water system. The City is concentrating on the replacement of lead service lines. Approximately 1200 lead lines have been replaced in the last few years.

Water System Activity

Year	# of Construction Permits Issued	Permitted Amount of WM Feet
2007	6	16,556
2008	4	2698
2009	4	35,273
2010	3	10,355
2011	1	13,854
2012	2	0
2013	1	31,418
2014	2	0
2015	4	18,100
2016	3	10,300

A detailed breakdown of water main permits by purpose (new vs. replacement) was not available at the time of the survey. A review of records indicates that the majority of these permitted mains are for the replacement of existing mains. Most new main is associated with transmission of raw water. Some permits included here are for pumps, controls, storage, and other improvements.

Comments:
Some of the above-permitted main was not constructed.

DISTRIBUTION

Water Rates

What is your current rate schedule?	See comments
Are current rates adequate to support O&M and CIPS?	See comments
When was last time rates were adjusted?	2015
Has a water rate study been performed? When?	
Is there a meter charge or ready to serve charge?	Yes
Is a copy of the water rate schedule and ordinance available?	

Comments:

A rate analysis was completed in 2016 by Raftelis Financial Consultants, which indicated a "typical" monthly water bill of $53.84 for 5 ccf of water consumption. The bill includes commodity charges, operating costs, capital costs, personnel costs, etc. The Raftelis survey indentifies the commodity charge portion of a typical bill as $15.89/month, or $3.18/ccf ($4.25/1000 gallons). The Raftelis survey further indicates that the current rate structure is not sufficient to meet future expenses due to a number of factors. The actual future gap between revenue and expenses is dependent on the City's final Source Selection and associated costs. The current rate was established in 2015 through a court decision.

Repair Parts Inventory

Extra Mains (Sections for Each Size in Service)	
Repair Clamps (2 or more for each size)	
Tees, Crosses & Elbows	
Hydrants	
Valves	
Services (Corp & Curb Stops, Clamps and Lines)	
Other	

Comments:

Information about repair parts and equipment was not available at the time of the survey.

Safety Programs

Confined Space Entry Program	
Trench Safety Program	

Comments:

Information about the city's safety program was not available at the time of the survey.

PROGRAM COMPLIANCE

Cross Connection Program

Ordinance No.	Ch. 46, Art. II, Div. 4	Date:	Various
Approved Program (Y/N)?		Date:	
Staff Assigned to Program, (No., Dept and/or who)			
Is Annual Cross Connection report required (Y/N)?			Yes
Was previous year's annual report received (Y/N)?			No Date:
Was previous year's annual report acceptable (Y/N)?			No
Inspection Status:	Inactive		
Assembly Testing Frequency		High Hazard:	Low Hazard:
Assembly Testing Performance			
Recordkeeping:			
Private Well Isolation/Abandonment Procedure:			

Comments:
Annual Cross Connection Report forms have not been received for 2015 or 2016. The Cross Connection Inspector has been working primarily on plumbing permits, and inspections are not being completed.

Annual Pumpage Report

Is Annual Pumpage Report required (Y/N)?	No	
Was previous year's annual report received (Y/N)?		Date:

Comments:

Monthly Operation Reports

Are Monthly Operation Reports required (Y/N)?	Yes	
Were all previous year's reports received (Y/N)?	Yes	Timely? Yes
Are previous year's reports acceptable (Y/N)?	Yes	

If no, describe problems:

Comments:
The monthly operation report includes water purchased from GLWA, chemicals added at CS-II, water quality data at the water plant tap, and water quality data from the distribution system. Chemical treatment at the Cedar Street and West Side Reservoirs is reported on daily summary reports. Chemical feed data from the reservoirs should be included on the monthly operation reports once it is determined that daily summary reports are no longer required.

Consumer Confidence Report

Is the annual CCR required? (Y/N)	Yes	
Was the previous year's report received? (Y/N)	Yes	Date: 6/13/2017
Was the previous year's acceptable? (Y/N)	Yes	
Was the previous year's certification form received? (Y/N)	Due 10/1/17	Date:

Comments:

Emergency Response Plan

Date of ERP	2013	Acceptable?	
Filed where?			

Comments:
The most recent Emergency Response Plan on record with the DEQ is from 2013. The 2013 Sanitary Survey recommended an update Emergency Response Plan due to changes in operations. Since then, signficant changes to city and DEQ staffing and operational practices have occurred, and an updated plan is now required. If an updated plan exists, the DEQ should be notified of its availability.

PROGRAM COMPLIANCE

General Plan

Date of Most Recent Plan:	Various, up to 2016	
Filed Where?	Part of Rel. Study/Asset Mgt.	Acceptable?
	General Layout	Yes
	Facility locations & capacities	See comments
	Water Main Inventory	Yes
	Identification of Service Areas	In Contract w/GLWA
	Hydraulic Analysis	See comments
	Capital Improvement Plan	In DWRF Project Plan

Comments:
There is an existing hydraulic model of the distribution system, but fire flow contours or similar data were not provided. The U.S. EPA is in the process of developing and calibrating a new model. A draft Asset Management report was completed in 2016, which focused on the distribution system only, pending a selection of water source. Facility locations and storage and pumping capcities are included in the Reliability Study. Treatment capacities are available in this Sanitary Survey. A limited Capital Improvement Plan was also completed by Imagine Flint in 2105.

Reliability Study

Date of Most Recent Study:	2016	
Filed Where?	City, MDEQ	Acceptable?
Contents:	5 & 20 Year Demand Projections	Yes
	Source Production Totals (Monthly)	
	Customer Supply Usage (Annual)	
	Res/Comm/Ind Usage (Annual)	Residential vs.other
	Water Shortage Response Plan	See comments
	Recommended Improvements	

Comments:
The Reliability Study projects a 20 percent population loss between 2015 and 2040, which would further affect the City's ability to raise adequate revenue through water rates. The study includes a detailed water shortage response plan, and water shortage is also addressed in Chapter 46, Article 1 of the City Ordinances. The water shortage response plan may need modification once the long-term and backup supply selection is made.

Permits

Applies for and obtains permits prior to construction (Y/N):	Yes	
Reviews plans prior to submittal to DEQ (Y/N):	Yes	
Standard specifications on file at CWS (Y/N):		
If applicable, adheres to contract with supplier regarding plan submittal (Y/N):	See comments	Date:
Follows master plan for any construction (Y/N):		
Develops as-built plans (Y/N):		
Updates general plans (Y/N):		

Comments:
The water contract with GLWA allows for review and approval of projects related to: new metering facilities, water mains sized 24 inches or larger, pump stations, reservoirs, water towers, and projects in proximity to GLWA facilities. It is not known whether GLWA routinely excercises its right to do so.

PROGRAM COMPLIANCE

Capacity Development

Comments on Capacity Development: The EPA has required (in its Administrative Order) that the City must demonstrate adequate Technical, Financial, and Managerial capacity (TMF) prior to switching to another water source (i.e., other than treated water purchased from the Great Lakes Water Authority (GLWA)). The decision whether to continue to purchase water from GLWA, begin treating raw water from the KWA, or select another source has not been finalized. Because the City's source water selection decision is not finalized, it is not known whether a formal TMF demonstration will be required. However, certain aspects of a TMF demonstration are necessary regardless of source selection.

The following components of a TMF capacity assessment warrant further discussion:

Technical Capacity:
1. Source - a water system must have an adequate quantity of water available to meet demands, either through its own production facilities or secured through contract and capable of delivery from another water system. At this time, the City only has a short-term agreement with GLWA for the purchase of treated water. The DEQ had instructed the City to either approve the long-term agreement with GLWA that was negotiated by Mayor Karen Weaver, or offer a reasonable alternaivte proposal to provide drinking water from another source, by June 26, 2017. The City has not done so, and therefore does not have satifactory Technical Capacity with regard to its source.

Financial Capacity:
1. Budget - a water system must have adequate revenue to operate its water system, including operational costs, personnel costs, capital improvements, and debt retirement. As stated in the Flint Water Rate Analysis by Raftelis, operational costs and staffing levels are highly dependent on the City's final selection of a water source. Raftelis projects a future gap between revenue and expenses, although the analysis was based on routine operation of the City's water plant and other conservative assumptions. The actual future gap, if any, is dependent on source selection, the terms of any water service agreements, efforts to improve water accountability (currently around 50 percent unaccounted), availability of grants and alternative funding sources, relative levels of automation and staffing, water rates, etc. Once the source determination is made, water rates should be reviewed and, if necessary, adjusted to ensure adequate financial capcity with regard to budget. It should be noted that, in addition to other duties, water treatment/operations staff are responsible for operation of five dams on the Flint River. The time and resources needed to manage the dams must be accounted for when developing staffing and budget plans for water treatment/pumping.
Also, it has been mentioned that a low pay scale is reportedly contributing to the City's difficulty in recruting, hiring , and retaining staff.

Managerial Capacity:
1. Maintaining Certified Operators - a water system must place its treatment and distribution systems under the supervision of properly-certified operators. Operations staff may either be City employees or contractors. The operator currently supervising the distribution system is a City of Flint permanent employee. The operator in charge of the treatment system is a contractor with Fleis & Vandenbrink Operations. The City may attempt to recruit an internal or external candidate to supervise the treatment system.
2. Sampling Plans - a water system must prepare sampling plans, and follow the plans when conducting compliance monitoring under the Safe Drinking Water Act. The City's Total Coliform Rule sampling plan must be revised to include an additional five (5) routine sites, with associated repeat sites. The Disinfection Byproducts sampling plan is satisfactory, but may need future revisions based on the Arcadis Group distribution system optimization study. The lead and copper sampling plan is revised as necessary as additional information is obtained regarding service line materials.
3. Cross Connection Control - a water system must implement a program for the elimination of cross connections within its distribution system. It appears that due to personnel shortages, adequate time is not being devoted to cross connection control, and inspections and program administration are lacking.
4. Other Plans and Studies - a water system must complete other plans and studies as required by the Safe Drinking Water Act. The City completed a draft Reliablity Study and a draft Asset Management Plan in 2016. These studies should be finalized. Their contents are used to justify the City's Drinking Water Revolving Fund (DWRF) Project Plan and funding application. Also, an Asset Management Plan, and a 5-year and 20-year Capital Improvement Plan are required components of a Water System General Plan.

MONITORING

Bacteriological

Date of Approved Site Sampling Plan:	2/21/2017		
Number of samples required each month:	100	Basis:	Population
Certified Lab Used:	City of Flint water plant		
MCL, Monitoring or Reporting Violation(s) in past 3 years? (Y/N)	Yes	Date:	2014
Number & Type of Violations	3 MCL violations in 2014		
Public Notice Issued according to regulations? (Y/N)	Yes	Date:	Various

Comments:
The RTCR sampling plan was approved on 3/2/17 based on 20 routine sampling sites. Five more potential routine sites, with assoicated repeat sites, have been identified. The suitability of the sites will be confirmed, and the sampling plan will be expanded to 25 routine sites in the near future.

Chemical

Date of Monitoring Schedule:	5/12/2017
MCL, Monitoring or Reporting Violations(s)? (Y/N)	No
Public Notice Issued according to regulations? (Y/N)	NA
Detects for inorganics > 50% of MCL? (Y/N)	No
Detects for VOCs (Y/N)	No
Detects for SOCs (Y/N)	No
DBP Sampling Done According to Approved Plan? (Y/N/Waived)	Yes
Date of Approved Disinfection Byproduct Monitoring Plan:	7/12/2016

Comments:
The DBP Monitoring Plan may need to be updated based on the distribution system optimization study (in progress).

Lead and Copper Monitoring

No. of Samples Required:	60		
Frequency (Semi Annual/Annual/Triennial)	See comments		
Exceedance of lead or copper action level (Y/N)	See comments		
If yes, was public education issued? (Y/N)	See comments	Date:	
Next Monitoring Period:	1/1/17 - 6/30/17	(final reporting in progress)	
Corrosion Control Program Status, if applicable	See comments		
Lead service line replacement status, if applicable	Active - see Customer Sevice Information page of this sanitary survey for details		

Comments:
The city has collected two consecutive, 6-month rounds of samples (in 2016 and 2017) meeting the lead and copper action levels. The last monitoring period that exceeded the lead action level was January-June 2016. All required responses were completed in response to exceeding the action level. Samples are collected by the City, sentinel teams, and the public, and all valid tier 1 site results are used to calculate the 90th percentile lead and copper concentrations and determine compliance. The city is practicing corrosion control treatment for the incoming water from the GLWA. A corrosion control study is currently being conducted by Cornwell Engineering Group to evaluate current conditions and evaluate future possible situations (continued purchase of finished water from GLWA, purchase of water from Genesee County, treatment of KWA raw water at the Flint Water Plant, and combinations/mixing of those sources).

Radiological Monitoring

Date of Monitoring Schedule	Not Required		
Alpha, beta, radium, uranium		Date:	
Radon		Date:	
Tritium		Date:	
Detects for Rads > 50% of MCL? (Y/N)			
If yes, list		Date:	

Comments:
Radiological monitoring is the responsibility of the wholesale supplier (Great Lakes Water Authority)

Analytical Capabilities

Parameter	Analytical Method(s)	Calibration Frequency	Instruments Used	Method of Data Recording	Frequency of Measurements	Sampling Location	Location for Water Source	Analysis Run by
Alkalinity	SM 2320B Titration	Per batch of titrant	Standard burettes	Manual	Weekly Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Total Hardness	SM 2340C	Per batch of titrant	Standard burettes	Manual	Weekly Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Calcium Hardness	SM 3500 Ca D	Per batch of titrant	Standard burettes	Manual	Weekly Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
pH	SM 4500 H+B Electrometric	Daily	Hach HQ440d Hach SL1000	Manual	Daily Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
			Hach HQ440d		Every 2 Hours Every 2 Hours	CS-II Mini Lab Tap	GLWA Supply Main In-Plant Piping	Operations staff
Conductivity	SM 2510B	Monthly	Mettler Toledo Hach SL1000	Manual	Daily Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Temperature	SM 2550B	Annually	Grade 1 Thermometer	Manual	Daily Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Fluoride	SM 4500 F-C ISE	Daily	Hach HQ440d	Manual	Daily Daily	CS-II Lab Tap	GLWA Supply Main In-Plant Piping	Lab staff
Chlorine Residual		Daily	Hach SL1000	Manual	Twice per day Twice per day Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
		Periodic Checks by Lab Manager	Hach Pocket Colorimeter II	Manual	Every 4 Hours Every 2 Hours	CS-II Mini Lab Tap	GLWA Supply Main In-Plant Piping	Operations staff
			Hach CL-17	Manual Manual	Continuous Continuous	CS-II WTP Basement	GLWA Supply Main In-Plant Piping	Operations staff
Chloride	SM 4500 Cl-B Argentometric	Per batch of titrant	Standard burettes	Manual	Weekly Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Turbidity	SM 2130B Nephelometric	Monthly - primary Daily - secondary	Hach 2100 N	Manual	Twice per day Twice per day Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Total Colform	SM 9223 B-04 Colilert	Biannual PE		Manual	Twice per day Twice per day Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
HPC	SM 9215 B IDEXX Simplate	Annual PE		Manual	Weekly Weekly Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff
Iron			Hach DR 3900	M	Daily Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab staff

Analytical Capabilities

Parameter	Analytical Method(s)	Calibration Frequency	Instruments Used	Method of Data Recording	Frequency of Measurements	Sampling Location	Location for Water Source	Analysis Run by
Sulfate			Hach DR 3900	Manual	Daily	Lab Tap	In-Plant Piping	Lab Staff
Phosphate			Hach DR 3900	Manual	Daily Daily Weekly	CS-II Lab Tap Distribution	GLWA Supply Main In-Plant Piping Per RTCR Sampling Plan	Lab Staff

Other Notes/Observations on Laboratory Practices/Capabilities

1. The lab is certified for Total Coliform, E. Coli, HPC, and fluoride.
2. Based on inspections and conversations between lab staff and DEQ field personnel, lab practices are generally satisfactory. Minor issues brought to the attention of the Lab Manager are addressed promptly.
3. Lab QA/QC appears to be greatly improved under the current Lab Manager, who is working on plans for further imprrovement.
4. The laboratory balance was last calibrated in December 2016. Scale accuracy is checked monthly using certified weights..
5. The laboratory is successfully running extra performance evaluation/proficiency testing samples each quarter for all parameters being reported to the DEQ/EPA.

TREATMENT

Disinfection (sodium hypochlorite addition)

Point of Treatment	Control Station 2		
Injection Point:	42-inch supply main		
SDWIS Facility ID (site - 01)			
Purpose:	See comments		
Year Initiated	2016		
Product:	Havasan LB-12		
Manufacturer:	Haviland		
Chemical Strength:	12%		
Dilution:	NA		
ANSI/NSF Standard 60 Approval? (Y/N)	Yes	NSF max dose:	84 mg/L
Target Feed Rate/Dosage	1.0 - 1.3	mg/L	
Basis for Target Feed Rate	See comments		
Range of Incoming (GLWA) Residual	0.6 - 1.4	mg/L	
Range of Plant Tap Free Residual	0.8 - 2.0	mg/L	
Range of Distribution System Free Residual	0.2 - 2.0	mg/L	
Frequency of residual testing — Incoming:	Continuous plus 2 confirmation grabs/day		
Plant Tap:	Continuous plus 2 confirmation grabs/day		
Distribution:	Several per week		
Analytical Method Used:	DPD		
Instrument:	Hach CL-17, Hach SL1000, Hach Pocket Colorimeter		
Any Overfeed Instances? (Y/N)	No	Date(s):	
Any Low Feed Instances? (Y/N)	No	Date(s):	

Feed Pumps:

Type:	Diaphragm	Model:	Milton Roy SD46-88P
Number of Pumps:	2		
Capacity:	10 gph each	Discharge Head:	150 psi

Type:	Diaphragm	Model:	LMI C721-71FS
Number of Pumps:	1		
Capacity:	4 gph	Discharge Head:	100 psi

(Note: this model is no longer manufactured, but repair parts are believed to be readily available)

Chemical Storage Tank Type	Totes (from supplier)	Volume:	220 gallons
Weight/Level Reading Method	Staff gage on tank wall		

Comments on Sodium Hypochlorite Feed: The City purchases treated water from the GLWA, and adds sodium hypochlorite, phosphoric acid, and sodium hydroxide to meet the plant tap free chlorine residual (1.7 mg/l), orthophosphate residual (3.6 mg/l), and pH (7.5 units) goals established by the U.S. EPA's technical team. The incoming, Plant Tap, and Distribution pH ranges shown above are for the period of time when sodium hypochloride has been fed. The feed pumps now have flow-paced controls to help maintain consistent feed rates.

