

February 18, 2025

Fredonia Mayor Michael Ferguson, Trustee Jon Espersen, Trustee Paul Wandel
9-11 Church St.
Fredonia, NY 14063

RE: Village of Fredonia Water Supply Assessment

Dear Mayor Ferguson and Village Trustees,

A sanitary survey of the Village of Fredonia's public water supply was conducted by the Chautauqua County Health Department (CCHD) on February 11, 2025. Community water systems which use surface water as their source of water are required, by New York State Department of Health (NYSDOH), to have a sanitary survey / inspection at least every two (2) years. The inspection determines compliance with Title 10, Chapter 1, Part 5, Subpart 5-1 of the New York State Sanitary Code which regulates public water supplies within New York; each part and process of the water system is compared to this Standard.

The CCHD commends the Fredonia water operators and Village officials for addressing the following deficiencies that were identified in the May 2023 inspection:

- Backwash pumps have been removed, re-built, and replaced.
- One of the original chlorine pumps was replaced with a new pump.
- The waste sludge piping and valve has been unblocked on one of the clarifiers.
- Clear well vents have been screened.
- Clearwell hatches are locked with appropriately protective locks.
- Brush and weeds were removed from clearwell.
- Storage tank overflow has been screened.
- Storage tank vault has been locked with appropriately protective locks.
- Storage tank has been fenced.
- Pumps at the storage tank are in the process of being replaced.
- Secondary containment has been provided for some of the liquids stored on site.

However, a number of outstanding deficiencies do still exist. The deficiencies are listed below in order of their occurrence in the system; from the Fredonia Reservoir through the water treatment plant and into the distribution system. The list is organized this way to allow the reader to follow the flow of water through the system to better understand the points at which deficiencies exist. ***The following significant deficiencies were identified in the 2025 inspection:***

Subpart 5-1.71 (a) The supplier of water shall exercise due care and diligence in the maintenance and supervision of all sources of the public water systems to prevent, so far as possible, their pollution and depletion.

- A recent bathymetric survey, completed by SUNY Fredonia faculty, shows that the Reservoir has lost a significant percentage of its original volume of water due to sediment washing into the Reservoir.
- A comparison of Pieczonka Engineering's 1990 information to the most recent studies by SUNY Fredonia indicate that approximately 36 feet of sediment has been deposited in the deepest part of the Reservoir.
- Although the Village has applied for dredging permits from the NYSDEC in the past, there is no evidence that the Reservoir has ever been dredged or that the volume has been maintained in any other way since its construction in 1938.
- The 2011 O'Brien & Gere Fredonia Safe Yield Analysis report indicates that the Safe Yield, which is the amount of water that can be safely removed from the Reservoir daily without depleting the Reservoir, is between 1.1 and 1.5 million gallons per day.
- The Village's water treatment plant currently treats an average of 1.4 million gallons per day. In 2024, daily production exceeded the safe yield estimate of 1.5 million gallons per day on 143 of days or 39% of the time.
- This deficiency was first listed in the 2008 inspection report.

Subpart 5-1.71 (b) Facilities approved by the State shall be operated in general accordance with their design unless otherwise authorized.

- During the 2023 inspection temporary measures (a garden hose) were being used to draw the sludge off the bottom of both clarifiers using monitoring ports because the valves on the sludge lines were clogged.
- The clog has been addressed in the piping for one of the clarifiers, returning it to normal design operation.
- One clarifier continues to be operated by using a temporary connection to remove the excess sludge.

Subpart 5-1 Appendix 5-A Section 2.6 Dedicated standby power shall be provided.

- The water treatment plant does not have a generator dedicated solely to the plant.
- The generator that is available to supply the plant:
 - Has never been functionally tested to determine if it would adequately operate the plant
 - The power transfer lines are not installed safely.

Subpart 5-1 Appendix 5-A Section 2.14 To facilitate identification of piping in treatment plants and pump stations it is recommended that the pipes are color coded following the schematic in the citation and Labeled according to ASME A13.1.

- Pipes in the treatment plant are in the process of being painted, but they are not labeled and do not have symbols indicating flow direction.
- Piping in the storage tank is neither color coded nor labeled.
- This deficiency was first listed in the 2008 inspection report.

Subpart 5-1 Appendix 5-A Section 2.16 Operation and maintenance manual including parts lists, order forms, operator safety procedures and an operational trouble-shooting section shall be supplied.

- There are no “Operation & Maintenance Manuals” available for the water treatment plant, the storage tank and its pump station, or the pump station at the interconnect with Dunkirk.

