State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER RESOURCE MANAGEMENT
DIVISION OF WATER ENFORCEMENT
401 East State Street
P.O. Box 420, Mail Code 401-04E
Trenton, New Jersey 08625-0420
Tel. (609) 984-2011 • Fax (609) 984-9658
www.nj.gov/dep

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

SHAWN M. LATOURETTE
Commissioner

September 27, 2022

Mayor Reed Gusciora and Trenton City Council
City of Trenton
319 East State Street
Trenton, New Jersey 08608

RE: Compliance Evaluation and Assistance Inspection
Trenton Water Works (TWW)
PWSID No. 1111001
Compliance Activity # SCI210001
Trenton City / Mercer County

Dear Mayor Gusciora and City Council Members:

As part of the Department of Environmental Protection's (Department) long-term effort to assist Trenton Water Works (TWW) in meeting its safe drinking water compliance obligations, the Department performed facility inspections on October 26, 2021, October 27, 2021, November 8, 2021, and February 3, 2022. The Department has since continued to meet frequently with TWW representatives and has provided significant compliance assistance. This Compliance Evaluation and Assistance Inspection Report summarizes the Department's observations and concerns.

While the Department recognizes and appreciates the efforts of the City's executive leadership and TWW staff to improve operating conditions and advance long-overdue capital improvements at TWW, the system continues to struggle in meeting regulatory obligations and requirements. The Department's overall review, as described in detail below, reflects the City's continuing challenge to consistently and properly maintain and operate TWW in a manner that reliably produces safe drinking water that meets all requirements of the New Jersey Safe Drinking Water Act, N.J.S.A. 58:12A-1 et seq. (SDWA), the Water Supply & Wastewater Operators' Licensing Act, N.J.S.A. 58:11-64 et seq., and the New Jersey Water Supply Management Act, N.J.S.A. 58:1A-1 et seq. Moreover, the Department is disturbed by the current City Council's continuing failures or refusals to authorize resolutions necessary to advance critical capital improvements and ensure that ordinary maintenance and operational needs crucial to the protection of public health are met.

Specifically, TWW has repeatedly failed to properly maintain critical treatment processes, monitor water quality in accordance with the requirements of the SDWA, employ adequately trained operating personnel, and invest in required maintenance and capital needs. Partially functioning and poorly performing treatment units exacerbate water quality issues throughout the system and are a contributing factor to the formation of Disinfection By-Products (DBPs). This lack of maintenance also poses an increased risk to the public from waterborne pathogens such as *Cryptosporidium*, *Giardia lamblia*, viruses, and legionella. Since 2012, the Department has identified at least 40 incidents, including 18 in the past five years, where TWW's treatment plant was shut down for reasons including brown outs, treatment failures, and high turbidity in the Delaware River. These incidents further demonstrate the TWW's lack of technical and managerial capacity to adjust treatment plant processes in response to changing circumstances that directly implicate public health and safety.

The Department recognizes the efforts taken to address ongoing compliance issues, including the replacement of filter media in all 24 filters in July 2020, the rehabilitation of chlorine contact basins, the construction of a new raw water intake, and progress on the replacement of lead service lines in the distribution system. TWW had an obligation to replace lead service lines under the July 26, 2018, Administrative Consent Order and has a continuing obligation to replace all lead service lines within the TWW system by July 22, 2031, in accordance with N.J.S.A. 58:12A-40, et seq. The City Council rejected a $15 million bond request for the lead service line replacement program. Without this funding the Department has concerns regarding TWW's ability to meet the lead service line replacement requirements.

The City and TWW have failed to comply with the February 5, 2018, Administrative Consent Order that includes requirements to fill critical vacancies needed to run the treatment plant and timeframes for addressing the uncovered Pennington Reservoir. As a result, the Department lacks confidence that the City and TWW can sustain long term compliance. A 1976 Department report on the Trenton Water Crisis[1] found, "*insufficient training of operating personnel, an absence of emergency plans, a lack of proper maintenance at the plant, insufficient funding for maintenance and training, and a lack of understanding of the factors which are essential to the efficient and reliable operation of a water utility.*" These statements hold true today and emphasize the pattern of insufficient short-term corrective actions by the City and TWW combined with an ongoing failure to sustain compliance and take the necessary action to maintain technical, managerial, and financial capacity long term.

The City and TWW must take immediate action to develop and present to the Department a comprehensive plan that will address the findings of this report with the full support from both the Mayor and the City Council. Given TWW's plans to decommission the Pennington Reservoir (Reservoir), timing is critical. The Reservoir is a source of water for approximately 70% of TWW's customer base or approximately 151,900 consumers. The planned decommissioning will result in significantly less storage across the system to maintain supply during future incidents. However, as noted below and in the Bureau of Water System Engineering's April 4, 2022, letter, the City and TWW have not met the scheduled milestones outlined in the June 10, 2021, Pennington Reservoir Replacement Project plan.