The existing treatment system was designed and installed as a temporary measure while long-term treatment decisions are being made. Chemical scales may be installed at a later date. An SOP for chemical feed has been developed for both existing (temporary) and future (permanent) treatment at CS-II. Because the City has not selected a long-term water source, final decisions have not been made regarding the future treatment layout at CS-II.

Safety: The sodium hydroxide tote and sodium hypochlorite tote are stored together in a garage structure with air conditioning, a portable eye wash station, and face shield/gloves/PPE.

TREATMENT

Corrosion Inhibitor (phosphoric acid addition)

Point of Treatment	Control Station 2			
Injection Point:	42-inch supply main			
[redacted]				
Purpose:	See comments			
Year Initiated	2015 (December)			
Product	Phosphoric Acid			
Manufacturer:	Brenntag			
Chemical Strength	75%			
Dilution:	None			
ANSI/NSF Standard 60 Approval? (Y/N)	Yes (NSF)	NSF max dose:	13	mg/L
Target Feed Rate/Dosage	2.4 - 2.7	mg/L		
Basis for Target Feed Rate	See comments			
Range of Incoming (GLWA) PO4	1.0 -2.2	mg/L		
Range of Plant Tap PO4	3.5 - 3.9	mg/L		
Range of Distribution System PO4	2.9 - 3.9			
Frequency of residual testing — Incoming:	Daily			
Plant Tap:	Daily			
Distribution:	Several per week			
Analytical Method Used:	Spectrophotometry			
Instrument:	Hach DR3900			
Any Overfeed Instances? (Y/N)	No	Date(s):		
Any Low Feed Instances? (Y/N)	No	Date(s):		

Feed Pumps:

Type:	Diaphragm	Model:	LMI C921-362SI
Number of Pumps:	2		
Capacity:	4 gph each	Discharge Head:	100

Chemical Storage Tank Type	PE Shipping Totes	Volume:	220 gallons
Weight/Level Reading Method	Scale markings on tote		

Comments on Phosphoric Acid Feed: The City began feeding phosphoric acid in December 2015 to improve lead corrosion control by re-establishing an orthophosphate scale on lead surfaces within the distribution system/individual plumbing systems. The EPA has established a distribution system orthophosphate residual goal of 3.5 mg/l, and the City appears to be meeting the goal more consistently since May 2017. The incoming, Plant Tap, and Distribution PO4 residual ranges shown above are for the 12-month period covering June 1, 2016 to May 31, 2017.

The existing treatment system was designed and installed as a temporary measure while long-term treatment decisions are being made. Chemical scales may be installed at a later date. An SOP for chemical feed has been developed for both existing (temporary) and future (permanent) treatment at CS-II. Because the City has not selected a long-term water source, final decisions have not been made regarding the future treatment layout at CS-II.

Safety: The phosphoric acid tote is stored in a different bay from the sodium hydroxide and sodium hypochlorite storage/feed area in a garage structure with a portable eye wash station.

TREATMENT

pH Adjustment (sodium hydroxide addition)

Point of Treatment	Control Station 2			
Injection Point:	42-inch supply main			
GLWA Facility ID (Site Code)				
Purpose:	pH adjustment			
Year Initiated	2017 (February)			
Product	Sodium hydroxide			
Manufacturer:	Brenntag			
Chemical Strength	25%			
Dilution:	None			
ANSI/NSF Standard 60 Approval? (Y/N)	Yes (NSF)	NSF max dose:	200	mg/L
Target Feed Rate/Dosage	2.6	mg/L		
Basis for Target Feed Rate	To meet the point-of-entry pH minimum goal of 7.5 units, and the distribution system goal of 7.5 +/- 0.3 units			
Range of Incoming (GLWA) pH	7.18 - 7.47			
Range of Plant Tap pH	7.17 - 7.50			
Range of Distribution System pH	7.14 - 7.59			
Frequency of pH testing – Incoming:	Every 2 hours plus daily confirmation grab by lab staff			
Plant Tap:	Every 2 hours plus daily confirmation grab by lab staff			
Distribution:	Several per week			
Analytical Method Used:	Electrode			
Instrument:	Hach HQ440d, Hach SL1000			
Any Overfeed Instances? (Y/N)	No	Date(s):		
Any Low Feed Instances? (Y/N)	No	Date(s):		

Feed Pumps:

Type:	Diaphragm	Model:	Milton Roy SD46-88P
Number of Pumps:	2		
Capacity:	10 gph each	Discharge Head:	150 psi

Type:	Diaphragm	Model:	LMI C721-71FS
Number of Pumps:	1		
Capacity:	4 gph	Discharge Head:	100 psi

(Note: this model is no longer manufactured, but repair parts are believed to be readily available)

Chemical Storage Tank Type	PE Shipping Totes	Volume:	220 gallons
Weight/Level Reading Method	Scale markings on tote		

Comments on Sodium Hydroxide Feed: The City began feeding sodium hydroxide in February 2017 to stabilize pH levels in the distribution system. Beginning in June 2017, the sodium hydroxide dosage was gradually increased to meet the EPA's recommended distribution system pH goal of approximately 7.5 units. The incoming, Plant Tap, and Distribution pH ranges shown above are for the period of time when sodium hydroxide has been fed. The feed pumps now have flow-paced controls to help maintain consistent feed rates.

The existing treatment system was designed and installed as a temporary measure while long-term treatment decisions are being made. Chemical scales may be installed at a later date. An SOP for chemical feed has been developed for both existing (temporary) and future (permanent) treatment at CS-II. Because the City has not selected a long-term water source, final decisions have not been made regarding the future treatment layout at CS-II.

Safety: The sodium hydroxide tote and sodium hypochlorite tote are stored together in a garage structure with air conditioning, a portable eye wash station, and face shield/gloves/PPE.

TREATMENT

Corrosion Control Treatment - General Comments

As part of the U.S. EPA's Emergency Administrative Order, the City's Optimal Corrosion Control plan must be reviewed and, if necessary, revised. To accomplish this, a contract was awarded to Arcadis Group to complete a Water Distribution System Optimization study, including a Corrosion Control Plan (CCP). The CCP is being completed by Cornwell Engineering Group as a subcontractor to Arcadis Group.

The proposed scope of the CCP (dated 12/19/16) included:
- -An evaluation of the existing Flint system (purchase of treated water from Great Lakes Water Authority)
- -The potential conversion to Genesee County as water supplier
- -A plan for treating KWA raw water at the Flint Water Treatment Plant
- -An evaluation of the interface (blending) between two sources of treated water

The DEQ recommended that the scope be flexible enough to consider other scenarios
The final CCP has not been finalized, in part due to delays caused by the City failing to select a permanent water source.

Appendix A

Classes offered at the Flint Water Treatment Plant, 2016-2017:

Safe Drinking Water Act Overview: September 27, 28, and 29, 2016 (2 hours each day) – Bryce Feighner (DEQ)
Basic Math and Hydraulics (condensed course): October 18, 19, and 20 (2 hours each day)
– Bob London and Jon Bloemker (DEQ)
Filtration: November 29, 30, and December 1, 2016 (2 hours each day) – Nick Pizzi
Rapid Mix, Flocculation, and Sedimentation: January 10 and 11, 2017 (2 hours each day) – Nick Pizzi
Jar Test Calculations: March 14, 2017 (2 Hours) – Nick Pizzi
Hands-on Jar Testing: March 15, 2017 (2 Hours) – Nick Pizzi
Chemical Feed: April 18, 2017 (2 Hours) – Nick Pizzi
Distribution Math: April 19, 2017 (2 Hours) – Nick Pizzi
Lime Softening Practice Math: April 19, 2017 (2 Hours) – Nick Pizzi
Ion Exchange Practice Math: April 20, 2017 (2 Hours) – Nick Pizzi
Basic Math: July 17, 2017 (2 Hours) – Nick Pizzi
Chemical Feed: July 18, 2017 (2 Hours) – Nick Pizzi

Attachment B

CITY OF FLINT

Dr. Karen Weaver
Mayor

September 8, 2017

Mr. Robert A. London, P.E.
Surface Water Treatment Engineer
Engineering Unit
Drinking Water and Municipal Assistance Division
Department of Environmental Quality
401 Ketchum Street
Suite B
Bay City, Michigan 48706

Sent via e-mail

Dear Mr. London,

This correspondence is in response to the Water System Sanitary Survey, WSSN: 2310 received on August 11, 2017. The Survey identified several ***significant deficiencies*** and ***deficiencies*** associated with the Flint water system. Additionally, ***recommendations*** are made regarding several elements of the water system. As required in your Violation Notice, the City requests the Department of Environmental Quality consider the following information when assessing the various survey elements.

Significant Deficiencies

1. **Source - The City has failed to select a long-term water supply source.**

The City administration has recommended a preferred primary long-term water source (GLWA) and is currently in litigation to support obtaining all approvals required to finalize all contracts. A final long-term water supply source selection should be completed within the 120 day corrective action time period.

2. **Distribution System – The City's cross connection program is not being implemented in a satisfactory manner.**

The City of Flint's Cross Connection manager has been performing the City's plumbing and mechanical inspections for the last two years. Therefore, cross connection inspections and backflow prevention devise testing has been deficient. The City plans to hire a cross connection manager before the end of 2017 to restart the cross connection control program. Initially, additional support personnel may be required on an "as needed" basis to catch up on the lack of cross connection activity over the last couple of years.

3. **Distribution System – The City has not provided details about maintenance and replacement programs and/or Standard Operating Procedures for hydrants, valves, meters, and galvanized service lines.**

The Standard Operating Procedures (SOPs) for the maintenance and operation of distribution system components are being developed by Arcadis as part of their Water Distribution System Optimization Plan. These draft SOPs should be available in September, 2017. Once the SOPs are reviewed and approved (planned for the end of 2017), budget and staff recommendations will be made to promote implementation of these best practices. These recommendations will be considered during the 2018 budget process.

4. **System Management and Operation – The DEQ does not have confidence that the City can continue to demonstrate the Technical, Managerial, and Financial (TMF) capacity necessary to consistently operate the water system in accordance with Act 399 after the current technical and training assistance contract expire.**

The City of Flint provided USEPA the attached August 18 correspondence addressing the managerial and operational staffing of the Utility's Water Division. The proposed staffing level (see organization chart) assumes that the mayor's water source recommendation is finalized. The City plans to achieve full staffing by the end of 2017. Training will continue until sufficient technical capabilities are achieved.

5. **Financial – The City should adopt an appropriate rate structure and administrative policies for the water system**

The City is currently undertaking a rate analysis based on the mayor's recommended water source selection. The Cost of Service analysis has been completed and provided to the FWICC Rate Subcommittee for comments. Comments have been received from the Subcommittee and these comments are being considered in the rate design. Upon completion of the rate study, appropriate rate adjustment will be considered when developing the 2018 budget.

Deficiencies

6. **Storage – The Cedar Street Reservoir requires an inspection**

The City agrees that Cedar Street Reservoir requires an inspection. However, before this inspection can be undertaken, a distribution system storage analysis is required to determine if West Side and Dort Reservoirs must be repaired/upgraded and placed in-service before draining Cedar Street Reservoir. This analysis is currently being performed by Arcadis. Hopefully, inspection of Cedar Street Reservoir can occur in 2018.

7. **Operator Compliance – The City has been unable to recruit and retain a properly-certified operator-in-charge, and is also having difficulty reaching desired staffing levels.**

Please see response to number 4. The City is interviewing candidates with appropriate credentials to be the certified operator-in-charge for the Flint water system. Additionally, Flint will continue to train existing operators to promote their achieving higher licensing levels. Hopefully, an existing operator will obtain the required licensing level through the MDEQ testing in November.

8. **Security – The City has not provided an updated Emergency Response Plan for DEQ review.**

The Emergency Response Plan will be updated by June, 2018.

Recommendations

9. **Source – An evaluation of the reliability of utility power and the need for an on-site emergency generator should be completed.**

The current treatment plant site receives electric power from two independent substations. This redundant power feed has historically provided a reliable electric power source to the treatment plant. Additional power source reliability should not be required.

10. **Treatment – Additional features should be added to the treatment system currently in operation at CS-II to enhance treatment reliability and consistency, as well as operator safety.**

The current chlorine, orthophosphate and caustic soda feed system were constructed as "temporary" facilities to treat GLWA water until a long-term water source was selected. If GLWA is designated as the long-term primary water source, the existing facilities will be modified to improve process control and monitoring, reliability, redundancy and ease of operation. Design of these improvements by CDM-Smith has commenced and will be completed after the water source selection is finalized. Construction will be completed in 2018.

11. **Distribution System – The City should plan financially for periodic updates of the General Plan, Asset Management Plan and Capital Improvement Plan.**

The City will either budget for periodic updates of these Plans or develop the in-house capabilities to properly modify the Plans to reflect changing conditions.

12. **Distribution System – The design of future water main replacement projects should strongly consider water age/water main sizing.**

A hydraulic model of the Flint distribution system has been develop and calibrated. This tool predicts water age under various hydraulic conditions in the distribution system. A storage analysis is also currently being conducted to optimize system storage considering peak demand requirements and the impact of water age on water quality. The results of these analyses will be used to develop the scope and timing of required distribution system capital improvement projects.

13. **Storage – A back-up power supply should be provided for the Cedar Street Reservoir booster station.**

The Cedar Street switchgear is compatible with the hook-up of a mobile generator. The City will either purchase a properly sized portable generator to service the booster station during a power outage or outsource this emergency response to a qualified vendor.

14. Pumps – Upgrades to the Torrey Road and Cedar Street booster pumps should be completed.

The Torrey Road booster pumps will be installed in 2018. The installation of pumps and VFDs in the Cedar Street booster station is included in a list of projects that will request WIIN/DWRF funding. A Project Plan will be submitted for this funding by December, 2017. Assuming the funding is approved, design will be completed in 2018 and installation in 2019.

15. Monitoring and Reporting – The City should begin planning financially for staff to complete all monitoring and reporting requirements.

As previously stated, the City will be fully staffed by the end of 2017. This staffing includes the water quality and laboratory support personnel to achieve MDEQ monitoring and reporting requirements, including the requirements of the Lead & Copper Rule.

The City recognizes that all ***significant deficiencies*** will not be corrected within the 120 day corrective action time period mandated in your letter. However, once a water source selection is finalized, staffing levels are enhanced, a Program Manager is contracted and SOPs are completed, the City will have made significant progress toward improving the quality and reliability of its water system operation.

If you have clarifying questions and/or need additional information, please contact me at (810) 237-2035 or via email at kweaver@cityofflint.com.