Subpart 5-1 Appendix 5-A Section [REDACTED]

- The [REDACTED]
[REDACTED] *This item has been redacted to protect the safety and security of the water system.*

Subpart 5-1 Appendix 5-A Section 3.0 The source must provide an adequate quantity of water to meet current demands.

- The Reservoir lacks capacity to provide the permitted withdrawal rate of 2.5 million gallons per day.

Subpart 5-1 Appendix 5-A Section 3.1.3 (a) The design of the water treatment plant must consider the worst conditions that may exist during the life of the facility

- The current plant design is incapable of handling fluctuating water quality related to conditions that have been observed in the Reservoir such as high turbidity, historical algae blooms, high Total Organic Carbon (TOC), and undesirable metals.

Subpart 5-1 Appendix 5-A Section 3.1.3 (c) Filtration preceded by appropriate pretreatment shall be provided for all surface waters.

- The plant currently struggles to remove Total Organic Carbon (TOC), which create disinfection byproducts when mixed with the chlorine that is required for disinfection.

Subpart 5-1 Appendix 5-A Section 3.1.4.1 (a) Design of intake structures shall provide for the withdrawal of water from more than one level if quality varies with depth.

The Village’s intake structure was designed to draw water from two different depths in the Reservoir. There are two valves that open or close the pipes at each depth to determine which depth the water is being pulled from to flow to the treatment plant.

- The valves that would allow the operators to choose which level water is being drawn from are frozen in place. One valve is stuck at 75% open and the other is fixed at 25% open.
- This deficiency was first reported to the Village in the 2016 inspection.

Subpart 5-1 Appendix 5-A Section 3.1.4.1 (b) Intake structures shall be designed to provide for separate facilities for release of less desirable water held in storage.

- This capacity does not exist because the blow off valve on the intake pipe does not function.

Subpart 5-1 Appendix 5-A Section 3.1.4.1 (e) Intake structures shall be designed to provide for occasional cleaning of the inlet line.

- There are no cleanouts provided on the inlet line.

- There is no evidence that the inlet has ever been cleaned other than by incidental scouring of water during times of high water demand.
- The valves that would need to be closed to shut off the flow from the Reservoir into the intake lines are not functional.

Subpart 5-1 Appendix 5-A Section 3.1.4.1 (g) Design of intake structures shall provide for ports located above the bottom of the impoundment, but at sufficient depth to be kept submerged at low water levels.

- During times of drought in 1991, 1998/1999 and 2007 the water intake was above the low water level.

Subpart 5-1 Appendix 5-A Section 3.1.6.3 (a) Water supply dams are to be designed and constructed in accordance with the requirements of the appropriate regulatory authority i.e. New York State Department of Environmental Conservation.

- The 2023 inspection of the Reservoir dam, by New York State Department of Environmental Conservation, listed the condition of the dam as Unsound-Fair due to its lack of spillway capacity and inadequate structural stability.
 - This condition rating means that the deficiencies at this dam are of such a nature that the safety of the dam cannot be assured.
 - To date, these deficiencies have not been resolved.
- LeBella's 2023 report further reinforces that there are deficiencies with spillway stability, spillway capacity, and the drawdown rate and elevation.

Subpart 5-1 Appendix 5-A Section 4.2 (b) Design of the clarification process shall be constructed to permit units to be taken out of service without disrupting operation.

- The existing clarifiers do not meet this requirement, they are too small. Each unit is only capable of treating approximately 1.05 million gallons per day which is less than the Village's average day usage of 1.44 million gallons per day. Therefore, one unit cannot be removed from service for scheduled or emergency maintenance.

Subpart 5-1 Appendix 5-A Section 4.2.2 (a) The mixing detention time should be instantaneous, but not longer than 30 seconds with mixing equipment capable of imparting a minimum velocity gradient of at least 750 fbs/ft.

- The current "coffin" mixing chamber provides greater than 30 seconds of contact time.
- The velocity gradient of the current rapid mixer is less than 750 fps/ft at average flow

Subpart 5-1 Appendix 5-A Section 4.2.5.7 (b) Sludge removal shall be designed to prevent clogging at the entrance to sludge withdrawal piping.

- The valves or withdrawal piping are currently clogged and not functioning on one clarifier.
- The lines cannot be repaired because the water treatment plant cannot meet the Village's daily water demand with one of the clarifiers shut down.

Subpart 5-1 Appendix 5-A Section 4.3.1.11 (i) Minimum provisions for backwashing shall include appropriate measures for cross-connection control.

- The water lines for the backwash water are directly connected to the finished water lines in the water treatment plant without any type of cross connection control device.
- This violation was first noted in 2008 and the Village has been given several violations with completion dates since that time, none of which have been met.