[1] Between Sunday, August 31 and Monday, September 8, 1975, cascading events, involving human error, equipment failure and design vulnerability knocked out Trenton's water filtration plant on the Delaware River, the sole source of supply for the water utility system owned by the City of Trenton. Over two hundred thousand residents of the City and the adjacent Townships that depend on that water utility suffered a catastrophic failure of water utility service.

As of the date of this letter, these milestones have not been achieved and a revised timeline for completion has not been submitted to the Department. In the meantime, the Pennington Reservoir experienced multiple, significant issues, including the presence of midges throughout the distribution system supplied by the Reservoir, algae growth in the Reservoir, and the backflowing of zinc orthophosphate into the Reservoir which has contributed to the presence of cyanobacteria and lead to a potential cyanotoxin exposure risk. With these delays and ongoing water quality concerns, the Department is concerned that the City and TWW will be unable to meet the July 2023 deadline to decommission the Pennington Reservoir, especially given that necessary construction and demolition activities have not been approved or completed.

Attached to this report is a summary of findings that supports the Department's concerns. As stated above, the City and TWW should submit to the Department a comprehensive plan providing specific details of remedial measures and an implementation timetable within thirty (30) calendar days of receipt of this correspondence.

This Compliance Evaluation and Assistance Inspection report shall also serve as notice to both the Mayor and the City Council of the numerous violations, deficiencies, areas of concern, and observations by the Department. Nothing in this report or its attachments constitutes a formal enforcement order, a final agency order, or a final legal determination by the Department. Therefore, it may not be appealed or contested. Neither the issuance of this report nor any corrective actions taken by the City or TWW precludes the State of New Jersey or any of its agencies from initiating further enforcement action with respect to the violations listed herein or any other violations. In the event the Department determines it necessary to pursue further formal enforcement action(s), the City and TWW will be provided with an opportunity to appeal or contest such action.

You are further advised that the SDWA, N.J.S.A. 58:12A-1 et seq., the Water Supply & Wastewater Operators' Licensing Act, N.J.S.A. 58:11-64 et seq., and the New Jersey Water Supply Management Act, N.J.S.A. 58:1A-1 et seq., provide for the potential assessment of substantial penalties in cases of violations. Therefore, your prompt attention to this matter is required to avoid further enforcement action, including but not limited to, the assessment of penalties. If you have any questions regarding this report, please contact Rai Belonzi, Bureau Chief, Bureau of Central Water Compliance and Enforcement at rai.belonzi@dep.nj.gov or the letterhead address above.

Sincerely,

Carlton Dudley, Director
Division of Water Enforcement

c: Mark Lavenberg, Director, Trenton Water and Sewer Utility
Taya Brown-Humphrey, Superintendent, Trenton Water and Sewer Utility
Patricia Ingelido, Director, NJDEP, Division of Water Supply & Geoscience
Patricia Gardner, Assistant Commissioner, Water Resource Management

Enclosure
Trenton Water Works
PWSID 1111001
Summary of Inspection Findings

On October 26, 2021, October 27, 2021, November 8, 2021, and February 3, 2022, a compliance inspection of Trenton Water Works (TWW) was completed by staff from the Department. The results of this inspection identified numerous violations, deficiencies, areas of concern, and observations that make the operational and maintenance issues at TWW an ongoing concern for the Department.

You are hereby notified that a review of your facility found that Trenton Water Works was out of compliance with the regulations promulgated pursuant to, inter alia, the New Jersey Safe Drinking Water Act (N.J.S.A. 58:12A-1 et seq.), and the Water Supply & Wastewater Operators' Licensing Act (N.J.S.A. 58:11-64 et seq.). This notice has been recorded as part of the permanent enforcement history of Trenton Water Works at the above location because your water system failed to comply with the following requirements. Following each identified violation, the Department notifies you of corrective actions required to comply with the applicable regulations.

a. <u>Operation & Maintenance</u>

- <u>Requirement:</u> Pursuant to N.J.A.C. 7:10A-1.12(a), each licensed operator and water system is responsible for properly operating and maintaining the water system.

  <u>Violation Details:</u> During the inspection, the following operational and maintenance deficiencies were identified:

  - ***O&M Manual***
    The Department's review of TWW's O&M manual submitted on October 22, 2021, found that it does not satisfy the requirement under N.J.A.C. 7:10A-1.12(a)1. Specifically, the O&M manual does not contain Standard Operation Procedures (SOP) for TWW's treatment processes including, but not limited to, a list of routine maintenance that must be performed at the plant, a plan for routine inspections and preventative maintenance of each treatment unit and other major components (e.g., pump, valve, storage tank), specifications for each treatment process and an inventory of equipment and supplies necessary to operate and maintain the system. For example, TWW did not have an SOP in place for the inline rapid mixers at the time of inspection which should have included routine inspections. Additionally, the SOP for the Superpulsators does not include routine inspections, cleaning schedules, or effluent turbidity performance levels to trigger necessary equipment maintenance.