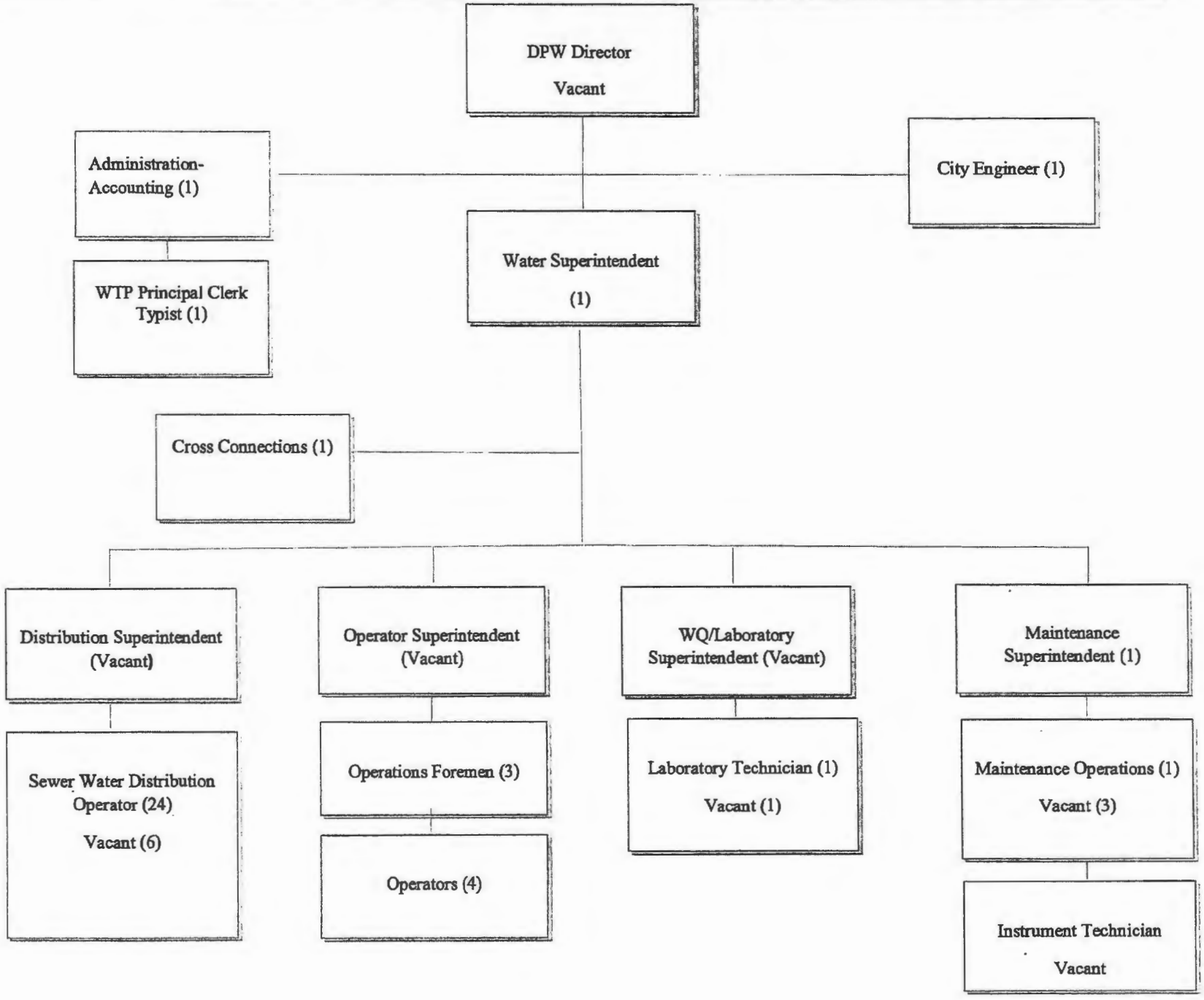
Respectfully submitted,

Karen W. Weaver

Dr. Karen W. Weaver
Mayor

cc: Mr. Eric Oswald, MDEQ
Mr. Sylvester Jones, City of Flint
Mr. Rob Bincsik, City of Flint
Mr. Mark Adas, City of Flint

Attachments:
City of Flint Correspondence to USEPA – August 18,2017
Flint Water Organization Chart


DPW Director
Vacant
Administration-Accounting (1)
City Engineer (1)
WTP Principal Clerk Typist (1)
Water Superintendent (1)
Cross Connections (1)
Distribution Superintendent (Vacant)
Operator Superintendent (Vacant)
WQ/Laboratory Superintendent (Vacant)
Maintenance Superintendent (1)
Sewer Water Distribution Operator (24)
Vacant (6)
Operations Foremen (3)
Operators (4)
Laboratory Technician (1)
Vacant (1)
Maintenance Operations (1)
Vacant (3)
Instrument Technician
Vacant

Attachment C

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
SAGINAW BAY DISTRICT OFFICE

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

March 21, 2018

The Honorable Karen W. Weaver, Mayor
City of Flint
1101 South Saginaw Street
Flint, Michigan 48502

Dear Mayor Weaver:

SUBJECT: Water System Sanitary Survey, WSSN: 2310

The Department of Environmental Quality (DEQ) has reviewed the city of Flint's (City) efforts to resolve the Significant Deficiencies and Deficiencies identified in our 2017 sanitary survey of the City water system. The City, the DEQ, and the U.S. Environmental Protection Agency (EPA) have been working closely to address these issues.

The Significant Deficiencies, Deficiencies, and Recommendations listed below were identified in our sanitary survey, and the City provided a response in your September 8, 2017 letter. Based on your response, and several discussions with City staff and contractors, we have the following comments.

Significant Deficiencies

1. **Source – The City has failed to select a long-term water supply source.**

This issue is resolved. The City executed a 30-year water supply agreement with the Great Lakes Water Authority (GLWA), with an effective date of December 1, 2017. Selection of a long-term water source allows the City to move forward with addressing other water system issues.

2. **Distribution System – The City's cross connection control program is not being implemented in a satisfactory manner.**

This issue is unresolved. The City has stated its intent to fill the vacant cross connection manager position and resume cross connection control activities but has been unable to hire a permanent employee for the manager position. It is our understanding that the City is negotiating for temporary, contractual assistance to oversee its cross connection control program. The use of contractual services to implement the program is acceptable to DEQ. A permanent or contractual cross connection manager must be in place, and routine cross connection control program activities must resume, by June 20, 2018. Implementation of the cross connection program will be evaluated under item 4 (System Management and Operation) below.

3. **Distribution System – the City has not provided details about maintenance and replacement programs and/or Standard Operating Procedures (SOPs) for hydrants, valves, meters, and galvanized service lines.**

This issue is unresolved. Several SOPs were prepared for the City by the Arcadis Group as part of the City's Distribution System Optimization Plan, but the City has not indicated its formal approval of the SOPs. For each Distribution System SOP, the City must provide the following to the DEQ by April 20, 2018: a signed, dated copy of the SOP (if the City intends to implement the SOP as written), or a statement indicating that a revised SOP is necessary. If revised SOPs are necessary, signed, dated copies of the revised SOPs must be submitted to us by May 21, 2018. Also, an SOP for galvanized service lines was not submitted and a signed, dated copy must be provided by May 21, 2018. The City's implementation of the approved SOPs will be evaluated under item 4 (System Management and Operation) below.

4. **System Management and Operation – The DEQ does not have confidence that the City can continue to demonstrate the Technical, Managerial, and Financial (TMF) capacity necessary to consistently operate the water system in accordance with Act 399 after the current technical and training assistance contracts expire.**

The overall issue of demonstrating adequate TMF capacity remains unresolved until the other Significant Deficiencies and Deficiencies identified in this letter are appropriately addressed. The DEQ will continue to work with the City and with EPA to ensure TMF capacity is maintained.

5. **Financial – The City should adopt an appropriate rate structure and administrative policies for the water system.**

This issue is unresolved. Selection of a long-term water source has allowed the City to begin financial planning; however, a water rate structure must be implemented that allows the City to properly operate and maintain the water system. The City must notify us by May 21, 2018, of your plan to implement a sufficient rate structure, including an effective date for any new rates.

Deficiencies

6. **Storage – The Cedar Street Reservoir requires an inspection.**

This issue is unresolved; however, the DEQ agrees the distribution system storage analysis should be completed before an inspection plan and schedule are developed for the Cedar Street Reservoir. The City projects the analysis will be completed and the reservoir inspection will take place in 2018. The inspection must be completed, and an inspection report and plan for completing any necessary improvements must be submitted to us, by September 28, 2018.

7. **Operator Compliance – The City has been unable to recruit and retain a properly-certified operator-in-charge, and is also having difficulty reaching desired staffing levels.**

This issue is unresolved. The City has been unsuccessful in its attempts to recruit and hire critical water system staff. The City must supply a full-time operator-in-charge on a permanent or contractual basis and sufficient staffing on a permanent or contractual basis to conduct continuous treatment system operations by June 30, 2018.

8. **Security – The City has not provided an updated Emergency Response Plan for DEQ review.**

This issue is unresolved; however, the City has committed to competing the Emergency Response Plan by June 2018. We interpret this to mean an updated plan will be submitted to DEQ by June 30, 2018. This schedule is acceptable to the DEQ.

Recommendations

9. **Source – An evaluation of the reliability of utility power and the need for an on-site emergency generator should be completed.**

This issue is resolved. The selection of a long-term water source has made an evaluation of the power supply to the water treatment plant unnecessary. Power needs may be considered during the design of permanent chemical feed facilities (item 10 below).

10. **Treatment – Additional features should be added to the treatment system currently in operation at CS-II to enhance treatment reliability and consistency, as well as operator safety.**

Design of chemical feed system improvements must be completed by December 31, 2018, and construction must be completed by December 31, 2019.

11. **Distribution System – The City should plan financially for periodic updates of the General Plan, Asset Management Plan and Capital Improvement Plan.**

The City indicated its intent to budget for periodic updates or develop in-house capability to complete these tasks. The cost of completing this task must be reflected in your water rates/budget.

12. **Distribution System – The design of future water main replacement projects should strongly consider water age/water main sizing.**

The City indicated its intent to use the recently-developed hydraulic model of the distribution system during the design of water system improvements. This is acceptable to the DEQ.

13. **Storage – A back-up power supply should be provided for the Cedar Street Reservoir booster station.**

The City indicated its intent to either purchase or arrange for the use of a properly-sized portable generator at the Cedar Street Reservoir. The generator should be purchased, or the emergency services contract should be executed, by December 31, 2018.

14. **Pumps – Upgrades to the Torrey Road and Cedar Street booster pumps should be completed.**

The City indicated the Torrey Road pumps will be installed in 2018, and upgrades to the Cedar Street pumps will be designed in 2018 and completed in 2019. This schedule for completing the work is acceptable to the DEQ.

15. **Monitoring and Reporting – The City should begin planning financially for staff to complete all monitoring and reporting requirements.**

The City indicated its intent to have adequate staffing and laboratory facilities to complete these tasks. The cost of completing this task must be reflected in your water rates/budget.

If you have any questions, please contact me at the phone number listed below or by email to londonr@michigan.gov.

Sincerely,

Robert A. London, P.E.
Surface Water Treatment Engineer
Engineering Unit
Drinking Water and Municipal Assistance Division
989-450-7834

bl/ajl
cc: Mr. Mark Adas, City of Flint
Mr. Rob Bincsik, City of Flint
Mr. Robert Jones, F&V Operations
✓Mr. Eric Oswald, DEQ
Ms. Sue Maul, DEQ

City of Flint Water Department
Technical, Management and Financial Capacity

The City of Flint (COF) has identified its long-term water source and has initiated the implementation of selected projects necessary to enhance the reliability and quality of its water system. However, the enduring sustainability of its system can only be achieved if the COF has the proper technical, managerial and financial (TMF) capacity to properly operate the system. This requirement is recognized in USEPA's First Amendment to Flint's Emergency Administrative Order (Paragraph 60.b.iii) and Michigan DEQ's August, 2017 Water System Sanitary Survey.

To help define the TMF capacity requirements of the COF water system, Arcadis of Michigan LLC (Arcadis) recently completed a report entitled "Water Distribution System Optimization Plan". This analysis developed a 20-year Capital Improvement Program (CIP), an Asset Management Program, staffing requirements, performance metrics and Standard Operating Procedures (SOPs) for the COF Water Department.

The revenue generated by the COF Water Department is not sufficient to support the current operating costs of the system. This discrepancy results for several reasons – low collection rates, declining population, inaccurate meters, loss of industrial/commercial customers, and water theft. To achieve "Cost of Service" rates under current conditions, annual rate increases of 20%, 16% and 10% would be required over the next three (3) years. If collection rates were return to a level closer to industry standards (95%), three 10% rate adjustments would still be required to achieve sufficient revenue. While alternative rate design were investigated to minimizes residential customer rate impact, such as inclining block rates, none of these alternative rate designs were deemed to be politically or financially feasible.

The political and financial environment in Flint is not amenable to implementing a customer rate increase over the next several years. Therefore, revenue enhancements must be achieved through improving collections and reducing the physical and commercial water losses associated with non-revenue water. A projected five-year forecast for Water Department revenue has been developed based on the following assumptions:

- Increase Water Department revenue by adjusting the water/wastewater revenue allocation from 45%/55% to 50%/50%.
- Increased sales to General Motors ($0.4M/year)
- Improve collection rates from approximately 70% to 80% in 2019, 90% in 2020 and 95% in 2021.
- One-half of current non-revenue water (25% of purchased water) results from commercial losses (meters and theft). These losses are converted to additional revenue by the meter replacement program and an aggressive water theft prevention program
- No customer rate increases

Based on these assumptions, the Water Department revenue would be:

	FY2019	FY2020	FY2021	FY2022	FY2023
Base revenue with improved collections	$31M	$35.4M	$40M	$42M	$42M
Improved metering and eliminate water theft			$5M	$10M	$20M
Total revenue	$31M	$35.4M	$45M	$52M	$62M

It is assumed that the revenue benefits from the metering/theft programs would not be realized until after all meters are installed by the end of 2019. However, some theft issues could be resolved concurrent with meter replacement.

Future operating costs will be primarily impacted by staffing levels. Arcadis has recommended that the following positions be added to provide the appropriate TMF capacity.

- Laboratory Technician
- Cross Connection Program Manager
- Water Distribution Valve and Hydrant Crew (3)
- Customer Service/ Call Center Staff (4)
- Enterprise Asset Manager
- GIS Specialist/ Hydraulic Modeler
- Construction Inspectors
- Leak Detection Team
- Flushing Team (2)

The first six listed positions are considered "high priority". The current COF Water Department budget does include the laboratory and cross connection positions because they are directly related to water quality issues. The remaining positions have not been included in the five year plan due to budget constraints and the challenge of attracting qualified personnel. The total annual costs of these positions would be approximately $1M.

The currently forecasted operating costs for the COF Water Department are presented below.

	2018	2019	2020	2021	2022
Projected Operating Costs	$34.5M	$36M	$37M	$38M	$38.3M

Given the lack of investment in the Flint water system for several decades, the future capital expenditure requirements are significant. Over the next two years, approximately $80M of WIIN grant funds have been designated for the COF to complete numerous capital projects that enhance the water system reliability, revenue and water quality management. However,

significant additional investment is required to support small main replacement, a cross connection control program, a customer service center, valve and hydrant replacement, SCADA and security upgrades and a water loss program for the COF water system. Arcadis has identified over $300M of capital expenditure requirements over the next 20 years with the majority of these projects being small main replacement. Unfortunately, the COF will be challenged to find the funding for these projects.

The table below helps define when funds may be available to hiring additional staff and invest in the system if the revenue enhancement programs are successful.

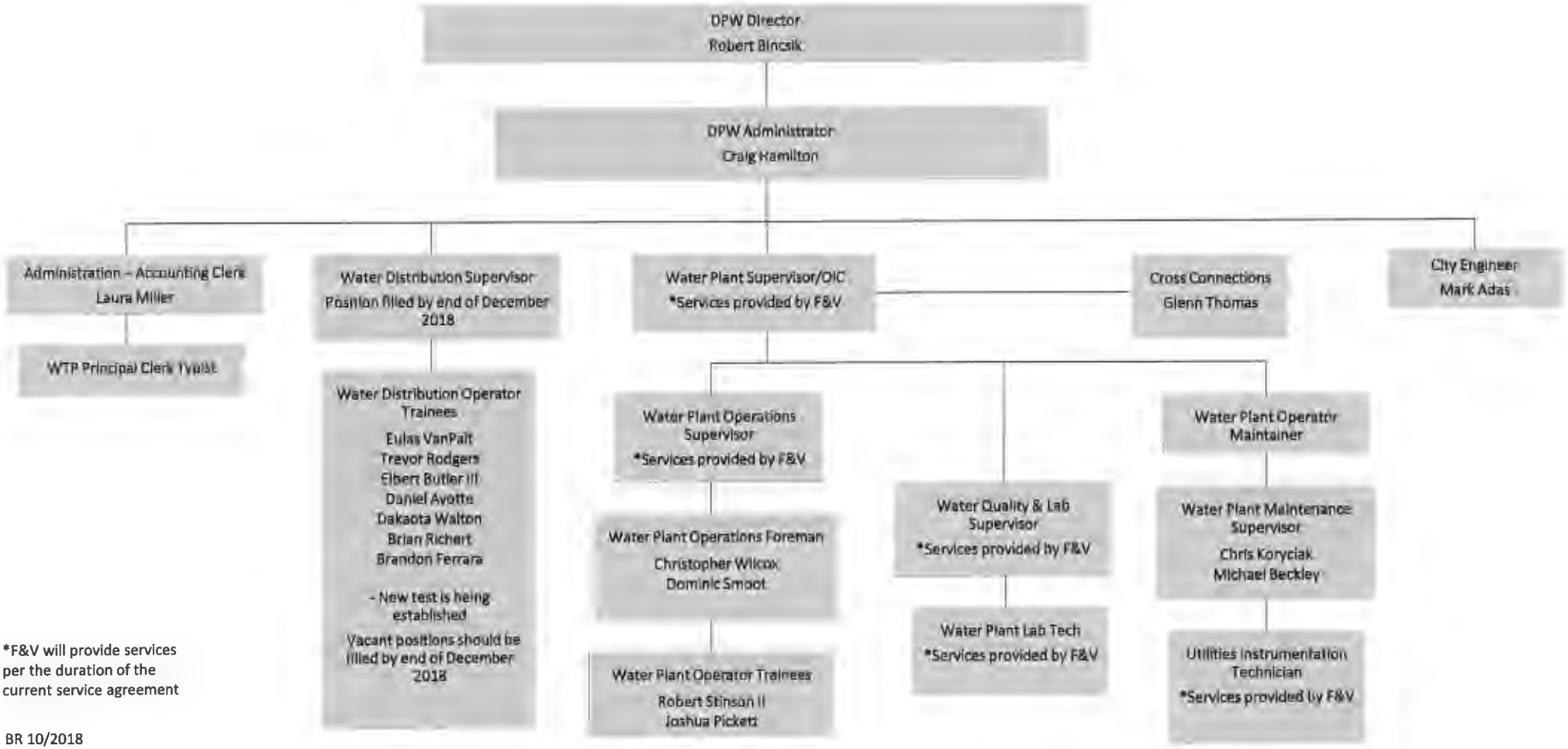
	FY2019	FY2020	FY2021	FY2022	FY2023
Revenue	$31M	$35.4M	$45M	$52M	$62M
Operating Costs	$34.5M	$36M	$37M	$38M	$38.3M
Water Fund Balance*	$8.5M	$7.9M	$9M	$9M	$9M
Funds available for staffing and/or capex			$6.9M	$14M	$23.7M

*Beginning Water Fund balance = $12M; Water Fund balance should be approximately 25% of O&M costs

Therefore, given the above discussion, the COF proposes the following plan to achieve its TMF capacity requirement:

1. Fill all COF Water Department staffing vacancies at the earliest possible date, including the laboratory technician and cross connection program manager positions. Until all vacancies are filled, outsource critical responsibilities not covered by existing staff. For regulatory acceptance, this will require committing to specific dates for hiring each position and executing contracts for outsourcing.
2. Initiate and complete the meter replacement program by the end of 2019 to enhance system revenue with more accurate and reliable meters. In conjunction with the meter replacement program, inspect the premise of all active and inactive customer accounts to identify and resolve water theft issues. Continue with an aggressive water theft prevention program. Additionally, in conjunction with the meter replacement program, collect data to assist with the prioritization of cross connection activities.
3. Adhere to water bill collection policies to return collection rates to industry standards by 2021 (greater than 95%)
4. Efficiently and effectively complete a majority of the WIIN funded construction projects in 2018 and 2019. Given the size of this program and Flint's history of limited capital projects within its distribution system, it would be difficult to perform any additional City-funded capital projects during this time period.
5. Closely monitor projected vs. actual revenues and identify and correct any variances.
6. Assuming projected system revenues are achieved through the meter, collections and water theft programs and revenues are further enhanced by community development activities, begin implementing the staffing and capital program recommended in the Arcadis report in FY2021.