Subpart 5-1 Appendix 5-A Section 4.4.1 (a) At plants treating surface water provisions shall be made for applying the disinfectant to the raw water, settled water, filtered water, and water entering the distribution system.

- The treatment plant does not have provisions for applying disinfectant to the raw water or settled water.
- It is not feasible to add disinfectant at the points listed above due to the likelihood of increasing the disinfection by-products level in the finish water.
- Increasing the levels of disinfection by-products in the finished water would cause a violation of the maximum contaminant level for disinfection byproducts.

Subpart 5-1 Appendix 5-A Section 4.4.3 (e) Systems that rely on chlorination for inactivation of bacteria or other microorganisms present in the source water shall have continuous chlorine residual analyzers and other equipment that automatically shut down the facility when chlorine residuals are not met.

- Fredonia's water treatment plant does not have this capability.
- Chlorination systems are monitored and adjusted manually which means the water treatment plant must be staffed 24 / 7.

Subpart 5-1 Appendix 5-A Section 4.4.4.3 Automatic switchover should be provided between chlorine pumps.

- Water treatment plant operators are required to manually switchover pumps in an area of the plant where lack of adequate ventilation creates dangerous working conditions.

Subpart 5-1 Appendix 5-A Section 4.4.4.4 Automatic proportioning chlorinators are required where the rate of flow or chlorine demand is not reasonably consistent.

- The existing pumps are not automatically proportioned, so the chlorine dose is manually operated. Manual operation increases the likelihood of human error and limits the ability to have a consistent, accurate chlorine dose as flow rates vary.
- The existing PLC automation system is maxed out and cannot accommodate any additional automation demands.
- Repeat violation from 2017 inspection.

Subpart 5-1 Appendix 5-A Section 4.4.4.6 The injector/diffuser must be compatible with the point of application to provide a rapid and thorough mix with all the water being treated. The center of a pipeline is the preferred application point.

- Chlorine is currently injected above the water level at the entrance to the clear well.

- It is neither rapidly nor thoroughly mixed with all of the treated water.

Subpart 5-1 Appendix 5-A Section 4.4.4.7 The chlorinator water supply piping shall be designed to prevent contamination of the treated water supply.

- The water used to dissolve the solid chlorine does not have adequate cross-connection control.

Subpart 5-1 Appendix 5-A Section 5.1.1 (a) Feeder redundancy – Where chemical feed is necessary for the protection of the water supply, such as a chlorination or other essential process, a standby unit or combination of units of sufficient size to meet capacity shall be provided to replace the largest unit when out of service, and the reviewing authority may require that more than one be installed.

- Boil water orders in February 2023, February 2024 and February 2025 were all caused by not having a second operational pump for the addition of chlorine, i.e. only one of the two existing pumps and associated tubing was functioning.
- While backup pumps are available on site, they are not installed, calibrated and ready for use in case of primary pump failure for the Poly Aluminum Chloride, Polymer or Polyphosphate.
 - This deficiency was first reported to the Village in the 2012 inspection.

Subpart 5-1 Appendix 5-A Section 5.1.1 (c) spare parts shall be available on site for all feeders to replace parts which are subject to wear and damage.

- The boil water order in February 2025 was caused by not having extra consumable parts for the chlorine pumps due to them being on back order. Fredonia uses a disinfection process that is not commonly seen in water treatment, therefore parts and supplies are not readily available.

Subpart 5-1 Appendix 5-A Section 5.1.1 (j) Liquid storage tanks shall be located and secondary containment provided so that chemicals from equipment failure, spillage, or accidental drainage shall not enter the water in conduits, treatment, or storage basins.

- There is no secondary containment under the tanks at the bottom of the stairs in the chemical storage room.
- The containment provided under the Poly Aluminum Chloride and Polymer day tanks is not adequate. The secondary containment should be 110% of the maximum volume of each of the two day tanks.
- This deficiency was first reported to the Village in the 2008 inspection.

Subpart 5-1 Appendix 5-A Section 5.1.3 (c) completely enclose dry chemical feeders to prevent emission of dust to the operating room.

- The Bentonite feed area is not completely enclosed.
- This deficiency was first reported to the Village in the 2008 inspection.

Subpart 5-1 Appendix 5-A Section 5.1.9 (a) Chemicals should be storage in a space where handling is convenient and efficient.

- Due to the fact that the loading dock/storage area is approximately four (4) feet higher than the floor that the day tanks sit on, the liquid chemicals used for coagulation and flocculation have to be

transferred from the tanks that they are delivered into an intermediate tank and then pumped into their respective day tanks which is neither convenient nor efficient.

Subpart 5-1 Appendix 5-A Section 5.1.9 (d) Liquid chemical storage tanks shall have a liquid level indicator.