  - ***Superpulsator Clarifiers ® (Superpulsator)***
    At the time of the inspection Superpulsators #2 and #4 were online, while #1 and #3 were offline. The Department notes that the lack of maintenance and poor condition of the Superpulsator units, as described below, conveys an elevated organic load into the chlorine contact basins and is likely a major cause of the formation of DBPs within the treatment plant and the distribution system. It also

increases the load on the plants filtration process and can increase the risk of *giardia* and cryptosporidium contamination through turbidity breakthrough in events of high raw water turbidity. TWW has consistently exceeded the maximum contaminant levels (MCLs) for DBPs over the last 20 years with the most recent exceedance in September 2021. A March 2018 Compliance Evaluation and Assistance Inspection of TWW also noted significant deficiencies with the Superpulsators at that time. Therefore, TWW should take additional actions as noted in this report to address the Operation and Maintenance (O&M) issues with this unit process in order to reduce the organic load within the treatment plant and prevent future violations of the MCLs for DBPs and treatment technique violations

Superpulsator #3 has been out of service since May 2021 due to a critical malfunction that caused sludge to backflow into the unit, resulting in damage to the settling plates and causing an approximately 8-foot layer of sludge to accumulate at the bottom of the basin, rendering it non-operational. The Department received a maintenance schedule on October 20, 2021, that indicated the anticipated return to service of Superpulsator #3 by December 1, 2022, which would require sludge removal and the replacement of the damaged settling plates. No updates to this schedule have been received.

Superpulsator #4 had significant floc formation on the surface, indicating performance issues and a need for TWW to remove it from operation for cleaning and maintenance. In addition, a review of Superpulsator #4 effluent data during the inspection showed that turbidity results were significantly higher than turbidity results for Superpulsator #2 (8-10 Nephelometric Turbidity Units (NTUs)compared to <1 NTU, respectively). This is further indication that Superpulsator #4 was not working correctly. TWW personnel noted that the data for Superpulsator #2 was typical of units #1 and #2 while the data for Superpulsator #4 was typical of units #3 and #4; however, the cause of the inconsistencies in performance between the various units was not identified. Superpulsator #4 was taken offline for maintenance in April 2022 which was months after the need for maintenance was identified.

Superpulsator #1 was offline for maintenance at the time of the inspection. In accordance with TWW's October 14, 2021, Super Pulsator Maintenance Schedule, Superpulsator #1 was planned to be placed back into operation on January 1, 2022; however, Superpulsator #1 was not placed back into operation until April 2022, over three months after the scheduled date. TWW's failure to follow the maintenance schedule set forth resulted in the reliance on the poorly performing Superpulsator #4 and the inability to remove it from service since two Superpulsators are needed in operation to meet system demand.

- To address these performance and maintenance issues, Special Condition #2 of Permit to Construct #WCP050007, which was issued on August 15, 2006, for treatment plant additions and alterations, states: "The maintenance procedures shall specify treated water contaminant levels that will trigger the equipment maintenance necessary to return the equipment to designed efficiency. Unless the contaminated source is taken out of service, the time between exceeding the trigger and completion of the maintenance shall not exceed thirty days."

- ***Chlorine contact basin***
  At the time of the inspection, the Riverside chlorine contact basin was offline due to shear pin failure and the subsequent significant damage to the basin's residuals collection system. According to TWW personnel and as noted in the Department's 2018 and 2019 inspection reports, similar incidents have previously occurred in the two chlorine contact basins. Having one contact basin offline for an extended period of time eliminates the redundancy of this critical treatment process, while also delaying any necessary cleaning or maintenance of the in-service basin. Without a proper cleaning frequency, the contact basins can accumulate DBP precursors and increase the levels of DBPs being formed at the plant, increasing the risk of a TTHM/HAA5 MCL. In addition, the presence of organic matter, sediment, sludge, etc., can affect the disinfection process by reducing the effectiveness of chlorine and affecting the CT needed for virus and *giardia* inactivation.

The Department hereby notifies you of the following corrective actions required to comply with the applicable regulations:

1) TWW should provide an explanation for what caused the delay in completing the maintenance of Superpulsators #1 and #4 by January 2022 as per the October 2021 maintenance schedule. TWW should provide an explanation for failing to follow their schedule for maintenance of these Superpulsators, including Superpulsator #2 that was scheduled to be taken offline for maintenance in June 2022. TWW should also provide an updated estimated timeframe for the return to service of Superpulsator #3.

2) TWW should provide an explanation for what caused the inconsistencies in performance between the turbidity levels in the Superpulsators and what corrective actions have been or will be taken to ensure consistent turbidity levels in the future.

3) TWW should establish effluent turbidity performance triggers for each of the Superpulsators, and a detailed list of maintenance tasks and corrective actions to address the cause of performance trigger exceedances and to return the equipment to designed efficiency within 30 days. As a reference, the USEPA's June 2020 "Guidance Manual for Compliance with the Surface Water Treatment Rules: Turbidity Provisions" recommends settled water turbidity less than 1 NTU 95 percent of the time when raw water turbidity is less than or equal to 10 NTU and settled water turbidity less 2 NTU 95 percent of the time when raw water turbidity is less than or equal to 20 NTU. The Department notes that TWW was not achieving this recommendation at the time of inspection with Superpulsator #4 online based on the results of monitoring at the effluent of each Superpulsator.