Organizational Chart
Utilities Water Division



*F&V will provide services per the duration of the current service agreement

BR 10/2018

Attachment C

VOLUNTARY AGREEMENT BETWEEN THE CITY OF FLINT AND THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

I. PREAMBLE

This agreement replaces the order the Department of Environmental Quality (DEQ) issued to the City of Flint (City) on October 22, 2018 under the Michigan Safe Drinking Water Act (Order). Upon execution of this agreement, the Order shall be deemed terminated and shall have no legal effect, it not having become "final" in accordance with the law.

The parties agree to work collaboratively to ensure that the City's water system achieves the goal of long-term self-reliance: a goal shared by both parties. To achieve that shared goal, the parties agree to the following:

II. TERMS

A. No later than January 31, 2019, the City will formally adopt the cross-connection control program that the DEQ approved on December 11, 2018. (Attachment A.)

B. The City will implement the timeline for the approval of outstanding Standard Operating Procedures that the DEQ approved on December 11, 2019. (Attachment B.)

C. The City provided DEQ with a July 25, 2018, Technical, Management, and Financial Capacity proposal in which the City explains its plan to achieve its technical, managerial, and financial (TMF) capacity by fiscal year (FY) 2023 (Attachment C). The City acknowledges that the revenue generated by the

City's Water Department is not enough to support the operating costs of the City's water system long-term but does not believe it would be politically or financially possible to increase customer rates until several years from now. So the City's TMF proposal describes the steps the City plans to take leading up to FY 2023 to achieve TMF capacity without raising customer rates. Beginning every six (6) months from the date of approval of the TMF plan by the MDEQ, until the City achieves TMF capacity, the City agrees to provide a signed statement to the DEQ that describes the City's progress towards completing its plan to achieve TMF capacity by FY 2023 (Progress Report). The Progress Report will also include an evaluation showing that the City can achieve TMF capacity by FY 2023 without increasing customer rates.

D. The City will use its best efforts to implement the timeline for filling vacant positions identified in the updated organizational chart the City provided the DEQ on December 12, 2018 no later than February 5, 2019. (Attachment D.)

E. The City confirms that it has authorized the contractor who serves as the Operator in Charge of its water plant to direct city employees in the plant not employed by that contractor to make any changes to plant operations required by the contractor, subject to the ultimate authority of the City Director of Public Works.

F. The City agrees to complete the design of chemical feed system improvements by March 31, 2019 and submit them for DEQ review and approval. The City

agrees to complete construction of the chemical feed system improvements by December 31, 2019.

G. The City agrees that by March 31, 2019, it will complete a preliminary inspection of the Cedar Street Reservoir using a remotely operated vehicle (which does not require taking the reservoir out of service) or, preferably, by using a method that allows the City to inspect one chamber of the reservoir at a time without taking the reservoir completely out of service. The City will then submit to the DEQ the inspection report and plan for completing any necessary improvements of the Cedar Street Reservoir identified by the preliminary inspection. The City agrees to also complete a full inspection of the Cedar Street Reservoir within 45 days of the date the Dort Reservoir is brought into service. The City agrees to submit to the DEQ an inspection report and plan for completing any necessary improvements of the Cedar Street Reservoir identified by both inspections after the Dort Reservoir is brought into service.

H. The City agrees that by January 31, 2019, it will execute a contract for emergency services at the Cedar Street Reservoir that will guarantee the provision of a generator that is compatible with the reservoir's electrical system. The City agrees to maintain the contract until the date it successfully implements its redundancy plan involving the Dort Reservoir and Genesee County.

I. The City agrees that by July 1, 2019, it will complete the design of upgrades to the Cedar Street Reservoir pumps and submit the design to the DEQ for review and approval. The City also agrees to complete the upgrades to the Cedar Street Reservoir by March 31, 2020.

J. The City agrees to submit a plan by January 31, 2019 explaining how it will provide both the services currently provided by John Young once his contract is no longer funded, and the services previously provided by Nick Pizzi now that his contract is no longer funded.

K. Attachments B, C, and D and their respective deadlines are incorporated into this agreement.

III. SUBMISSIONS

A. The City will send all submissions required by this agreement to the DWMAD Director at DEQ, DWMAD, P.O. Box 30817, Lansing, Michigan 48909-8311 or by email, as appropriate. With each submission, the City will include a cover letter that identifies the specific paragraph of this agreement to which it pertains. If appropriate, the cover letter may be email correspondence, and may refer to more than one paragraph.

B. If the DEQ disapproves of a submission, it will notify the City, in writing, specifying its reasons for such disapproval. Within 30 days of the date of the DEQ's written disapproval, the City will deliver a revised submission that addresses the issues identified in the DEQ's notice of disapproval. If the

City's revised submission is still not acceptable to the DEQ, the DEQ will notify the City of this disapproval.

C. In the event the DEQ approves of the City's submission subject to specific modifications, it will notify the City, in writing, specifying the modifications required to be made to the submission prior to its implementation and the specific reasons for such modifications. The DEQ may require the City to submit, prior to implementation and within 30 days of the date of DEQ's written approval subject to specific modifications, a revised submission that addresses such modifications. If the City's revised submission is still not acceptable to the DEQ, the DEQ will notify the City of this disapproval.

D. Upon DEQ approval, or approval with modifications, of a submission, such submission shall be incorporated by reference into this agreement and shall be enforceable in accordance with the provisions of this agreement.

E. The failure by the City to submit an approvable submission within the applicable time periods specified above constitutes a violation of this agreement and may subject the City to the enforcement provisions of this agreement.

F. Any delays caused by the City's failure to submit an approvable submission when due shall in no way affect or alter the City's responsibility to comply with any other deadline(s) specified in this agreement.

G. No informal comments by the DEQ regarding any submission made by the City will be construed as relieving the City of its obligation to obtain written approval when required to do so by this agreement.

IV. EXTENSIONS

A. The City and the DEQ agree that the DEQ may grant the City a reasonable extension of the deadlines specified in this agreement. The City will submit extension requests to the DEQ in writing no later than ten (10) business days prior to the pertinent deadline. The City's extension request shall describe the circumstances the City believes will prevent the City from meeting the deadline(s); describe the measures the City has taken and/or intends to take to carry out the responsibility imposed on City under this Agreement for which a deadline extension is requested; and state the length of the extension requested and the specific date on which the obligation will be met.

B. The DEQ will respond in writing to extension requests. No change or modification to this agreement is valid unless in writing from the DEQ and, if applicable, signed by both parties. In considering extension requests, the DEQ shall take into account the purpose of this agreement as set forth in the Preamble.

C. Extension requests and responses may be delivered by email.

V. REPORTING OF VIOLATIONS

A. The City will report any violations of the terms in Section II of this agreement no later than the close of five (5) business days following detection of such violation(s) and will send a written report to the DEQ within ten (10) business days following detection of such violation(s). The written report will include a detailed description of the violation(s), as well as a description of any actions proposed or taken to correct the violation(s). The City will report any anticipated violation(s) of this agreement to the DEQ in advance of the relevant deadlines whenever possible.

VI. RETENTION OF RECORDS

A. Upon request by an authorized representative of the DEQ, the City will make available to the DEQ all records, plans, logs, and other documents required to be maintained under this agreement, the Safe Drinking Water Act, or its rules. All such documents will be retained by the City for at least a period of three (3) years from the date of generation of the record unless a longer period of record retention is required by law.

VII. RIGHT OF ENTRY

A. The City will allow any authorized representative or contractor of the DEQ, upon presentation of proper credentials, to enter upon the premises of those City facilities related to water storage, distribution and treatment at all reasonable times for the purpose of monitoring compliance with the

provisions of this agreement. This paragraph in no way limits the authority of the DEQ to conduct tests and inspections pursuant to the Safe Drinking Water Act or any other applicable law.

VIII. ENFORCEMENT

A. The City agrees that if it does not meet the deadlines identified in Section II without obtaining an extension under Section IV, that the DEQ is empowered to assess and to require the City to pay monetary penalties. If notwithstanding the provisions of section III regarding City submissions and DEQ responses, and if all requested extensions have been exhausted or denied, the DEQ determines it will assess monetary penalties, the City acknowledges the following penalties will apply until the day the deadline is met: $200 per violation per day for one to seven days of violation; $300 per violation per day for eight to 14 days of violation; and $500 per violation per day for each day of violation thereafter. In no event shall any fines or penalties exceed those authorized by law.

B. All assessments of penalties issued by the DEQ under this agreement must be delivered to the City in writing, which shall specifically identify by reference to sections of this agreement and reference to the City's submission (or lack thereof if the failure to make a submission is the basis for the penalty) the violation for which such penalty is being assessed. Penalty assessments may be delivered via email.

C. The City agrees to pay all funds due pursuant to this agreement by check made payable to the State of Michigan and delivered to the Accounting Services Division, Cashier's Office for the DEQ, P.O. Box 30657, Lansing, Michigan 48909-8157. To ensure proper credit, all payments made pursuant to this agreement must include the Payment Identification No. RMD90037.

D. The City agrees not to contest the legality of any penalties assessed pursuant to this section but reserves the right to dispute the factual basis upon which a demand by the DEQ for penalties is made.

E. In addition to the penalties described in this section, the DEQ reserves the right to pursue appropriate action, including injunctive relief, to enforce the provisions of this agreement. The DEQ is precluded from seeking both a penalty under this agreement and a statutory fine for the same violation.

F. This agreement does not affect the City's responsibility to comply with any other applicable local, state, or federal laws or regulations.

IX. TERMINATION

A. This agreement will remain in effect until terminated by the DEQ. If the City believes it has fully satisfied the obligations it has agreed to, it will submit a written certification to the DEQ that its obligations are satisfied, including the payment of any applicable penalties, if any. The certification will include: the date of compliance with each provision of the terms in Section II, and the date applicable penalties were paid under Section VIII; a statement that all required information has been reported to the DEQ; and

confirmation that all records required to be maintained pursuant to this agreement are being maintained.

B. The DEQ may request additional relevant information after receiving the City's certification and request but before terminating the agreement. The DEQ will not unreasonably decline to terminate the agreement.

SIGNATORIES

The undersigned CERTIFY they are fully authorized by the party they represent to enter into this agreement and to EXECUTE and LEGALLY BIND that party to it.

CITY OF FLINT

By: Dr. Karen W. Weaver, Mayor

Date: Dec 17, 2018 w/permission

DEPARTMENT OF ENVIRONMENTAL QUALITY

By: Eric Oswald, Director
Drinking Water and Municipal Assistance Division

17-Dec-18
Date

APPROVED AS TO FORM:

By: Nathan A. Gambill (P75506)
Assistant Attorney General
Environment, Natural Resources, and Agriculture Division
Department of Attorney General
P.O. Box 30755
Lansing, Michigan 48909

Dec 17, 2018
Date

ATTACHMENT A

DEPARTMENT OF PUBLIC WORKS

Dr. Karen Weaver
Mayor

Robert Bincsik
Director

November 14, 2018

Under part 14 of the Michigan Safe Drinking Water Act, PA 399, "A water utility shall develop and maintain a comprehensive control program for the elimination and prevention of all cross connections. A cross connection is a connection or arrangement of piping or appurtenances through which backflow of non-potable water could flow into the public drinking water supply."

The Cross Connection Control Program for the City Of Flint consists of the following:

The program, first started in 1974 and given authority under City of Flint ordinance Chapter 46 Division 4 and with reference to the Michigan Department of Environmental Quality Cross Connection Rules Manual, tracks and requires annual testing of all testable backflow prevention devices in use on plumbing systems in residential, commercial and industrial applications throughout the City. These tests come due twice a year in either January or July, depending on when the device was installed/repaired. Test reminders are mailed out at least 30 days prior to each due date. Customers that are found to be in violation of this ordinance are given 10 business days to comply, or could face termination of water service and/or fines until the hazard has been eliminated. Further, all commercial/industrial/institutional plumbing systems are examined periodically to ensure compliance with all applicable codes and rules.

Accounts that are considered to be medium and high hazard risks of backflow are to be inspected once per year. Systems deemed low hazard are to be inspected once in every three-year period. While the exact number of inspections vary almost daily due to businesses opening/closing or being remodeled, the current number of occupied low hazard accounts is 1,920. The current number of active medium/high hazard accounts in the system is 351.

As of now, the program maintains one inspector and, when budget allows, a part time clerical position. Presently, the inspector does all of the inspection and clerical duties. Inspection durations can vary from a few minutes to several days, depending on the complexity of the system. Enforcement assistance is also available from the Building Inspection department and code enforcement on a continuing basis.

Attached, is an excerpt taken from the MI DEQ Cross Connection Rules Manual that further explains what types of risks our water system may face.

Glenn Thomas

Plumbing/Mechanical/Cross Control Inspector
City of Flint
810-787-6537 Ext. 3516
gthomas@cityofflint.com

CITY OF FLINT, MICHIGAN

Dr. Karen W. Weaver
Mayor

Under part 14 of the Michigan Safe Drinking Water Act, PA 399 last amended in 1976, A water utility shall develop and maintain a comprehensive control program for the elimination and prevention of all cross connections. A cross connection is a connection or arrangement of piping or appurtenances through which backflow of nonpotable water could flow into the public drinking water supply.

The Cross Connection Control program for The City of Flint consists of the following.

The program, first started in 1974 and given authority under City Of Flint Ordinance Chapter 46 tracks and requires annual testing of all testable backflow prevention devices used on plumbing systems in residential, commercial, and industrial applications throughout the city. These tests come due twice a year in either July or January depending on when the device was first put into service. We mail out test reminder letters at least 30 days prior to each due date. Customers that are in violation of this ordinance are given ten business days to comply and then face shut off of water service and/or fines until the hazard has been eliminated.

Testable devices considered as medium and high hazard risk are to be inspected once a year.
Systems deemed to be low hazard are inspected once in each three year period. While the exact number of inspections vary almost daily due to some businesses closing and others being started or remodeled, the current number of low hazard accounts is at 2071, and 1266 medium/high hazard devices. The program maintains one inspector and when budget allows a part time clerical position. Currently the inspector does all inspection and clerical duties. Inspection times vary from a few minutes to several days depending on the complexity of the system.

The Cross Connection Control inspector also assists City water and sewer operations as needed, works with laboratory operators, and helps to resolve customer complaints. He also inspects and consults on construction blueprints and permits as necessary to protect the integrity of our potable water system. He enforces the City Of Flint ordinance, The Michigan adopted Plumbing Code, Mechanical Code, NFPA, and the Cross Connection Rules from the Michigan Department of Environmental Quality as they pertain to maintaining the safety of our drinking water.

Attached is an excerpt taken from the Cross Connection Rules Manual that further explains what type of risks our water system may face.

Glenn Thomas

9-6-18

Cross Connection Control Inspector
City of Flint

DEPARTMENT OF PUBLIC WORKS

Dr. Karen Weaver
Mayor

Robert Bincsik
Director

Ordinance Proposal
Cross Connection Control Program
City of Flint

Cross Connection Control Program for City of Flint

I. In accordance with the requirements set forth by the MI DEQ, City of Flint has officially adopted the state of Michigan cross connection rules to protect the Flint public water supply system. **Cross Connection** is defined as, "a connection or arrangement of piping or appurtenances through which a backflow could occur". **Backflow** is, "water of questionable quality, waste, or other contaminants entering a public water supply system due to a reversal of flow". The revised Cross Connection Control program will take effect upon approval of Flint City Council and DEQ approval.

II. The authority to carry out and enforce a local cross connection control program will be in accordance with city ordinance No. 46.

III. The Director of Public Utilities and/or his designated agent shall be responsible for making cross connection inspections, and reinspections to check for the presence of cross connections within the municipal water system. Individuals responsible for carrying out these inspections shall have obtained necessary training to current industry best practice.

IV. Schedule for Inspections
1. All known/suspected high, medium, low hazard establishments, including all industrial, commercial and municipal buildings will be inspected upon discovery.
2. All other building and water system connections, including residential accounts shall be inspected in a logical sequence as time permits.