- None of the day tanks for the Poly Aluminum Chloride, Polymer or Polyphosphate have liquid level indicators.

Subpart 5-1 Appendix 5-A Section 5.1.11 (f) Continuous agitation shall be provided to maintain chemical slurries in suspension.

- Both the Polyphosphate and pelleted chlorine tanks contain slurries which must be mechanically mixed.

Subpart 5-1 Appendix 5-A Section 5.3.1 Special provisions shall be made for ventilation of chlorine feed and storage rooms.

- Chlorine room fan was not operational during the May 2023 inspection.
- Though it had been replaced, the fan was not operational during the February 2025 inspection.

Subpart 5-1 Appendix 5-A Section 7.0.1 (a) The minimum storage capacity (or equivalent capacity) for systems not providing fire protection shall be equal to the average daily consumption.

- The Village's average production in 2024 was 1.44 million gallons per day.
- The Village's storage tank holds 1 million gallons.
- The current storage does not allow for adequate volume or pressure for fire protection.
- This deficiency was first reported to the Village in the 2003 inspection.

Subpart 5-1 Appendix 5-A Section 8.2.1 The normal working pressure in the distribution system should be approximately 60 to 80 pounds per square inch (psi).

- During the inspection on February 11, 2025, the gauge on the Fredonia side of the Vineyard Drive interconnect indicated that the pressure fluctuated between 110-120 psi. The reading was observed while the storage tank was offline.
- This pressure would be even greater if the storage tank had been in service because it would be actively pumping water into the distribution system which would further increase pressure in the lines.
- This excess pressure is routine in the Fredonia distribution system and it is the reason that neither North Chautauqua County Water District nor the City of Dunkirk can feed the Village an adequate volume of water while there is water present in Fredonia's distribution system.

Subpart 5-1.71 (b) The supplier of water and the person operating a treatment plant or distribution system shall exercise due care and diligence in the operation and maintenance of these facilities and their appurtenances to ensure compliance with this Subpart.

- The southeast corner of the water treatment plant is approximately three (3) feet from a sharp drop off into a ravine formed by a tributary of Canadaway Creek.
- Per LaBella's 2023 report "the building's proximity to this slope and the evidence that erosion is

actively occurring to further worsen the circumstances is very concerning”.

- If left unchecked the building foundation is at risk of collapse.
- The [REDACTED] This item has been redacted to protect the safety and security of the water system.
 - This deficiency was first reported to the Village in the 2008 inspection.
- The [REDACTED] This item has been redacted to protect the safety and security of the water system.
 - This deficiency was first reported to the Village in the 2008 inspection.
- On May 23, 2023 representatives of CCHD and NYSDOH performed a joint sanitary survey (inspection) of the Fredonia Public Water Supply. The Village was made aware of the violations that were identified during that inspection in a letter from CCHD dated July 24, 2023, and per Part 5 Section 5-1.70 (c) of the State Sanitary Code were given 30 days to submit a plan that described how all the violations and significant deficiencies would be addressed, and 120 days to correct the significant deficiencies or be in compliance with a corrective action plan. The Village’s Engineer, LaBella, did submit timeframes by which they intended to complete various projects for the Village, however, CCHD has not yet received a corrective action plan from the Village. Now that a more recent inspection has been completed, a corrective action plan must include timeframes to address all the violations and significant deficiencies identified in the February 2025 inspection.
- The NYSDOH is required to ensure that all systems receiving Drinking Water State Revolving Fund (DWSRF) assistance have adequate technical, managerial, and financial capacity to provide safe drinking water. Systems that lack adequate capacity may be determined to be ineligible by the NYSDOH to receive DWSRF assistance unless the project to be financed corrects the technical, managerial, and financial deficiencies. The historical lack of investment in maintaining or upgrading the water treatment plant and the Reservoir prompt concern for the Village’s current and future capacity.

For your convenience and information, an Assessment form has been enclosed. Please use the form to complete a self-assessment of the Fredonia system to ensure that Village officials, water operators and other municipal staff involved with Fredonia’s Public Water Supply have a better understanding of the daily and long-term investments required to operate a safe and reliable system.

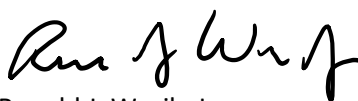
The Chautauqua County Health Department does understand that some of the above listed deficiencies may not be addressed if the Village pursues an alternative water supply. However, even if the Village does pursue other water supply options some of the existing water treatment plant deficiencies must be addressed while the water treatment plant is in operation. The Village must identify the timelines they intend to meet as they consider other options.

If you have any questions or concerns regarding the violations above, please contact the writer at 716-753-4481.

Regards,



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