4) TWW should provide an explanation for the delays in the return to service of the Riverside chlorine contact basin, as well as a plan for eliminating the factors, such as shear pin failure, that have caused the failures of the chlorine contact basins.

5) TWW should submit an updated O&M Manual to the Department for review within 120 days of receipt of this report. The O&M Manual should include all information

required pursuant to N.J.A.C. 7:10A-1.12(a)1 and should incorporate any updated SOPs cited in this report. TWW should correct any deficiencies identified by the Department's review of the O&M Manual within 60 days of receipt of written notice by the Department.

Please be advised that, under N.J.A.C. 7:10A-1.12(a)1, the O&M Manual must be reviewed and updated on a routine basis and within 30 days of a substantial change that warrants a change in the operation and maintenance of the system. Therefore, TWW's O&M Manual should also be updated as needed as forthcoming modifications to the water treatment plant and distribution system are completed.

6) TWW should provide an update on any incomplete items from the DBP Mitigation Program as outlined in the May 10, 2022, 1st Quarter DBP Report. This should include a timeframe for when these items would be completed, an explanation of delays, and justification for projects that won't be completed.

b. Pre-treatment

- Requirement: Pursuant to N.J.A.C. 7:10-11.13(b), pretreatment chemicals shall be applied to water where there is sufficient agitation to ensure rapid and uniform dispersion of each chemical throughout the water, such as at pump suctions, rapid mix basins, or static mixers.

  Violation Details: At the time of the inspection, both in-line rapid mixers were not operational, having been removed from service on August 13, 2021, due to damage to the shafts and paddles.

  Without the rapid mixing process, TWW cannot ensure the uniform dispersion of the ferric chloride coagulant and the performance of the subsequent treatment processes (i.e., Superpulsators and filtration) may be negatively impacted and exacerbates the issues identified above in section "a". Further, this may be a contributing factor to the frequency in which TWW has been forced to shut down the treatment plant due to high raw water turbidity.

  While one of the two mixers was brought back online on March 23, 2022, a review of TWW's maintenance records indicates that the in-line rapid mixers have been removed from service multiple times from March 9, 2019 through August 13, 2021, for repairs due to malfunctions. During the inspection, staff were also unable to establish the length of time that the second mixer was damaged and not functioning properly.

  As a result of the above incident and previous failures of the inline mixers, TWW modified its SOP #60 "Inspection of Inline Mixer" on February 4, 2022, to include monthly and quarterly inspections of these treatment units.

  On June 9, 2022, TWW received temporary treatment approval #WTA220001 to relocate the ferric chloride and polymer chemical injection points from before the inline

rapid mixers to the upstream water effluent channel after the sand separators with a goal of improving the coagulation process.

1) The Department hereby notifies you of the following corrective actions required to comply with the applicable regulations: TWW should provide an explanation for the delay in returning the mixers to service. TWW should also, in accordance with Condition #5 of WTA220001, submit a report to the Bureau of Water System Engineering detailing the findings on the effectiveness of relocating the ferric chloride and polymer injection points on the coagulation process.

c. Monitoring, Reporting & Recordkeeping

- Requirement: Pursuant to 40 CFR 141.174(b), if there is a failure in the continuous turbidity monitoring equipment, the system must conduct grab sampling every 4 hours in lieu of continuous monitoring.

  Violation Details: TWW failed to collect a grab sample following a malfunction of the continuous analyzer on April 28, 2021, between 12:20 am and 5:20 am.

- Requirement: Pursuant to N.J.A.C. 7:10-9.6(b), the supplier of water shall verify the accuracy of performance of each continuous turbidity analyzer/recorder by taking a grab sample of the effluent at least once every 24-hour period.

  Violation Details: TWW failed to collect daily turbidimeter verification samples from July 22, 2021, through July 29, 2021, and on August 3, 2021.

- Requirement: Pursuant to 40 CFR 141.132(d)1, Subpart H systems that use conventional filtration treatment must monitor for total organic carbon (TOC) in the source water prior to any treatment at the same time as monitoring for TOC in the treated water.

  Violation Details: According to TWW's chain of custodies for TOC monitoring in February 2021, TWW collected its source water sample on February 8, 2021, and its finished water sample on February 6, 2021 and thus failed to conduct monitoring at the same time.

- Requirement: 40 CFR 141.175(b)(4) establishes reporting requirements and corrective actions a water system must complete if any individual filter has a measured turbidity level of greater than 2.0 NTU.

  Violation Details: During a review of TWW's individual filter effluent (IFE) turbidity data, it was identified that the maximum IFE turbidity value that the IFE turbidimeters could record was 2.0 NTU, thus prohibiting TWW from reporting IFE data that exceeds the regulatory limit.

The Department hereby notifies you of the following corrective actions required to comply with the applicable regulations:

1) Submit an updated Technical, Managerial, and Financial (TMF) analysis of the water system to the Department in accordance with N.J.A.C. 7:10-2.7(a) within 90 days of receipt of this report. The TMF analysis should evaluate TWW's current management, financial structure, staffing levels, treatment, and distribution system, and propose corrective actions, including timeframes, that address all findings of the TMF report.