V. Schedule for Reinspection
1. Reinspection of high and medium hazard accounts shall be conducted annually.

2. **Reinspection of all low hazard accounts shall be performed once in every three-year period.**

VI. **The methods to protect against backflow as outlined in the Cross Connection Rules Manual and the current MI Plumbing Code shall be incorporated into the City of Flint cross connection control program.**

VII. Time allotted for correction or elimination of any cross connection.

1. Cross connections which pose an imminent and extreme hazard shall be disconnected immediately and so maintained until necessary protective devices or modifications are made.
2. Other cross connections which do not pose an extreme hazard to the water supply system shall be corrected as soon as possible.

VIII. All testable backflow prevention assemblies shall be tested at the time of installation or relocation and after any repair. In addition, all testable devices shall be tested annually. These tests shall be performed by an individual certified to test/repair such devices in accordance with applicable plumbing codes. The results of such tests shall be submitted to the Utilities director or his agent no later than 30 days past the due date. The due date shall be January 1 or July 1, depending on the installation date of the device. Further, the test result shall be affixed to the device in an indelible and legible manor. Any testable device that is found to not be in compliance with any provisions of this ordinance may be liable for a fine not to exceed $500 per device per day, and/or disconnection of water service.

IX. The City of Flint shall maintain sufficient and accurate records of the cross connection control program and report annually to the DEQ on a form provided by the department.

DRAFT

ORDINANCE NO._____

An Ordinance to amend the Flint City Code of Ordinances by adopting Article II Division 4 Backflow Prevention; Chapter 46, Utilities; Section 46-34, Adoption- Cross Connection Policy and Manual.

IT IS HEREBY ORDAINED BY THE PEOPLE OF THE CITY OF FLINT:

Sec. 34. That Section 46-34 of the Code of the City of Flint shall be amended as follows.

§46-34 CROSS-CONNECTIONS — RESPONSIBILITIES AND MANUAL.
THE CITY ADOPTS BY REFERENCE THE WATER SUPPLY CROSS CONNECTION RULES OF THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY BEING R 325.11401 TO R 325.11407 OF THE MICHIGAN ADMINISTATIVE CODE. It shall be the duty of the **DEPARTMENT OF PUBLIC WORKS DIRECTOR** or his or her designee to cause inspections to be made of all properties served by the public water supply where cross-connections are deemed possible. The frequency of inspections and reinspection shall be based on potential health hazards involved and shall be established by the **DEPARTMENT OF PUBLIC WORKS DIRECTOR** or his or her designee and approved by the Michigan Department of Environmental Quality. **THE DEPARTMENT OF PUBLIC WORKS DIRECTOR SHALL ESTABLISH A CROSS CONNECTION CONTROL PROGRAM POLICY PURSUANT TO THE MICHIGAN SAFE DRINKING WATER ACT AND THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY CROSS CONNECTION RULES MANUAL AND MAY BE AMENDED BY THE DEPARTMENT OF PUBLIC WORKS DIRECTOR FROM TIME TO TIME BY THE DEPARTMENT OF PUBLIC WORKS DIRECTOR OR HIS OR HER DESIGNEE AS REQUIRED BY LAW.** The **DEPARTMENT OF PUBLIC WORKS DIRECTOR** or his or her designee shall have the right to enter, at any reasonable time, any property served by connection to the public water system of the City for the purpose of inspecting the piping system or systems thereof for cross-connections. On request, the owner, lessee or occupants of any property so served shall furnish to the inspection agency any pertinent information regarding the piping system or systems on the property. The refusal of such information or refusal of access, when requested, shall be deemed prima facie evidence of the presence of cross-connections. The **DEPARTMENT OF PUBLIC WORKS DIRECTOR** or his or her designee is authorized and directed to discontinue water service after reasonable notice to any property wherein any cross- connection or other violation of this section exists, and to take other precautionary measures deemed necessary to eliminate any danger of contamination of the City's potable water supply system. A person or business that fails to conform with any of the requirements thereof shall be assessed a fine not to exceed $500.00 per day per device. Water service to such property shall not be restored until the illegal water connection or cross-connection has been eliminated. Potable water supply made available on the properties served by the public water supply shall be protected from possible contamination as specified by this section and by the State of Michigan Plumbing Code and §§ 46-43.1 through 46-43.7. Any water outlet which is not supplied by potable water system must be labeled in a conspicuous manner as "water unsafe for drinking." (Ord. 3630, passed 12-13-2004; Ord. 3712, passed 5-12-2008)

Sec. 34. This ordinance shall become effective this ___ day of _____ 2018.

Adopted this _____ day of

_____A.D., 2018.

_____
Karen W. Weaver, Mayor

_____
Inez M. Brown, City Clerk

APPROVED AS TO FORM:

_____
Angela Wheeler, City Attorney

S:\AWO\Cross Connection\Revised Division 4 Backflow Prevention Chapter 46-accepted revisions.docx

(b) The following shall be considered sufficient evidence of the presence of organisms of the colon bacillus group within 24 hours of incubation at 37°C:

(1) The appearance of red, acid forming colonies of bacteria on Endo's medium plates; and

(2) The formation of gas in fermentation tubes containing lactose peptone broth.

(c) The culture medium used for these tests shall be prepared in accordance with standard methods of water analysis of the American Public Health Association, as set forth in the last revision of *Standard Methods of Water Analysis.*
(Ord. 9, passed 8-21-1917)

§ 46-30 INTERFERENCE WITH DEPARTMENT OF PUBLIC HEALTH.

It shall be unlawful for any person to interfere with the Department of Public Health or its duly authorized representatives in the inspection of water supply of any premises in the City, or to prevent such inspection, or to prevent the abatement of a nuisance created by an unwholesome and contaminated water supply.
(Ord. 9, passed 8-21-1917)

DIVISION 3. FLUORIDATION OF WATER SUPPLY

§ 46-31 FLUORIDATION REQUIRED.

The Water Division of the Department of Public Works and Utilities, in cooperation with the Department of Public Health, is hereby authorized and directed to institute fluoridation of the water supply of the City, in the approximate amount of one part fluoride to every million parts of water, and to do all things necessary to carry out the directive set forth in this section.
(Ord. 1815, passed 1-11-1965)

§ 46-32 SAME — COMPLIANCE DEPARTMENT OF PUBLIC HEALTH RULES.

The control and testing of water before and after fluoridation, the method of determining the fluoride content of the water and tests for the purity of the fluoride chemical shall, in all respects, comply with the rules and standards promulgated by the Department of Public Health.
(Ord. 1815, passed 1-11-1965)

§ 46-33 SAME — PURCHASE OF WATER FROM CITY OF DETROIT; UNFLUORIDATED WATER.

In the event the City purchases its water supply from the City of Detroit, the City shall purchase fluoridated water. In the event the City purchases its water supply from the City of Detroit, the Department of Public Health shall certify that the safeguards, as provided for in this article, have been provided for by the City of Detroit, and, if not, the City shall purchase unfluoridated water and shall provide the fluorides to be added to the water supply as provided for in this article.
(Ord. 1815, passed 1-11-1965)

DIVISION 4. BACKFLOW PREVENTION

§ 46-34 CROSS-CONNECTIONS — RESPONSIBILITIES.

It shall be the duty of the Utilities Director or his or her designee to cause inspections to be made of all properties served by the public water supply where cross-connections are deemed possible. The frequency of inspections and reinspection shall be based on potential health hazards involved and shall be established by the Utilities Director or his or her designee and approved by the Michigan Department of Environmental Quality. The Utilities Director or his or her designee shall have the right to enter, at any

reasonable time, any property served by connection to the public water system of the City for the purpose of inspecting the piping system or systems thereof for cross-connections. On request, the owner, lessee or occupants of any property so served shall furnish to the inspection agency any pertinent information regarding the piping system or systems on the property. The refusal of such information or refusal of access, when requested, shall be deemed prima facie evidence of the presence of cross-connections. The Utilities Director or his or her designee is authorized and directed to discontinue water service after reasonable notice to any property wherein any cross-connection or other violation of this section exists, and to take other precautionary measures deemed necessary to eliminate any danger of contamination of the City's potable water supply system. A person or business that fails to conform with any of the requirements thereof shall be assessed a fine not to exceed $500.00 per day per device. Water service to such property shall not be restored until the illegal water connection or cross-connection has been eliminated. Potable water supply made available on the properties served by the public water supply shall be protected from possible contamination as specified by this section and by the State of Michigan Plumbing Code and §§ 46-43.1 through 46-43.7. Any water outlet which is not supplied by potable water system must be labeled in a conspicuous manner as "water unsafe for drinking."
(Ord. 3630, passed 12-13-2004; Ord. 3712, passed 5-12-2008)

§ 46-35 REQUIRED TESTING OF BACKFLOW PREVENTION DEVICES.

All backflow prevention devices having external means of testing for proper operation shall be tested and the testing of these devices shall be accomplished by a State licensed journey person or master plumber who is certified in cross-connection control. A copy of the completed test results shall be filed, within 30 days after the anniversary date of the original installation. All testable devices shall be tested at the time of installation, after repair and every 12 months thereafter, or as often as the Utilities Director or his or her designee deems necessary to ensure the public safety, and submit a report to the Cross-Connection Control Department. All testable devices which have potable water supply, shall be tested every year. The reports shall be received by the Cross-Connection Control Department by January 1 or July 1 of each year as determined by the Cross-Connection Trades Supervisor. A plastic envelope shall be permanently attached to each testable device with a chain. The envelope will contain a card to keep test results of the device, the signature and State license number of the certified person performing the test. This card shall be updated after each test.
(Ord. 3630, passed 12-13-2004; Ord. 3712, passed 5-12-2008)

§ 46-36 CONNECTION TO BOILERS.

The potable water supply to all boilers other than one- and two-family dwellings shall be protected by an approved air gap or a reduced pressure principle backflow preventer. When boilers in one- and two-family dwellings have chemicals introduced into the system, the potable water connection shall be protected by an approved air or a reduced pressure principle backflow preventer. The potable water connection to the boilers in one- and two-family dwellings without chemical additives shall be protected by a double check-valve assembly with an intermediate atmospheric vent.
(Ord. 3630, passed 12-13-2004)

§ 46-37 PIPING IDENTIFICATION.

When a secondary water supply system is exposed to the public water system, all secondary water piping shall be identified by distinguishing color or tags and so maintained that each pipe may be traced readily in its entirety. All process water piping shall also be color coded or tagged. If piping is installed so that it is impossible to trace in its entirety, it shall be necessary to protect the public water supply at the

service connection in a manner acceptable to the Superintendent of the Department of Water and Sewer.
(Ord. 3630, passed 12-13-2004)

§ 46-38 POTABLE WATER CONNECTION TO COMMERCIAL APPLIANCES AND SINKS THAT REQUIRE AN AIR GAP ON THE WASTE DISCHARGE.

When potable water is supplied to one-, two- and three-compartment kitchen pot, pan and food preparation sinks, the waste shall discharge into a 12 x 12 x 8 inch floor or equal sink with a removable strainer. There shall be a minimum air gap of one inch from the end of the waste pipe to the top of the rim of the floor sink (see Table P-1505.1 1.1 of the State of Michigan Plumbing Code). Ice machines may discharge into a 6 x 6 x 4 floor sink or equal.
(Ord. 3630, passed 12-13-2004)

§ 46-39 NOTICE OF ACCIDENTAL BACKFLOW INCIDENT; PENALTY.

In the case of an accidental backflow incident, it is the responsibility of the user to immediately notify the Superintendent of the Department of Water and the Trades Supervisor of the Building and Safety Inspections Division of the incident. The notification shall include the location of the incident, the type of contamination, and any and all corrective actions including, but not limited to, containment. The City may terminate the water service to prevent contamination if in the determination of the Superintendent of the Department of Water that this action needs to be taken to protect the public water supply. Failure to comply with this section shall be deemed a misdemeanor and may be subject to a fine not to exceed $500.00 and/or 90 days in jail for each day that a violation remains in effect.
(Ord. 3630, passed 12-13-2004)

§ 46-40 WRITTEN NOTICE.

Within five days following a cross-connection incident, the user shall submit to the Building and Safety Inspections Cross-Connection Trades Supervisor a detailed written report describing the cause of the incident, and the measures that will be taken by the Supervisor to prevent future occurrences. Notification shall not relieve the user of any expense, loss, damage or other liability as a result of damage to persons or property; nor shall the notification relieve the user of any fines, civil penalties or other liability which may be imposed by this article or any other applicable law or ordinances.
(Ord. 3630, passed 12-13-2004)

§§ 46-41 – 46-47 RESERVED.

ARTICLE III. RATES AND CHARGES

DIVISION 1. WATER

§ 46-48 WATER SERVICE PLACED IN NAME OF PROPERTY OWNER OF RECORD; EXCEPTION.

(a) Effective June 1, 1986 or as soon thereafter as practicable, water service shall only be placed in the name of the property owner of record. Duplicate bills may also be sent to the service address if requested in writing by the property owner.

(b) However, in the case of industrial, commercial or residential rental property registered with the City pursuant to Ordinance 3271, or its subsequent amendments, where a legally executed lease contains a provision that the tenant, not the property owner of record, shall be liable for the payment of water or sewage system bills, and the tenant's birthdate, social security number and his or her driver's license or Michigan I.D. number, upon

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER AND MUNICIPAL ASSISTANCE DIVISION

2017 WATER SUPPLY CROSS CONNECTION REPORT

Issued under authority of 1976 PA 399, as amended. MCL 325.1001 et seq., and its administrative rules.
Failure to submit this form is a violation of the Act and may subject the water supply to enforcement actions.

Return the completed form by March 31, 2018 to the appropriate Department of Environmental Quality (DEQ) district office to comply with administrative Rule R 325.11405 that states "a water utility shall report annually to the department on the status of the cross connection control program on a form provided by the department." For district office addresses, visit www.michigan.gov/deq and click on Locations.

WSSN: 2310

A. Name of water system: City Of Flint County: Genesee

B. Year that the current written cross connection control program was approved by DEQ: 1974

C. Total number of industrial, commercial, institutional, residential, and governmental accounts that must be routinely reinspected for cross connections: 1815
Of this number,
- How many are High Hazard accounts: 305 Frequency of Reinspection: Once per: year
- How many are Low Hazard accounts: 1510 Frequency of Reinspection: Once per: 3 years

D. Number of accounts from line "C" that received an initial inspection in 2017: 0

E. Total number of reinspections required and completed in 2017 based on degree of hazard:
- High hazard reinspections required: 305 High hazard reinspections completed: 20
- Low hazard reinspections required: 503 Low hazard reinspections completed: 35

F. Number of accounts where a cross connection(s) was found to exist during inspections or reinspections in 2017: 20

G. Number of accounts from line "F" where corrective actions have been completed: 20

H. Total number of accounts from line "C" which are now in compliance with the local cross connection control program; H = C – (F - G): 1815

I. Total number of backflow prevention devices in system requiring testing: 987

J. Number of backflow prevention devices tested in 2017: 283

Outline briefly any changes or significant findings since last reporting. Use additional sheets if necessary.

Narrative Description of Program:

Added personnel should allow our CCC program to improve in 2018.

Name: Glenn Thomas

Title: Cross Connection Control Inspector Date: 05/09/2018

ATTACHMENT B

Date Submitted: November 18, 2018

Administrative Order Paragraph 3.4 Response

Water Treatment Plant Standard Operating Procedures	Compliance Now	Compliance Future
Phosphoric Acid Addition at Control Station #2	X	
Sodium Hydroxide Addition at Control Station #2	X	
Sodium Hypochlorite Addition at Control Station #2	X	
Sodium Hypochlorite Addition at Distribution Storage Facilities	X	
Sodium Hypochlorite Testing	X	
Hydrant Inspection, Testing and Maintenance	X	
Valve Inspection, Exercising and Maintenance		2021[1]
Backflow Preventer Testing and Repair	X	
Meter Installation, Inspection and Testing		2020[2]
Customer Complaint Tracking		2021[3]
Control Charting of Water Quality Parameters	X	
Conventional Flushing for Water Turnover		2021[4]
Unidirectional Flushing		2021[5]

[1] Pursuant to the City of Flint Water Department TMF Capacity Plan (See Attachment), Arcadis recommended the hiring of three Water Distribution Valve and Hydrant Crew. The City will have the funding available for these positions to implement this SOP in 2021.

[2] The Meter Installation project will be completed by the end of 2019. Therefore the City will be able to implement this SOP in 2020.

[3] Pursuant to the City of Flint Water Department TMF Capacity Plan, Arcadis recommended the hiring of four Customer Service and Call Center Staff. The City will have the funding available for these positions to implement this SOP in 2021.

[4] Pursuant to the City of Flint Water Department TMF Capacity Plan, Arcadis recommended the hiring of two Flushing Team staff. The City will have the funding available for these positions to implement this SOP in 2021.

[5] Pursuant to the City of Flint Water Department TMF Capacity Plan, Arcadis recommended the hiring of two Flushing Team staff. The City will have the funding available for these positions to implement this SOP in 2021.

Maintaining Distribution System Chlorine Residual	X	
Water Age Management		2020[6]
Emergency Repair of Water Mains	X	
Distribution Storage and Pumping Station Operation and Maintenance		2020[7]

[6] The improvements to Dort and Cedar Water Storage Facilities will be completed in 2020. Therefore the City will be able to implement this SOP in 2020.

[7] Based on the receipt of WIIN funding for the Dort and Cedar Street pumping stations, the City will have the funding to implement this SOP in 2020.

City of Flint Water Department

Technical, Management and Financial Capacity

The City of Flint (COF) has identified its long-term water source and has initiated the implementation of selected projects necessary to enhance the reliability and quality of its water system. However, the enduring sustainability of its system can only be achieved if the COF has the proper technical, managerial and financial (TMF) capacity to properly operate the system. This requirement is recognized in USEPA's First Amendment to Flint's Emergency Administrative Order (Paragraph 60.b.iii) and Michigan DEQ's August, 2017 Water System Sanitary Survey.

To help define the TMF capacity requirements of the COF water system, Arcadis of Michigan LLC (Arcadis) recently completed a report entitled "Water Distribution System Optimization Plan". This analysis developed a 20-year Capital Improvement Program (CIP), an Asset Management Program, staffing requirements, performance metrics and Standard Operating Procedures (SOPs) for the COF Water Department.

The revenue generated by the COF Water Department is not sufficient to support the current operating costs of the system. This discrepancy results for several reasons – low collection rates, declining population, inaccurate meters, loss of industrial/commercial customers, and water theft. To achieve "Cost of Service" rates under current conditions, annual rate increases of 20%, 16% and 10% would be required over the next three (3) years. If collection rates were return to a level closer to industry standards (95%), three 10% rate adjustments would still be required to achieve sufficient revenue. While alternative rate design were investigated to minimizes residential customer rate impact, such as inclining block rates, none of these alternative rate designs were deemed to be politically or financially feasible.

The political and financial environment in Flint is not amenable to implementing a customer rate increase over the next several years. Therefore, revenue enhancements must be achieved through improving collections and reducing the physical and commercial water losses associated with non-revenue water. A projected five-year forecast for Water Department revenue has been developed based on the following assumptions:

- Increase Water Department revenue by adjusting the water/wastewater revenue allocation from 45%/55% to 50%/50%.
- Increased sales to General Motors ($0.4M/year)
- Improve collection rates from approximately 70% to 80% in 2019, 90% in 2020 and 95% in 2021.
- One-half of current non-revenue water (25% of purchased water) results from commercial losses (meters and theft). These losses are converted to additional revenue by the meter replacement program and an aggressive water theft prevention program
- No customer rate increases

Based on these assumptions, the Water Department revenue would be:

	FY2019	FY2020	FY2021	FY2022	FY2023
Base revenue with improved collections	$31M	$35.4M	$40M	$42M	$42M
Improved metering and eliminate water theft			$5M	$10M	$20M
Total revenue	$31M	$35.4M	$45M	$52M	$62M

It is assumed that the revenue benefits from the metering/theft programs would not be realized until after all meters are installed by the end of 2019. However, some theft issues could be resolved concurrent with meter replacement.

Future operating costs will be primarily impacted by staffing levels. Arcadis has recommended that the following positions be added to provide the appropriate TMF capacity.

- Laboratory Technician
- Cross Connection Program Manager
- Water Distribution Valve and Hydrant Crew (3)
- Customer Service/ Call Center Staff (4)
- Enterprise Asset Manager
- GIS Specialist/ Hydraulic Modeler
- Construction Inspectors
- Leak Detection Team
- Flushing Team (2)

The first six listed positions are considered “high priority”. The current COF Water Department budget does include the laboratory and cross connection positions because they are directly related to water quality issues. The remaining positions have not been included in the five year plan due to budget constraints and the challenge of attracting qualified personnel. The total annual costs of these positions would be approximately $1M.

The City of Flint and its regulatory agencies are focused on assuring that adequate resources are provided to comply with all SDWA requirements, including providing optimal corrosion control and water quality monitoring. Since the City’s future water source will be finished water from GLWA, operation of a treatment plant will not be required. However, chemical feed facilities will be constructed at the current treatment plant site to provide adequate disinfection and optimal corrosion control. The size of the current Water Department operating staff is sufficient to operate the chemical feed facilities and perform water quality sampling. However, until this staff is properly licensed and trained, operation of the chemical feed facilities and sampling will be outsourced. F&V Operations and Resource Management have been contracted by the City to perform these tasks.

The currently forecasted operating costs for the COF Water Department are presented below.

	2018	2019	2020	2021	2022
Projected Operating Costs	$34.5M	$36M	$37M	$38M	$38.3M

Given the lack of investment in the Flint water system for several decades, the future capital expenditure requirements are significant. Over the next two years, approximately $80M of WIIN grant funds have been designated for the COF to complete numerous capital projects that enhance the water system reliability, revenue and water quality management. However, significant additional investment is required to support small main replacement, a cross connection control program, a customer service center, valve and hydrant replacement, SCADA and security upgrades and a water loss program for the COF water system. Arcadis has identified over $300M of capital expenditure requirements over the next 20 years with the majority of these projects being small main replacement. Unfortunately, the COF will be challenged to find the funding for these projects.

The table below helps define when funds may be available to hiring additional staff and invest in the system if the revenue enhancement programs are successful.

	FY2019	FY2020	FY2021	FY2022	FY2023
Revenue	$31M	$35.4M	$45M	$52M	$62M
Operating Costs	$34.5M	$36M	$37M	$38M	$38.3M
Water Fund Balance*	$8.5M	$7.9M	$9M	$9M	$9M
Funds available for staffing and/or capex			$6.9M	$14M	$23.7M

*Beginning Water Fund balance = $12M; Water Fund balance should be approximately 25% of O&M costs

Therefore, given the above discussion, the COF proposes the following plan to achieve its TMF capacity requirement:

1. Fill all COF Water Department staffing vacancies at the earliest possible date, including the laboratory technician and cross connection program manager positions. Until all vacancies are filled, outsource critical responsibilities not covered by existing staff. For regulatory acceptance, this will require committing to specific dates for hiring each position and executing contracts for outsourcing.
2. Initiate and complete the meter replacement program by the end of 2019 to enhance system revenue with more accurate and reliable meters. In conjunction with the meter replacement program, inspect the premise of all active and inactive customer accounts to identify and resolve water theft issues. Continue with an aggressive water theft

prevention program. Additionally, in conjunction with the meter replacement program, collect data to assist with the prioritization of cross connection activities.

3. Adhere to water bill collection policies to return collection rates to industry standards by 2021 (greater than 95%)
4. Efficiently and effectively complete a majority of the WIIN funded construction projects in 2018 and 2019. Given the size of this program and Flint's history of limited capital projects within its distribution system, it would be difficult to perform any additional City-funded capital projects during this time period.
5. Closely monitor projected vs. actual revenues and identify and correct any variances.
6. Assuming projected system revenues are achieved through the meter, collections and water theft programs and revenues are further enhanced by community development activities, begin implementing the staffing and capital program recommended in the Arcadis report in FY2021.

ATTACHMENT C

City of Flint Water Department

Technical, Management and Financial Capacity

The City of Flint (COF) has identified its long-term water source and has initiated the implementation of selected projects necessary to enhance the reliability and quality of its water system. However, the enduring sustainability of its system can only be achieved if the COF has the proper technical, managerial and financial (TMF) capacity to properly operate the system. This requirement is recognized in USEPA's First Amendment to Flint's Emergency Administrative Order (Paragraph 60.b.iii) and Michigan DEQ's August, 2017 Water System Sanitary Survey.

To help define the TMF capacity requirements of the COF water system, Arcadis of Michigan LLC (Arcadis) recently completed a report entitled "Water Distribution System Optimization Plan". This analysis developed a 20-year Capital Improvement Program (CIP), an Asset Management Program, staffing requirements, performance metrics and Standard Operating Procedures (SOPs) for the COF Water Department.

The revenue generated by the COF Water Department is not sufficient to support the current operating costs of the system. This discrepancy results for several reasons – low collection rates, declining population, inaccurate meters, loss of industrial/commercial customers, and water theft. To achieve "Cost of Service" rates under current conditions, annual rate increases of 20%, 16% and 10% would be required over the next three (3) years. If collection rates were return to a level closer to industry standards (95%), three 10% rate adjustments would still be required to achieve sufficient revenue. While alternative rate design were investigated to minimizes residential customer rate impact, such as inclining block rates, none of these alternative rate designs were deemed to be politically or financially feasible.

The political and financial environment in Flint is not amenable to implementing a customer rate increase over the next several years. Therefore, revenue enhancements must be achieved through improving collections and reducing the physical and commercial water losses associated with non-revenue water. A projected five-year forecast for Water Department revenue has been developed based on the following assumptions:

- Increase Water Department revenue by adjusting the water/wastewater revenue allocation from 45%/55% to 50%/50%.
- Increased sales to General Motors ($0.4M/year)
- Improve collection rates from approximately 70% to 80% in 2019, 90% in 2020 and 95% in 2021.
- One-half of current non-revenue water (25% of purchased water) results from commercial losses (meters and theft). These losses are converted to additional revenue by the meter replacement program and an aggressive water theft prevention program
- No customer rate increases

Based on these assumptions, the Water Department revenue would be:

	FY2019	FY2020	FY2021	FY2022	FY2023
Base revenue with improved collections	$31M	$35.4M	$40M	$42M	$42M
Improved metering and eliminate water theft			$5M	$10M	$20M
Total revenue	$31M	$35.4M	$45M	$52M	$62M

It is assumed that the revenue benefits from the metering/theft programs would not be realized until after all meters are installed by the end of 2019. However, some theft issues could be resolved concurrent with meter replacement.

Future operating costs will be primarily impacted by staffing levels. Arcadis has recommended that the following positions be added to provide the appropriate TMF capacity.

- Laboratory Technician
- Cross Connection Program Manager
- Water Distribution Valve and Hydrant Crew (3)
- Customer Service/ Call Center Staff (4)
- Enterprise Asset Manager
- GIS Specialist/ Hydraulic Modeler
- Construction Inspectors
- Leak Detection Team
- Flushing Team (2)

The first six listed positions are considered “high priority”. The current COF Water Department budget does include the laboratory and cross connection positions because they are directly related to water quality issues. The remaining positions have not been included in the five year plan due to budget constraints and the challenge of attracting qualified personnel. The total annual costs of these positions would be approximately $1M.

The City of Flint and its regulatory agencies are focused on assuring that adequate resources are provided to comply with all SDWA requirements, including providing optimal corrosion control and water quality monitoring. Since the City’s future water source will be finished water from GLWA, operation of a treatment plant will not be required. However, chemical feed facilities will be constructed at the current treatment plant site to provide adequate disinfection and optimal corrosion control. The size of the current Water Department operating staff is sufficient to operate the chemical feed facilities and perform water quality sampling. However, until this staff is properly licensed and trained, operation of the chemical feed facilities and sampling will be outsourced. F&V Operations and Resource Management have been contracted by the City to perform these tasks.

The currently forecasted operating costs for the COF Water Department are presented below.

	2018	2019	2020	2021	2022
Projected Operating Costs	$34.5M	$36M	$37M	$38M	$38.3M

Given the lack of investment in the Flint water system for several decades, the future capital expenditure requirements are significant. Over the next two years, approximately $80M of WIIN grant funds have been designated for the COF to complete numerous capital projects that enhance the water system reliability, revenue and water quality management. However, significant additional investment is required to support small main replacement, a cross connection control program, a customer service center, valve and hydrant replacement, SCADA and security upgrades and a water loss program for the COF water system. Arcadis has identified over $300M of capital expenditure requirements over the next 20 years with the majority of these projects being small main replacement. Unfortunately, the COF will be challenged to find the funding for these projects.

The table below helps define when funds may be available to hiring additional staff and invest in the system if the revenue enhancement programs are successful.

	FY2019	FY2020	FY2021	FY2022	FY2023
Revenue	$31M	$35.4M	$45M	$52M	$62M
Operating Costs	$34.5M	$36M	$37M	$38M	$38.3M
Water Fund Balance*	$8.5M	$7.9M	$9M	$9M	$9M
Funds available for staffing and/or capex			$6.9M	$14M	$23.7M

*Beginning Water Fund balance = $12M; Water Fund balance should be approximately 25% of O&M costs

Therefore, given the above discussion, the COF proposes the following plan to achieve its TMF capacity requirement:

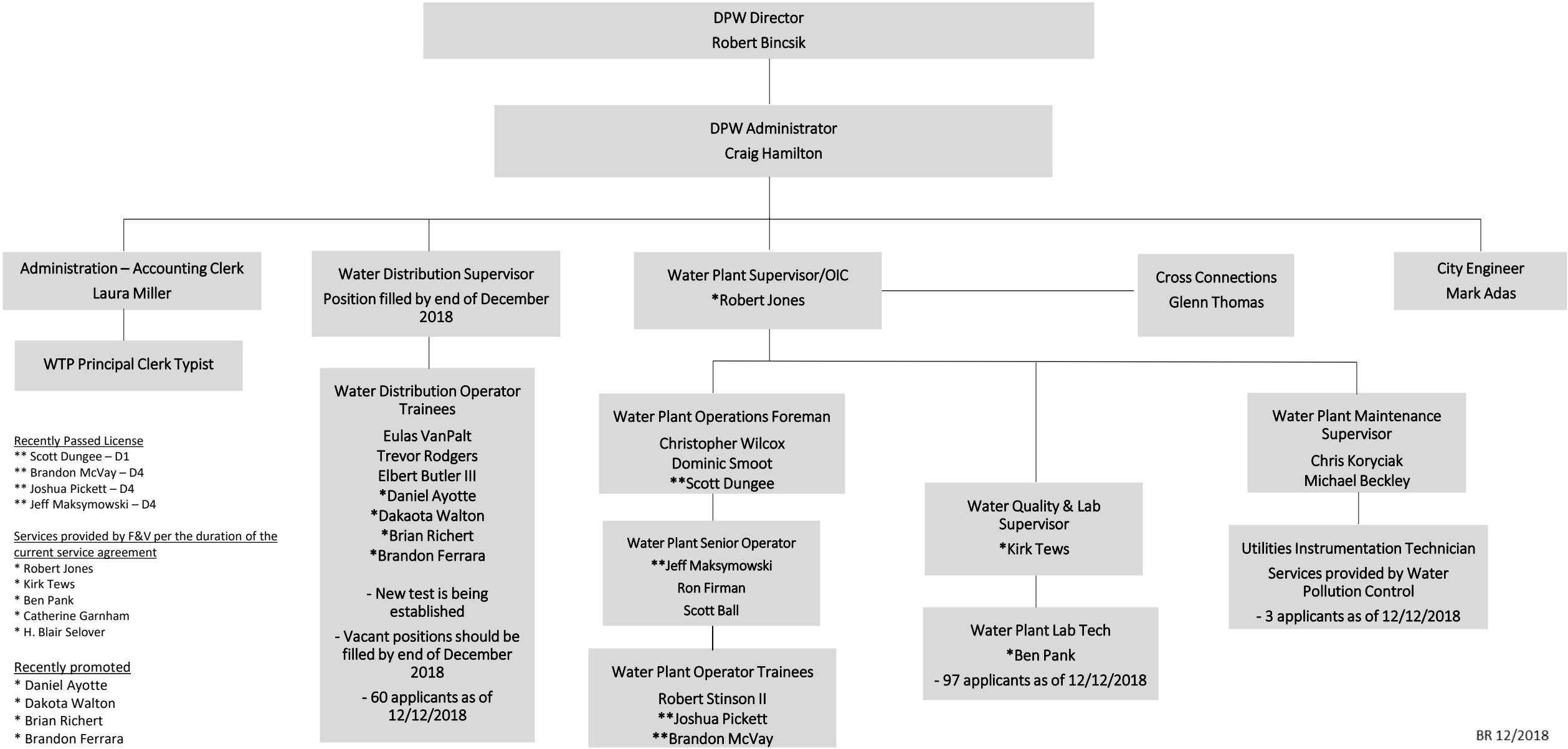
1. Fill all COF Water Department staffing vacancies at the earliest possible date, including the laboratory technician and cross connection program manager positions. Until all vacancies are filled, outsource critical responsibilities not covered by existing staff. For regulatory acceptance, this will require committing to specific dates for hiring each position and executing contracts for outsourcing.
2. Initiate and complete the meter replacement program by the end of 2019 to enhance system revenue with more accurate and reliable meters. In conjunction with the meter replacement program, inspect the premise of all active and inactive customer accounts to identify and resolve water theft issues. Continue with an aggressive water theft

prevention program. Additionally, in conjunction with the meter replacement program, collect data to assist with the prioritization of cross connection activities.

3. Adhere to water bill collection policies to return collection rates to industry standards by 2021 (greater than 95%)
4. Efficiently and effectively complete a majority of the WIIN funded construction projects in 2018 and 2019. Given the size of this program and Flint's history of limited capital projects within its distribution system, it would be difficult to perform any additional City-funded capital projects during this time period.
5. Closely monitor projected vs. actual revenues and identify and correct any variances.
6. Assuming projected system revenues are achieved through the meter, collections and water theft programs and revenues are further enhanced by community development activities, begin implementing the staffing and capital program recommended in the Arcadis report in FY2021.