   In accordance with the Water Quality Accountability Act (WQAA), N.J.S.A. 58:31-1 et seq., TWW has submitted an annual certification stating that the system is in compliance with various drinking water regulations despite the fact that the system is in violation of the SDWA regulations as noted in this report. Therefore, the TMF should outline TWW's current asset management plan required pursuant to WQAA, N.J.S.A. 58:31-1 et seq., and evaluate TWW's ability to finance and plan for necessary capital improvements contained in that plan. This should include distribution system improvements, and studies to evaluate treatment plant performance in response to the deficiencies noted above. The TMF should establish how TWW will ensure the system has the capacity to meet maximum daily demand and ensure an adequate source of supply in the future through successful operation and maintenance.

   The February 5, 2018, Administrative Consent Order requires TWW to fully and adequately staff the water treatment system and water distribution system. TWW should attain, or maintain, staffing levels of no less than 90% full staffing for all positions identified by the TMF as essential or critical ("Full Staffing"). If, within 60 days of DEP's approval of the TMF submission, 90% Full Staffing has not been confirmed to the Department in writing, absent a showing that TWW has made a good faith showing, TWW should advertise all vacancies necessary to be filled to comply with the 90% Full Staffing requirement and shall submit proof of advertisement to the Department within 60 days of advertisement. Offers for all such vacancies shall be made within 120 days of advertisement. Furthermore, 150 days following DEP approval of the TMF, TWW should submit to the Department, in writing, confirmation that they have achieved the Full Staffing requirement of the TMF.

2) Conduct a Comprehensive Performance Evaluation (CPE) by a third party acceptable to the Department within 30 days from receipt of this report, and have the CPE completed and submitted to the Department within 90 days from receipt of this report. The CPE should include an assessment of plant performance, evaluation of major unit processes, and identification of performance limiting factors. The template for conducting a CPE can be found in USEPA's Handbook "Optimizing Water Treatment Plant Performance Using the Composite Correction Program – 1998 Edition." The CPE should also include a plan, with timeframes, to complete a Comprehensive Technical Assistance (CTA) which will address the performance limiting factors identified by the CPE. The template for completing a CTA is outlined in the same Handbook.

   TWW should also submit monthly CTA progress reports to the Department by the fifteenth day of the month following the month being reported. TWW's first progress report should be submitted to the Department in the month following

TWW's commencement of the CTA. Each progress report should explain the status of all work completed by TWW for the CTA project, and include, but not be limited to, the following:

- A list of the performance limiting factors" that were assessed during the reporting period;
- Progress made in addressing the identified performance limiting factors and any resulting improvements in the performance of the treatment plant;
- Difficulties or problems encountered during the reporting period which have prevented improvements; and
- Actions taken or to be taken to rectify difficulties or problems.

3) TWW should adjust the range of all individual filter effluent turbidity analyzing and recording systems to ensure they are capable of recording turbidity values of at least 2.1 NTU. The Division of Water Supply and Geoscience recommends that systems set their turbidimeter output signal span from 0.00 to 5.10 NTU for filtered water samples.

4) The Department issued Notice of Noncompliance #PEA210003 to TWW on September 24, 2021, for the failure to collect daily turbidimeter samples in July and August 2021. In accordance with the Notice of Noncompliance, TWW is required to complete a Tier 3 public notification within 1 year of the date of the Notice (i.e., by September 24, 2022). Further, TWW is required to conduct Tier 3 public notification within 1 year of the date of the other monitoring and reporting violations as noted above.

d. Security

- Requirement: In accordance with N.J.A.C. 7:19-2.14(c), a permittee should protect their diversion source from vandalism, tampering, and contamination at all times.

  Violation Details: At the time of the inspection, the security cameras located outside of the Delaware River intake station and at the Pennington Reservoir were not operational.

The Department hereby notifies you of the following corrective actions required to comply with the applicable regulations:

Recommended Action: To prevent security threats and be better forewarned of potential risks to the intake station (i.e., floating debris, ice, boat impacts) and reservoir, TWW should take appropriate security measures that may include the repair and return to service the intake station security cameras.

The following significant deficiencies and areas of concern which, if not addressed, have the potential to impact the quality of water delivered by TWW, were also noted during the inspection. Following each significant deficiency and area of concern, the Department notifies you of corrective actions that should be taken.

e. Storage Tanks

- Significant Deficiency: TWW hired contractors to conduct interior and exterior inspections of its finished water storage tanks in 2019 and 2021. The inspection reports prepared by the contractors include the following recommendations that have not been implemented as of the date of this inspection:

  - Mercerville tank:
    - N.J.A.C. 7:10-11.11(c)(1) requires that elevate tanks "be provided with an impermeable and durable roof or cover." In its inspection, DEP noted a one-inch hole in the roof of this tank. TWW has since indicated in conversations that this was fixed on August 23, 2022. TWW should provide written confirmation that it patched or covered the 1-inch hole in the roof on August 23, 2022, and an explanation for the delays in completing this work.
    - TWW should conduct a complete interior and exterior rehabilitation and complete installation of the pump-down mixing system.
  - Lawrenceville tank: TWW should install a pump-down mixing system.
  - Jones Farm tank: TWW should conduct a complete interior rehabilitation.
  - Whitehorse tank: TWW should perform an exterior spot prime and topcoat within 4-5 years and an interior chemical cleaning within 4-5 years.

  The referenced pump-down mixing systems are designed to force the tanks to turnover each day to provide the necessary exchange of water to maintain a consistent chlorine residual and to improve water quality throughout the distribution system.

  Corrective Action: TWW should provide a timeframe for the completion of the recommended projects at each storage tank. The Department notes that a Placed in Service Certification form for the Mercerville tank pump down and mixing system was received by the Department on September 20, 2022.

f. Central Pumping Station

- Significant Deficiency: N.J.A.C. 7:10-11.9 sets forth requirements for pumping stations, including that water systems have pumping equipment designed to meet demand requirements pursuant to N.J.A.C. 7:10-11.6(a). Significant rust and chipping paint were observed on the pipes in the basement of the Central Pumping Station (CPS), causing concerns about the long-term structural integrity of these pipes. The CPS is crucial for supplying the high service gradient of the distribution system which makes up 70% of the system demand and customer base. A failure of the piping at any time would be catastrophic for water supply and public health.

  Corrective Action: TWW should address and evaluate the condition of these pipes as part of the CPS upgrade project, which is included in TWW's Pennington Reservoir Replacement Project plan.

g. Monitoring and Reporting

- Significant Deficiency: In accordance with N.J.A.C. 7:10-9.6(b), a supplier of water shall verify the accuracy of performance of each analyzer/recorder by taking a grab sample of the effluent at least once every 24-hour period. TWW's SOP #40 "Daily Turbidimeter Grab Sample Verification" states that supervision must be notified if the difference between the SCADA and grab sample readings is +/- 0.5 NTU. A review of daily turbidity log sheets during the inspection indicated that there were multiple instances when the difference between the SCADA and grab sample results was greater than 0.5 NTU, but it could not be determined what actions were completed to address this situation.

  Corrective Action: TWW should update SOP #40 to include the specific steps that staff should follow when grab samples are outside the range set in the SOP (e.g., calibrating equipment, replacing sample cells, flushing grab sample lines, etc.). In addition, the Department recommends that TWW review and potentially decrease the +/- 0.5 NTU difference between SCADA and grab samples results as a determination of analyzer accuracy, particularly for filtered water turbidity data, which is typically less than 0.1 NTU. In response to this report, TWW should provide an updated copy of SOP #40, as well as justification for the use of a reduced turbidity data differential to be used to determine analyzer accuracy.

- Significant Deficiency: During the inspection, TWW personnel stated that the raw water turbidimeter is typically flushed weekly if water quality conditions in the river are good but needs to be flushed daily during times of poor water quality in the river. Procedures for how to flush the turbidimeters are included in TWW's standard operating procedure (SOP) #42 "SOP for Flushing Turbidimeters". On July 18, 2021, TWW was forced to shut down the filtration plant due to elevated filter effluent turbidity levels. Turbidity and flow data from the incident was used to determine if water with turbidity exceeding 1 NTU may have flowed through the filters into the clearwells during the shutdown period. The raw water turbidimeter was providing inaccurate readings that did not match true raw water quality data for several days and this was attributed to the turbidimeter being clogged. From the log sheets submitted by TWW in response to this incident, the raw water turbidimeter read approximately 1.8-2.0 NTU from 12:00 am July 16, 2021, to 2:30 am July 19, 2021. This did not match the hourly raw grab samples collected during this time which were much higher (above 20 NTU at times). It took several days for this inconsistency to be identified and addressed by TWW.

  While these results were determined not to be representative of finished water, this incident is evidence that high raw water turbidity events are not being handled properly by TWW. Having accurate raw water turbidity data is required to make treatment adjustments and process decisions. Additionally, pursuant to N.J.A.C. 7:10-2.4(b), TWW should have called these results into the hotline to inform the Department upon awareness.

  Corrective Action: TWW should update SOP #42 to include a schedule for flushing the raw water turbidimeter and specifying the raw water quality conditions that would

necessitate an increased frequency of meter flushing. In response to this report, TWW should provide an updated copy of SOP #42.

- Significant Deficiency: When the treatment plant is restarted following a temporary shutdown, the Hach 1720E turbidimeters at each filter can temporarily read inaccurate, elevated turbidity levels due to the disruption of settled sediment in the bottom of the instrument and in the sample lines. An example of this occurred on the July 18, 2021, incident. Because the grab samples are collected from the turbidimeter discharge line, it will read the same inaccurate result.

  Corrective Action: TWW should identify and submit a schedule to address this issue so that in future incidents, turbidity readings are accurate to allow TWW to determine if water is entering the distribution system within regulatory standards, which can affect public health, and respond appropriately. For example, replacing the 1720Es with new technology that would not be affected by the stirred-up sediment. As confirmed by a representative from Hach, the 1720E units have been discontinued.