ATTACHMENT D

Organizational Chart
Utilities Water Division



Recently Passed License
** Scott Dungee – D1
** Brandon McVay – D4
** Joshua Pickett – D4
** Jeff Maksymowski – D4

Services provided by F&V per the duration of the current service agreement
* Robert Jones
* Kirk Tews
* Ben Pank
* Catherine Garnham
* H. Blair Selover

Recently promoted
* Daniel Ayotte
* Dakota Walton
* Brian Richert
* Brandon Ferrara

BR 12/2018

Attachment D

GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
BAY CITY DISTRICT OFFICE

LIESL EICHLER CLARK
DIRECTOR

January 6, 2021

VIA EMAIL AND U.S. MAIL

Mr. Clyde Edwards, Administrator
City of Flint
1101 South Saginaw Street
Flint, Michigan 48502

WSSN: 02310
County: Genesee

Dear Mr. Edwards:

SUBJECT: City of Flint – 2020 Sanitary Survey

This letter confirms the Department of Environment, Great Lakes, and Energy's (EGLE's) October 16, 2020 virtual meeting, and November 12, 2020 site visit with you, Mr. Scott Dungee, and Ms. Yolanda Gray, to conduct a Sanitary Survey (Survey) of the City of Flint (City) water system and to present findings, discuss areas for improvement, and identify timelines for corrective action where appropriate. The purpose of a Survey is to evaluate the water system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399). It is also an opportunity to update EGLE's records, provide technical assistance, and identify potential risks that may adversely affect drinking water quality. Enclosed is a copy of the Sanitary Survey Review Summary for your reference.

Since the last Survey, EGLE acknowledges the City has completed several significant water system improvements, including the following:

1. Entered into a long-term agreement to purchase treated water from the Great Lakes Water Authority and began construction of a secondary water supply pipeline to the Genesee County Drain Commissioner-Water and Waste Services water system. Upon completion of the secondary pipeline, the City will have access to two independent, high-quality water sources and will have a high degree of service reliability.

2. Entered into a contract with Fleis and Vandenbrink Operations for oversight of the City's corrosion control treatment system and laboratory.

3. Began construction of a new chemical storage and treatment facility.

4. Implemented several Standard Operating Procedures (SOPs) incorporating best practices for operating and maintaining the treatment and distribution systems.

5. Began rehabilitation of the Dort Reservoir and booster pumping station.

The following table summarizes EGLE's findings from the Survey:

Survey Element	Findings
Source	No Deficiencies/Recommendations
Treatment	No Deficiencies/Recommendations

Distribution System	**Deficiencies Identified**
Finished Water Storage	**Deficiencies Identified**
Pumps	Recommendations Made
Monitoring & Reporting	**Deficiencies Identified**
Management & Operations	**Significant Deficiency Identified**
Operator Compliance	No Deficiencies/Recommendations
Security	No Deficiencies/Recommendations
Financial	**Significant Deficiency Identified**
Other	No Deficiencies/Recommendations

Significant Deficiencies:

Significant deficiencies are serious sanitary deficiencies identified in water systems which include, but are not limited to, defects in design, operation, maintenance, or a failure or malfunction of the sources; treatment, storage, or distribution systems that are determined to be causing, or have the potential to cause, contamination into the public water supply.

During the Survey, the following significant deficiency was identified:

1. The City's January 31, 2018, Water System Asset Management Plan (AMP) indicated an expected funding gap (i.e., that expenses would exceed revenues) and lack of staffing once outside funding assistance was no longer available. Because the City wishes to avoid rate increases, a Technical, Managerial, and Financial (TMF) capacity plan was submitted to EGLE documenting how TMF capacity would be achieved by the City's fiscal year 2023 (FY2023) without raising customer water rates. The City's commitment to the TMF plan was formalized in the December 17, 2018, Voluntary Agreement between the City and EGLE.

   The Voluntary Agreement requires periodic TMF update reports, demonstrating the City's progress toward eliminating the funding gap by FY2023. The most recent TMF update report indicates the City is behind schedule in eliminating the funding gap due, in part, to mandated financial policies related to the ongoing COVID-19 outbreak. Therefore, a significant deficiency finding is in place for two survey elements: *Management and Operations*, and *Finance*.

   The required response to a significant deficiency is to correct it within 120 days or develop an EGLE-approved Corrective Action Plan. The TMF capacity plan and Voluntary Agreement are already in place, which meets the 120-day Corrective Action Plan deadline. The City's approved TMF plan requires the projected funding gap to be eliminated by FY2023, and the City must either submit and receive approval for an alternative TMF capacity plan, or meet the current deadline of FY2023, even if rate increases are necessary to do so.

Deficiencies:

Deficiencies indicate non-compliance with one or more Act 399 requirements, and include defects in a water system's infrastructure, design, operation, maintenance, or management that

cause, or may cause, interruptions to the "multiple barrier" protection system and adversely affect the system's ability to produce safe and reliable drinking water in adequate quantities.

During the Survey, the following deficiencies were identified:

1. A cross connection is a piping arrangement where contaminated water can enter the public water supply through backflow. R325.11403 (Rule 1403) prohibits cross connections for all customer classes, including residential customers. R325.11404 (Rule 1404) requires a local cross connection control program, which includes a schedule for inspection and reinspection of all customers for cross connections.

   Elimination of cross connections is necessary to protect public health. Based on discussions with the City's Cross Connection Manager, no residential cross connection control activities are currently being performed, and the number of inspections completed annually does not meet the number required by your local program. The City must submit a plan by February 28, 2021, for improved residential cross connection control and for meeting the inspection and reinspection frequencies in your local program. The plan shall identify what is preventing residential inspections from being conducted, include a description of the City's residential cross connection control strategy, a schedule for meeting the required inspection frequencies for all customer classes, and the status (vacant or filled) of all positions needed to carry out the cross connection program. For vacant positions, a hiring plan must be included. Also, the City must submit cross connection program updates by June 30, 2021, and December 31, 2021 to help evaluate progress toward resolving this deficiency.

2. R325.11112 (Rule 1112(c)) states that all treated water storage tanks shall have no unprotected openings. Per *Recommended Standards for Water Works* (Ten States Standards), storage tank overflow pipes shall not be directly connected to a drain or sewer, shall be fitted with 24-mesh non-corrodible screen, and shall be located so that any discharge is visible. Drain lines shall not be directly connected to a storm or sanitary sewer. Access hatches to the tank's wet interior shall be locked and have a watertight seal. The following tank features do not meet the requirements of Rule 1112(c):

   a. **Elevated storage tank** – The overflow pipe is directly connected to an enclosed drainage vault and is not screened, and the overflow pipe's discharge is not visible. The tank drain is directly connected to an enclosed drainage vault and the drain's discharge is not visible. The access hatch to the tank's wet interior was not protected by a watertight gasket. The locking mechanism for the rooftop access hatch needed to be repaired or replaced. Mr. Dungee provided a copy of an invoice for hatch and gasket repairs and has confirmed the work was completed on December 7, 2020. To resolve the remainder of this deficiency, a suitable plan and schedule must be submitted to EGLE by February 28, 2021, to provide properly protected and air-gapped overflow and drain lines.

   b. **Dort Reservoir** – The Dort Reservoir is currently off-line for renovations. A condition assessment of the tank's structural concrete has been completed and concrete repairs are underway. An assessment of sanitary protection features (hatches, gaskets, vents, roof and wall penetrations, overflow structures, etc.) must be completed and any necessary improvements must be made before the reservoir is returned to service. Because the Dort Reservoir is currently not in service, this is not classified as a deficiency at this time; however, excessive

delays in placing the reservoir in service may delay the needed improvements to the Cedar Street Reservoir identified below and may result in further deficiencies.

c. **Cedar Street Reservoir** – A preliminary inspection of the Cedar Street Reservoir has been performed. A comprehensive inspection and plans and specifications for reservoir repairs and improvements will be completed after the Dort Reservoir is returned to service. The preliminary inspection report identified several areas of deteriorated concrete and cracking of the walls and roof slab which require repairs. The report did not specifically address the presence/condition of gaskets on the reservoir access hatches. The reservoir's overflow structures discharge into an enclosed vault which is separated from the drainage system by flap gates. The overflow discharge lines are not visible without opening the vault and do not appear to be screened. The reservoir drain discharges directly to an enclosed drainage vault and the discharge is not visible.

   It is acknowledged that some of these deficiencies cannot be resolved until the reservoir can be removed from service, which cannot occur until the Dort Reservoir is rehabilitated and returned to service. In the interim, the following actions are required. Each access hatch to the reservoir's wet interior must be inspected, and gaskets and locking mechanisms must be installed or repaired as needed, by February 28, 2021. Hatch and vent structures on the reservoir roof, including vent screens, must be periodically checked as part of the operators' routine duties. Any indication of sanitary defects, such as further concrete deterioration, unprotected openings, such as broken wiring conduits, missing gaskets, damaged/missing vent screens, or loss of earth cover above the roof slab must be promptly addressed. The inspections by operations staff should begin by January 31, 2021.

3. R325.10710a (Rule 710a) requires tap sampling for lead and copper from a designated number of sample sites, and R325.10710d (Rule 710d) requires the sampling data to be reported to EGLE by specific deadlines.

   The City did not report some 2019 data by the required deadline and did not collect the required number of tier 1 samples during the second half of 2019 and the first half of 2020. The City did collect the required number of samples in the most recent round of sampling, but to help prevent further lead and copper monitoring violations, the City is preparing a Standard Operating Procedure (SOP) for implementing its lead and copper monitoring program. The SOP must be finalized in consultation with EGLE staff, signed by an appropriate City official, and implemented by February 28, 2021.

Required Actions:

The required actions listed below are not deficiencies but must be completed to maintain compliance with Act 399 to avoid a future deficiency or significant deficiency.

1. The City was required to complete a Risk and Resilience Assessment and certify its completion to the U.S. Environmental Protection Agency, by December 31, 2020. Within six months of completing the assessment, the City must update its Emergency Response Plan and make a copy available to EGLE for review.

2. Adequately seal all openings to the chemical feed totes and secure all fill hoses in the Butler Building chemical feed facility.

3. Continue to make improvements to the water system as resources allow, as outlined in the City's Asset Management Plan and Distribution System Optimization Plan.

4. Continue to implement the SOPs and fill critical water system vacancies, as identified in the Distribution System Optimization Plan, as resources allow.

5. Complete the five-year update of the water system reliability study or request a waiver (with appropriate justification), by April 30, 2021.

6. Begin using the D Class (Limited Chemical Treatment) template for the Monthly Operation Report. The template is being developed by EGLE and will be provided to the City.

Recommendations:

Recommendations are suggestions the public water supply should consider, to enhance its operations and services, and to avoid future deficiencies.

During the Survey, the following recommendations were identified:

1. Provide SCADA enhancements at the Torrey Road booster pumping station to allow operators to remotely detect control valve position/malfunction or other operational problems.

2. Conduct critical flushing and valve operation activities until the comprehensive valve and hydrant SOPs can be fully implemented.

Please contact this office **within 60 days** of receiving this letter to acknowledge its receipt and respond to the deficiencies, recommendations, and comments provided.

We anticipate and appreciate your cooperation in addressing these findings. If you have any questions regarding this Sanitary Survey, please contact me by telephone at 989-450-7834, or by email at LondonR@Michigan.gov.

Sincerely,

Robert London
Surface Water Treatment Specialist
Engineering Unit
Drinking Water and Environmental Health Division

Enclosure
cc: Mr. Michael Bolf, EGLE
Ms. Indu Jayamani, EGLE
cc/enc: Mr. Scott Dungee, City of Flint
Mr. Rob Jones, Fleis and Vandenbrink Operations

Sanitary Survey of Community Water Supply - Review Summary

Water Supply: City of Flint — WSSN: 2310
County: Genesee — District: 92
Evaluator: London, Jayamani — Date: 11/12/2020

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source				X			
Construction & Maintenance				X			
Standby Power		X					
Isolation				X			
Source Water Protection				X			
Capacity	*Current single feed - secondary source under construction*			X			
Treatment				X			
Disinfection	*Close unprotected openings on chlorine feed containers*			X			
Fluoride		X					
Phosphate Addition	*Close unprotected openings on phosphate feed containers*			X			
Softening		X					
Iron/Manganese Removal		X					
Arsenic Removal		X					
Pretreatment		X					
Filtration (gravity or membranes)		X					
C*T		X					
Other	*Close unprotected openings on sodium hydroxide feed containers*			X			
Distribution System						X	
Interconnections w/ Other WS	*Interconnection with Genesee County under construction*			X			
Hydrants & Valves	*SOP for flushing and valve turning on hold pending resources*				X		
Service Lines & Metering	*Ongoing replacement of meters and lead service lines*			X			
General Plan				X			
Cross Connections	*No residential component, behind on inspections due to staffing*					X	
Construction & Maintenance	*AMP includes main replacement, but delayed due to funding gap*			X			
Capacity				X			
Finished Water Storage						X	
Construction & Maintenance	*No data and/or known sanitary defects at storage facilities*					X	
Controls				X			
Capacity				X			
Pumps (All Pumping Facilities)					X		
Construction & Maintenance	*Dort station being renovated, Cedar Street to be done afterward*			X			
Controls	*SCADA enhancements for Torrey Road*				X		
Capacity				X			
Monitoring & Reporting						X	
Bacteriological Monitoring				X			
Chemical Monitoring	*Need to implement lead and copper compliance SOP*					X	
MOR or Annual Pumpage Report	*Begin using Limited Treatment MOR template*			X			
Consumer Confidence Report	*Revison needed to 2019 CCR*			X			
Analytical Capabilities				X			
System Management & Operations							X
Owner Responsibility				X			
Capacity Development	*Inadequate TMF capacity; revenue gap; staffing*						X
Reliability Study	*Update due in April 2021*			X			
Operations Oversight				X			
Permits				X			
Operator Compliance				X			
Operator Certification				X			
Technical Knowledge & Training				X			
Security				X			
Emergency Response Plan	*Updated ERP due in 2021 per Risk and Resilience Assessment*			X			
Site Security (Fences, Alarms...)				X			
Financial							X
Rates	*City attempting to resolve funding gap without rate increase*						X
Budget & Capital Imp. Plan	*Funding gap causing City to fall behind on AMP projects*						X
Other		X					

N/A - Not Applicable
NotEv - Not Evaluated
NoD/R - No Deficiencies/Recommendations Made
Rec - Recommendations Made
Def - Deficiencies Identified
SigDef - Significant Deficiencies Identified

Attachment E

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
BAY CITY DISTRICT OFFICE

GRETCHEN WHITMER
GOVERNOR

PHILLIP D. ROOS
DIRECTOR

December 13, 2023

Clyde Edwards, Administrator
City of Flint
1101 South Saginaw Street
Flint, Michigan 48502

WSSN: 2310
County: Genesee

Dear Clyde Edwards:

SUBJECT: Significant Deficiency Violation Notice (SDVN); City of Flint Water System Sanitary Survey (Survey)

This letter confirms the Department of Environment, Great Lakes, and Energy's (EGLE's) staff meeting with you and with Mr. Scott Dungee, on November 6, 2023, to conduct a Survey of the city of Flint (Flint) water system and to present the final findings, discuss areas for improvement, and identify timelines for corrective action where appropriate. The purpose of a Survey is to evaluate the water supply system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399). It is also an opportunity to update EGLE's records, provide technical assistance, and identify potential risks that may adversely affect drinking water quality. Enclosed is a copy of the Sanitary Survey Report (Report) for your reference.

Since the last Survey, EGLE acknowledges that Flint has completed the following water facility improvements and operations:

1. Completed upgrades to the elevated storage tank.
2. Completed construction of a new chemical feed building.
3. Completed construction of a secondary supply line.
4. Updated the Emergency Response Plan (ERP).
5. Completed repairs to hatches, vents, and overflow structures at the Dort Reservoir.

The following table summarizes EGLE's final findings from the Survey of the water system:

Survey Element	Findings
Source	No Deficiencies/Recommendations
Treatment	**Deficiencies Identified**
Distribution System	**Significant Deficiencies Identified**
Finished Water Storage	**Deficiencies Identified**
Pumps	**Deficiencies Identified**
Monitoring & Reporting	No Deficiencies/Recommendations
Management & Operations	**Significant Deficiencies Identified**
Operator Compliance	No Deficiencies/recommendations

Security	Recommendations Made
Financial	**Significant Deficiencies Identified**
Other	Recommendations Made

Significant Deficiencies:

Significant deficiencies represent an immediate health risk to consumers of water and indicate non-compliance with one or more Act 399 requirements. Significant deficiencies are serious sanitary deficiencies identified in water systems which include, but are not limited to, defects in design, operation, maintenance, or a failure or malfunction of the sources; treatment, storage, or distribution systems that are determined to be causing, or have the potential to cause, contamination into the public water supply (PWS).

Significant deficiencies must be corrected within 120 days of the date of this letter, or a Corrective Action Plan, approved by EGLE, must be completed within 120 days of the date of this letter. Flint and EGLE previously entered into a Voluntary Agreement dated December 17, 2018, to address water system deficiencies and violations. Several corrective actions required by the 2018 Voluntary Agreement have been completed and the conditions surrounding other required corrective actions have changed; therefore, it is necessary to develop and execute a new Administrative Consent Agreement (ACA) to replace the Voluntary Agreement if the significant deficiencies cannot be corrected within 120 days. Failure to meet the 120-day deadline is a treatment technique violation.

During the Survey, two significant deficiencies were identified and are listed below. The significant deficiencies were also identified in earlier sanitary surveys and were included in the 2018 Voluntary Agreement between Flint and EGLE.

1. **R 325.11404: Local cross connection control programs**. Per Rule 1404(1), a type I public water supply shall develop a comprehensive control program for the elimination and prevention of all cross connections. When the plan is approved, the water supply shall implement the program for removal of all cross connections and prevention of all future cross connections.

   An insufficient number of cross connection inspections is being conducted due to staffing vacancies and resource limitations, and there is no history of inspections at residential accounts. No information was available regarding local enforcement of the program for accounts with known, unprotected cross connections. To resolve this significant deficiency, a comprehensive cross connection control program must be developed and implemented.