- Significant Deficiency: The grab sample line from the raw water turbidimeter was lying on the ground.

  Corrective Action: This line should be elevated to prevent contamination and potential false turbidity readings.

h. Chemical Feed, Chemical Storage & Treatment

- Significant Deficiency: N.J.A.C. 7:10-11.6(a) requires that the components of a public water system, including treatment components, shall be designed and constructed to meet all daily demand requirements imposed on the water system and shall have the firm capacity to meet the applicable peak daily demand. The treatment plant's two gravity thickeners receive residuals from the Superpulsators and chlorine contact basins, and backwash from the gravity filters. According to TWW personnel, one thickener cannot accommodate all the residuals flow from the treatment plant, limiting the time a thickener can be offline for maintenance or cleaning. In addition, any failures of the gravity thickeners, which have now exceeded their lifespan, have the potential to limit the production of finished water in the treatment plant as solids may not be able to be adequately removed from the water treatment process. As a result, in 2020, TWW developed designs for the rehabilitation of the two gravity thickeners.

  Corrective Action: TWW should provide an update on implementing the gravity thickener rehabilitation project and an estimated timeframe for completion.

- Significant Deficiency: Standing water was observed in the potassium permanganate feed room. Please be advised that, in accordance with N.J.A.C. 7:10-11.6(g)3, all floors, dry wells, meter pits, interconnection chambers, piping galleries and similar structures not intended to contain water shall be self-draining without the possibility of backflow and, if necessary, sufficient sump pumping capacity shall be provided for the removal of water.

Corrective Action: TWW should investigate the source of the water and, if necessary, install a sump pump or other equipment to allow water to be routinely pumped out to prevent damage to equipment.

- Significant Deficiency: A leak in the roof of the lime chemical feed room was observed during the inspection.

  Corrective Action: TWW should repair the leak to prevent damage to equipment.

i. Additional Deficiencies

- Significant Deficiency: Standing water observed in the pit containing the Pennington Avenue reservoir effluent pipes during the November 8, 2021, inspection of the distribution system. According to TWW personnel, this is due to groundwater intrusion. As noted above, in accordance with N.J.A.C. 7:10-11.6(g)3, all floors, wells, meter pits, and similar structures shall have sufficient sump pumping capacity for the removal of water.

  Corrective Action: TWW should ensure this water is routinely pumped out to prevent damage to equipment.

- Significant Deficiency: Waterfowl were observed swimming on the finished water reservoir during the November 8, 2021, inspection of the distribution system. TWW indicated they do not have a wildlife management plan. Waterfowl and other wildlife coming in to contact with the reservoir can lead to contamination of the finished water.

  Corrective Action: TWW should develop a Finished Water Reservoir Management Plan.

In addition to the above, TWW should take note of the following:

1. Under N.J.S.A. 58:12A-44, effective July 22, 2021, all public community water systems must replace all lead service lines by July 22, 2031. The law includes galvanized lines as lead service lines, which were not required to be replaced under the federal Lead and Copper Rule. Therefore, based on the System's current lead service line inventory, 16,257 of lead service lines, serving consumers within the System's service area. In addition, the system has reported 15,301 service lines of unknown material that must be identified and replaced if they contain lead.
    - TWW submitted an Initial Lead Service Line Identification and Replacement Plan (Plan) in July 2022, which is under review.
    - Based on the Plan, TWW indicated that the lead service line customer notifications were not completed within 30 days of inventory submission as required under N.J.S.A. 58:12A-43.

- TWW indicated in the Plan that the required lead service line replacement program would be financed through the issuance of municipal bonds and Water Bank financing including principal forgiveness.

2. As per the Bureau of Water System Engineering's April 4, 2022, Pennington Reservoir Replacement Project – Plan Response Follow-Up letter, the projects outlined by TWW in their June 10, 2021, Pennington Reservoir Replacement Project plan have not been completed and submitted by their planned dates. This includes:
   - Phase 2 Storage Tank Site Alternative Analysis – Due end of October 2021
     i. Six sites were identified for possible storage tanks as per the January 19, 2022, email from TWW, but no update has been received.
   - Operational Resiliency Study (ORS) – Final report due December 31, 2021
     i. A draft report was received on January 19, 2022.
   - Phase 2 Storage Tank Proposal – Due February 28, 2022

3. TWW exceeded the recommended upper limit of 50 mg/l for iron in a sample collected from its distribution system on April 8, 2021. As a result, this iron exceedance must be included in TWW's 2022 Consumer Confidence Report (CCR). In addition, the specific language for iron exceedances, which is located at N.J.A.C. 7:10-5.2(b)3, must be included in the CCR.

4. Paragraph 17D of the February 5, 2018, Administrative Consent Order (ACO), sets forth requirements for large diameter valve exercising and replacement. On August 18, 2022, TWW stated that all remaining valves have been exercised and evaluated and should provide written confirmation of such to the Department. TWW is reminded that all distribution system valves should continue to be inspected and tested according to the frequency established by the Water Quality and Accountability Act (WQAA).