2. **Insufficient technical, managerial, and financial (TMF) capacity.** Flint has not demonstrated sufficient TMF capacity to consistently operate the water system in compliance with Act 399. TMF capacity is demonstrated in several ways – maintaining adequate staffing and resources to complete critical and routine tasks, implementing appropriate policies and Standard Operating Procedures (SOPs), and implementing an appropriate financial structure for operations, maintenance, planning, and capital improvements. Several reports and documents have been prepared which identify areas of insufficient TMF capacity. The 2018 City of Flint Water Distribution System Optimization Plan prepared by Arcadis Group (Arcadis Report) identified critical SOPs and critical positions within the water system, many of which could not be immediately implemented due to resource limitations. Per R325.11606, Rule 1606, a general plan must include a capital improvement plan (CIP) that identifies water system needs for 5-year

and 20-year planning periods and a funding structure and rate methodology that provide sufficient resources to implement the asset management plan (AMP). A CIP and AMP were prepared, but significant funding gaps were projected to occur once external (state and federal) one-time funding sources are exhausted. Water rates necessary to eliminate the gap between revenues and expenses have been identified but have not been implemented due to affordability concerns for Flint residents. Over 60 percent of Flint's water mains have been in service for over 90 years and have exceeded their design life, and the projected available revenue is insufficient to replace them in a reasonable timeframe. Based on this information, it was determined Flint lacks sufficient Technical, Managerial, and Financial (TMF) capacity to consistently operate the water system in compliance with Act 399. To resolve this significant deficiency, the AMP and CIP must be updated, and a funding structure and rate methodology must be implemented that allows Flint to fill critical vacancies, fully implement the AMP, and achieve adequate TMF capacity.

Deficiencies:

Deficiencies indicate non-compliance with one or more Act 399 requirements, and include defects in a water system's infrastructure, design, operation, maintenance, or management that cause, or may cause, interruptions to the "multiple barrier" protection system and adversely affect the system's ability to produce safe and reliable drinking water in adequate quantities.

During the Survey, seven deficiencies were identified and are listed below.

1. **R 325.11112: Storage tanks generally, R325.11113: Gravity storage tanks.** Per Rule 1112, storage tanks shall have no unprotected openings. Per Rule 1113, gravity storage tanks shall be provided with a watertight and properly drained roof and an overflow line of sufficient size. Per Ten States' Standards, section 7.1.9, vents on ground level tanks shall be protected with 24-mesh, non-corrodible screen. Per section 7.1.8, access hatches must be fitted with a solid watertight cover. Per section 7.1.7, all water storage structures shall be provided with an overflow extending to an elevation between 12 and 24 inches above the ground surface and protected by 24-mesh screen or a rubber duckbill valve. Per Section 7.4.4, finished water storage facilities shall be designed to provide mixing. Per U.S. Environmental Protection Agency (USEPA) guidelines, storage tank drains must have a removable 24-mesh screen or plug. Deficiencies were identified at the following two treated water storage facilities:
    a. Cedar Street reservoir – the following deficiencies were identified during the survey and have been corrected by city of Flint personnel:
        i. A hatch cover was bent/cracked and was missing the required watertight gasket.
        ii. Gaps were observed around the 24-mesh screen on the north reservoir vents.
        iii. Areas of deteriorated concrete were observed which could present a pathway for contaminants to enter the reservoir.

    The following deficiencies were observed and must be corrected by September 30, 2025:
        i. The flap gate protecting the reservoir overflow has a broken hinge, the splash pad at the overflow outlet is damaged, and the overflow does not appear to have a 24-mesh screen.
        ii. The drain outlet is hard-piped to a drainage structure and does not have a removable plug or 24-mesh screen.
        iii. Proper mixing is not being achieved in the south reservoir chamber due to a broken flap gate.
        iv. There is significant growth of trees and brush around the reservoir which can create a security risk and increase the potential for structural damage due to root intrusion at joints or cracks.

It is noted that an Act 399 construction permit has been issued for rehabilitation of the Cedar Street reservoir, and it is expected that the rehabilitation project will address all deficiencies.

b. Dort reservoir – the drain does not have a removable 24-mesh screen or plug. The drain outlet terminates below grade, and it is not feasible to raise the outlet due to elevation restrictions. To resolve this deficiency, a removable screen or plug must be installed on the drain outlet and a Standard Operating Procedure (SOP) must be developed by June 30, 2024, to ensure the drain outlet chamber will drain freely and will not be surcharged.

2. **R 325.11011: Pumping facility; capacity.** Per Rule 1011, a pumping facility shall have sufficient capacity to meet the service area demands with the largest unit removed from service. Deficiencies were identified at the following three pumping facilities:
   a. Dort pumping station (Pump Station #4) – new pumps were recently installed but they have developed excessive vibration and cannot reliably be used without modifications. To resolve this deficiency, the vibration issues must be corrected, and the station must demonstrate reliable performance by March 31, 2024.
   b. Cedar Street booster station – the pumps have exceeded their design life, are oversized and inefficient, and may not be capable of meeting demands as their condition deteriorates. Booster station controls are obsolete and should be upgraded but are currently functional. To resolve this deficiency, the booster station must be upgraded by September 30, 2025. It is noted that improvements to the Cedar Street booster station cannot begin until the Dort pumping station vibration issues are corrected.
   c. Torrey Road booster station – the pumps cannot be operated at 100 percent of capacity due to overheating concerns with the variable frequency drive (VFD) units. The control system does not transmit information related to several critical features – system pressure, run/fail status of pumps, and position of check valves. The exterior isolation valves are in poor condition, with excessive leakage and the potential for building damage, pipe freeze-ups, and the entry of contaminants to the water supply. To resolve this deficiency, mitigate the potential for pipe freeze-ups by December 31, 2023, evaluate upgrades to or replacement of the station by December 31, 2024, and complete upgrades or replacement by December 31, 2025.

3. **R 325.11502: Monthly operation reports of public water supplies employing treatment.** Per Rule 1502, monthly operation reports must include information on chemical application. Per Ten States' Standards, Section 5.5.2.d, provisions shall be made for measuring the quantities of chemicals used. The chlorine feed system at the Cedar Street reservoir is not equipped with a means to measure chemical usage. Chemical usage is estimated from feed pump settings. To resolve this deficiency, a means to measure chemical usage must be installed by September 30, 2025. It is noted that an Act 399 construction permit has been issued for rehabilitation of the Cedar Street reservoir, and it is expected that the rehabilitation project will address this deficiency.

4. **R325.11108: Distribution system valves.** Per Rule 1108, sufficient valves shall be provided on distribution systems to minimize interruptions in service and minimize safety hazards during construction or repairs. The SOP for routine operation and maintenance of valves has not been implemented due to resource and staffing limitations. To resolve this deficiency, begin partial implementation of the SOP for routine valve operation and maintenance by December 31, 2024, by identifying critical distribution system valves, confirming their location and accessibility, and repairing or replacing them as appropriate. It is understood that full implementation of the SOP for all system valves may not be possible until sufficient TMF capacity is achieved.

5. **R325.11506: Recordkeeping.** Per Rule 1506, water systems must maintain various records related to Act 399 compliance for designated periods of time. During the survey, it was stated that Flint does not have operational or monitoring records from 2014 to 2016 because they were removed from the water plant during legal proceedings by the State of Michigan. To resolve this deficiency, provide documentation to EGLE that Flint has obtained the original or copies of the records by June 30, 2024.

6. **Bulk chemical storage.** Per Ten States' Standards, Section 5.5.10, for bulk storage tanks, acids and other hazardous chemical storage tanks shall be vented to the outside atmosphere. The bulk storage for sodium hypochlorite, sodium hydroxide, and phosphoric acid is vented to the interior of the chemical feed building. To resolve this deficiency, modify the bulk storage tank vents to provide outdoor venting by December 31, 2024.

7. **R325.11204 Required capacity of waterworks systems; applicability.** Per Rule 1204, a public water supply shall provide sufficient capacity in the waterworks system to meet the approved finished water supply requirements. The capacity may be the available capacity obtained under contract and capable of delivery from another approved public water supply. Flint's water service agreement with the Great Lakes Water Authority (GLWA) specifies a maximum daily contractual allotment of 14.0 million gallons per day (MGD) and a peak hour allotment of 14.5 MGD. Maximum daily demand has been decreasing in recent years, but the reported 2023 maximum day usage is 14.8 MGD. Flint is taking steps to reduce lost water and has a significant amount of storage to equalize flows above the maximum day and peak hour values, so a physical shortage of water is not anticipated, but it is necessary to have a formal understanding with GLWA regarding how they intend to treat delivery rates greater than specified in the water service agreement. To resolve this deficiency, consult with GLWA and provide documentation to EGLE by June 30, 2024, how daily water purchases in excess of the contract limitation will be handled. If exceedances of the contract will not be allowed by GLWA, update your reliability study by December 31, 2024, to ensure that available supply exceeds projected 5-year and 20-year demands.

Required Actions:

The required actions listed below are not deficiencies but must be completed by the dates indicated to avoid a future deficiency or significant deficiency designation.

1. Update your Revised Total Coliform Rule sampling plan by December 31, 2023. The population served by the water system has changed since the last sampling plan was prepared. The new population served is 81,252 (Census 2020), and the required number of monthly routine bacteriological samples is 80. The revised plan should not reduce the number of sampling sites but may reduce the sampling frequency. The revised plan must be submitted to EGLE for review and approval prior to changing your sampling program.

2. Update the following components of the general plan by June 30, 2024 – inventory of water main by age, size, and pipe material.

Recommendations:

Recommendations are suggestions the public water supply should consider, to enhance its operations and services, and to avoid future deficiencies.

During the Survey, the following recommendations were identified and are listed below.

1. Conduct a power reliability audit for your drinking water facilities.
2. Provide security enhancements as appropriate. For example, there is evidence of graffiti at the Cedar Street reservoir and booster pumping station.

EGLE's investigation is considered complete. This significant deficiency begins as of the date of the date of this letter and will continue until Flint completes corrective actions. Flint must complete corrective action within 120 days of the date of this letter or be in compliance with a Corrective Action Plan and schedule approved by this office. Please contact this office within 30 days of the date of this letter to discuss appropriate corrective action. You must also notify EGLE, in writing, within 30 days of correcting the significant deficiency.

If you have any factual information that you would like EGLE to consider regarding the significant deficiencies identified in this SDVN, please provide it in a written response to this office by January 31, 2024.

Please note that any Significant Deficiency (SD) that remains unresolved at the time the annual Consumer Confidence Report (CCR) is distributed, the water supplier is required to provide a Special Notice in its CCR. The water supplier must inform your customers on the details regarding the unresolved SD including the date the SD was identified by EGLE; the EGLE approved plan and schedule for correction along with the current progress toward this approved plan. This Special Notice requirement shall be included in all future CCRs until the SD has been resolved.

If you have any questions, please feel free to contact me at the phone number listed below, or by email at londonr@michigan.gov.

Sincerely,

Robert London, PE, Surface Water Specialist
Engineering Section
Drinking Water and Environmental Health
989-450-7834

Enclosure:
cc/enc: Mr. Robert Jones, F&V Operations
Mr. Scott Dungee, City of Flint
Ms. Caitie O'Neill, City of Flint
Mr. Paul Simpson, City of Flint
cc: Mr. Mike Bolf, EGLE
Ms. Maureen Nelson, EGLE
Mr. George Krisztian, EGLE
Mr. Ryan VanDerWoude, EGLE
Genesee County Health Department

Sanitary Survey of Community Water Supply - Review Summary

Water Supply: City of Flint | WSSN: 02310
County: Genesee | District: 92
Evaluator: London, Roeser | Date: 11/6/2023

Category	Comment	N/A	NotEv	NoD/R	Rec	Def	SigDef
Source				X			
Construction & Maintenance				X			
Standby Power				X			
Isolation		X					
Source Water Protection		X					
Capacity				X			
Treatment						X	
Disinfection	*Cedar St. feed system, venting of bulk tanks*					X	
Fluoride		X					
Phosphate Addition	*Venting of bulk tanks*					X	
Softening		X					
Iron/Manganese Removal		X					
Arsenic Removal		X					
Pretreatment		X					
Filtration (gravity or membranes)		X					
C*T		X					
Other - pH Adjustment	*Venting of bulk tanks*					X	
Distribution System							X
Interconnections w/ Other WS		X					
Hydrants & Valves	*Valve SOP not implemented due to resource limitations*					X	
Service Lines & Metering	*Lead service line removal is ongoing*			X			
General Plan	*Updated inventory of water main is needed*				X		
Cross Connections	*Limited activity, lack of staffing, no residential efforts*						X
Construction & Maintenance	*Significant old and break-prone mains*					X	
Capacity				X			
Finished Water Storage						X	
Construction & Maintenance	*Cedar St. several components, Dort drain*					X	
Controls	*Old and in need of replacement, but currently functional*				X		
Capacity				X			
Pumps (All Pumping Facilities)						X	
Construction & Maintenance	*Cedar St. old but functuional, Dort vibration issues*					X	
Controls	*Torrey Road - insufficient remote monitoring*				X		
Capacity				X			
Monitoring & Reporting				X			
Bacteriological Monitoring				X			
Chemical Monitoring				X			
MOR or Annual Pumpage Report				X			
Consumer Confidence Report				X			
Analytical Capabilities				X			
System Management & Operations							X
Owner Responsibility				X			
Capacity Development	*Continues to lack TMF capacity*						X
Reliability Study	*Max day demand dropping but exceeds GLWA contract*					X	
Operations Oversight	*Missing records from 2014-2016*					X	
Permits				X			
Operator Compliance				X			
Operator Certification				X			
Technical Knowledge & Training				X			
Security					X		
Emergency Response Plan				X			
Site Security (Fences, Alarms...)	*Additional security at Cedar St. reservoir*				X		
Financial							X
Rates							X
Budget & Capital Imp. Plan	*Updated CIP is needed*				X		
Other - Asset Management Plan	*Updated AMP is needed*				X		

N/A - Not Applicable
NotEv - Not Evaluated
NoD/R - No Deficiencies/Recommendations Made
Rec - Recommendations Made
Def - Deficiencies Identified
SigDef - Significant Deficiencies Identified

Attachment F

Michigan Department of Environment, Great Lakes, and Energy
Water Resources Division

ADMINISTRATIVE CONSENT ORDER TERMINATION REQUEST

The completion of this form is voluntary and is intended to be used as guidance for persons that are eligible to request EGLE to issue a Termination Notice of their Administrative Consent Order (ACO). However, it may not be relied upon as being legally sufficient to cover all potential issues related to the specific requirements of the ACO. EGLE does not assume any liability for the use of this document and encourages the user to seek independent legal advice before using this form to draft its certification and request for Termination of its ACO.

PLEASE TYPE OR PRINT

<table>
<tr><td>1.ACO</td><td colspan="3">ADMINISTRATIVE CONSENT ORDER NUMBER:</td></tr>
<tr><td rowspan="4">2. Facility Owner or Legally Authorized Representative</td><td colspan="3">Facility Owner/Legally Authorized Representative Who Signed the ACO:</td></tr>
<tr><td colspan="2">Address:</td><td>Address 2 or P.O. Box:</td></tr>
<tr><td>City:</td><td>State:</td><td>Zip Code:</td></tr>
<tr><td>Telephone:</td><td>Fax:</td><td>E-mail address:</td></tr>
<tr><td>3. Compliance Section</td><td colspan="3">Summarize each completed requirement in the Compliance Section of the ACO give the completion date. Please use additional sheets if necessary:</td></tr>
</table>

Michigan Department of Environment, Great Lakes, and Energy
Water Resources Division

ADMINISTRATIVE CONSENT ORDER TERMINATION REQUEST

3.Certification	I, enter the name of owner or legally authorized representative, hereby certify that each requirement of the ACO that was entered into with the Department of Environment, Great Lakes, and Energy (EGLE) on enter the date has been complied with and completed including paying all money required by the ACO including but not limited to costs, civil fines, stipulated fines and fees. I also certify that all information that I am required to report to EGLE, enter District Office District Office Supervisor has been reported and that all records I am required to maintain pursuant to the ACO are being maintained at the facility (or other location as specified in Section 12 of the ACO). I hereby request that EGLE issue a Termination Notice, formally terminating the ACO in recognition of the resolution of the matters therein. I certify under penalty of law that this certification is true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of a fine for having knowledge of violations and certifying that there are none. Print Name _____Title_____ Signature _____ Date _____

Please mail this completed form to EGLE, Water Resources Division, District Office that is listed in Section III of the ACO the Owner/Legally Responsible Representative entered into with EGLE. Addresses for the district offices are listed below.

Bay City District Office
401 Ketchum Street, Suite B
Bay City, Michigan 48708

Cadillac District Office
120 West Chapin Street
Cadillac, Michigan 49601-2158

Gaylord District Office
2100 West M-32
Gaylord, Michigan 49735-9282

Grand Rapids District Office
State Office Building, 5th Floor
350 Ottawa Avenue NW, Unit 10
Grand Rapids, Michigan 49503-2341

Jackson District Office
301 E. Louis Glick Highway
Jackson, Michigan 49201-1556

Kalamazoo District Office
7953 Adobe Road
Kalamazoo, Michigan 49009-5026

Lansing District Office
525 West Allegan Street (Constitution Hall, 1S)
P.O. Box 30242
Lansing, Michigan 48909-7742

Marquette District Office
1504 West Washington Street
Marquette, Michigan 49855

Warren District Office
27700 Donald Court
Warren, Michigan 48092-2793

5963