5. Construction of the new Delaware River raw water intake was completed by TWW in April 2022. TWW should prepare an O&M Manual for the intake that includes, at a minimum, SOPs, a schedule of routine inspections and preventative maintenance tasks, and an emergency operations plan.

6. The zinc orthophosphate chemical feed system at the water treatment plant, which is to be used for corrosion control treatment in the gravity zone of the distribution system, was placed into service in February 2022. In accordance with condition #6 of Permit to Construct #WCP200001, which was issued on June 1, 2020, for the construction and operation of this system, TWW must submit a revised Corrosion Control Treatment Recommendation for the entire water system within six months of the covering or replacement of the Pennington Avenue reservoir that is representative of the water quality and system operations applicable at that time. In addition, TWW must submit and obtain a Safe Drinking Water permit prior to any modifications to centralize corrosion control treatment (i.e., to change the injection location of zinc orthophosphate and chemical pump replacement).

7. In January 2022, TWW completed the construction of nine (9) distribution system sampling stations at the locations of each of its DBP sampling sites and received approval to use them from the Bureau of Safe Drinking Water on March 8, 2022. Please be advised that the DBP

Sampling Plan must be updated to reflect this change as per 40 CFR 141.622(a). TWW may also use the sampling stations for total coliform sampling in its distribution system. Please be advised that upstream and downstream repeat sampling locations must be selected for each new routine sampling location. In addition, TWW's Total Coliform Sampling Plan must be modified to reflect any changes to the routine and/or repeat sample locations.

8. TWW has been completing numerous modifications at the water treatment plant and within the distribution system to maintain compliance with the February 5, 2018, and July 26, 2018, ACOs, Department-required corrective actions, and the New Jersey Safe Drinking Water Act. As a result, TWW must ensure that all appropriate operation and maintenance procedures, as well as schedules of routine inspections and preventative maintenance tasks, are updated as needed.

9. According to TWW's standard operating procedure (SOP) #15 "SOP for Backwashing Filters in Manual Mode via SCADA", a backwashed filter can be returned to service when the individual filter's effluent turbidity is less than 0.25 NTU. The Department recommends a turbidity value of less than 0.1 NTU prior to returning a filter to service after a backwash. TWW should adjust its filter backwash operations and SOP #15 accordingly.

10. TWW personnel indicated that various alarms for the raw water intake station, water treatment plant, and distribution system are only visual (i.e., there is no corresponding audible notification). To allow for water system personnel to respond to these situations promptly, the Department recommends that TWW evaluates the effectiveness of the existing alarm systems and supplements as needed.

11. The powder activated carbon (PAC) chemical feed system is currently not connected to the SCADA system and needs to be operated manually. The Department recommends that TWW connects the PAC feed system to SCADA during a future SCADA system upgrade for improved operations.

In addition to the issues identified in the inspection, the Department notes that TWW continues to be in violation of a February 2018 Administrative Consent Order as a result of failure to meet the National Primary Drinking Water Regulations, Enhanced Treatment of Cryptosporidium at 40 CFR 141.714 and subsequent delays in executing a plan to cover, replace or provide adequate treatment to address the risk of contamination of the treated water from human activity, algal growth, and animal waste. The public health risk from these pathogens and the failure to move forward has been demonstrated by the following deficiencies that have occurred in June, July, and August 2022. Following each identified deficiency, the Department notifies you of corrective actions that should be taken.

- <u>Identified Deficiencies</u>
    - On June 29, 2022, a customer of TWW notified the Department that they were finding midges in their home cartridge filter. Through investigation by the Department and TWW, the presence of midges in the customer's water supply was confirmed and the Department determined that the midges were likely coming from

the Pennington Reservoir, and that it was a widespread issue in the TWW distribution system.

- On July 14, 2022, TWW discovered that zinc orthophosphate (ZOP) was present in the reservoir and called the Department hotline (CC# 22-07-1703-09). Phosphorus is a primary food source for cyanobacteria, so this triggered immediate sampling of the reservoir to determine if cyanobacteria and cyanotoxins were present. While a toxin producing cyanobacteria species was found in the reservoir through extensive sampling, it is a smaller species and was not producing toxins above guidance levels.

- Recommended Actions:
  - TWW should investigate the cause for zinc orthophosphate entering the reservoir and provide a timeframe for remedial actions. ZOP has been shut off at the filtration plant until the issue is fixed. ZOP is necessary for corrosion control and lead and copper compliance in the gravity zone.
  - TWW has contracted with Princeton Hydro to address the algae, cyanobacteria, and midge issues with the reservoir and should continue to sample in accordance with the plan submitted to the Department for review and approval.

This Summary does not constitute final agency action and may not be appealed or contested. The issuance of this Summary or your compliance therewith does not preclude the State of New Jersey or any of its agencies from initiating formal administrative and/or judicial enforcement action, including assessment of penalties, with respect to the items of non-compliance listed above or for any other violations. In the event of formal administrative or enforcement action, you may appeal or contest such action and penalties.