# CONSULTING ENGINEER'S ANNUAL REPORT - WATER SYSTEM

CAPITAL REGION WATER
HARRISBURG, PA

**September 2024**
GANNETT FLEMING PROJECT NO.: 064841.CEAR.2024

Prepared for:
Capital Region Water

GANNETT FLEMING

## TABLES



## FIGURES

# 1.0 INTRODUCTION

Gannett Fleming, Inc. prepared this Water System Consulting Engineer's Annual Report (CEAR) for Capital Region Water (CRW) as required by the Trust Indenture between CRW and the Bank of New York Mellon Trust Company, N.A. originally dated January 1, 1991, and Amended and Restated as of April 1, 2014, and May 1, 2018. This CEAR is being submitted to comply with the following requirements, as outlined in the Indenture:

Section 7.11:

> *"It shall be the duty of the Consulting Engineers, in addition to the other duties prescribed elsewhere in this Indenture, to prepare and file with the Authority and with the Trustee on or before 90 days prior to the beginning of each Fiscal Year hereafter, a report setting forth the following:*
>
> *a. Their advice and recommendations as to the proper maintenance and repair of the operating and water delivery infrastructure of the Water System during the next Fiscal Year;*
>
> *b. Their advice and recommendations as to the Capital Additions that should be made during the next Fiscal Year and their estimate of the amounts of money necessary for such purpose; and*
>
> *c. Their finding whether the operating and water delivery infrastructure of the Water System have been maintained in good repair and sound operating condition and their estimate of the amount, if any, required to place such operating and water delivery infrastructure in such condition and the details of such expenditures and the approximate time required therefor."*

CRW's fiscal year runs from January 1 through December 31 of each year. The Water System includes the Dr. Robert E. Young Water Services Center Water Treatment Facility, Susquehanna River Raw Water Intake, the DeHart Dam Reservoir, finished water reservoirs (Upper Reservoir, Lower Reservoirs 1 & 2), pump stations, pumping equipment, transmission and distribution mains, and related equipment servicing the City of Harrisburg (City) and portions of the Borough of Penbrook, Swatara Township, Susquehanna Township, and Lower Paxton Township, all located in Dauphin County, Pennsylvania.

## 1.1 Report Methodology and Limitations

In preparing this CEAR, existing records and documents prepared by or on behalf of CRW were reviewed to understand, assess, and report on the technical information contained therein as it relates to the FY 2023 CEAR. The major relevant documents provided by CRW and reviewed as part of the CEAR include, but are not necessarily limited to, the following:

- 2023 Water Allocation Permit Compliance Report
- 2023 Drinking Water Quality Report
- 2023 DeHart Dam Annual Safety Inspection Report
- 2023 Water Loss Audit for Finished Water
- 2023 and 2024 Drinking Water Division Monthly Reports
- Historic Actual Water System Expenses (FY 2022 and FY 2023)

- Budgeted FY 2024 Water System Expenses
- Asset Management Plan
- 2024 Capital Improvement Plan

In addition, limited visual site inspections of the following components of the Water System were conducted on July 22, 2024:

- DeHart Dam, Reservoir Control Building, and Chemical Feed Facility
- Susquehanna River Raw Water Pump Station
- Dr. Robert E. Young Water Services Center Treatment Facility
- Gate House Pump Station
- Union Square Industrial Park Booster Station
- Lower Finished Water Reservoirs 1 & 2

The review also included discussions with representatives of CRW and performance comparisons to other comparable water systems and related industries.

This CEAR summarizes the findings of the visual inspections at the time they were conducted, and the findings of the data reviewed and discussions with CRW up to the date of the issuance of the CEAR. Changed conditions occurring or becoming known after such date could affect the material presented and the conclusions reached herein to the extent of such changes.

Gannett Fleming has not independently verified the accuracy of the information provided by CRW and others. However, we believe such sources are reliable and the information obtained to be appropriate for the analysis undertaken and the conclusions reached herein. In addition, the scope of our review did not include any pending or threatened litigation against CRW. CRW has stated that there is no pending litigation related to its water operations.

In completing this CEAR for CRW, Gannett Fleming is not serving in the role of a "municipal advisor" under the regulations of the Securities and Exchange Commission. As such, Gannett Fleming is not recommending any action regarding municipal financial products or the issuance of municipal securities and is not acting as a registered municipal advisor to CRW, and does not owe a fiduciary duty to CRW pursuant to Section 15B of the Securities Exchange Act of 1934, as amended by the Dodd-Frank Wall Street Reform and Consumer Protection Act, with respect to the information and material prepared in connection with this CEAR. CRW should discuss any information and material prepared in connection with this CEAR with any and all internal and external financial and other advisors that they may deem appropriate before acting on this information and material.

# 2.0 WATER SYSTEM MANAGEMENT

## 2.1 Overview of the Water System

The primary source of drinking water for the Water System is the William T. DeHart Dam and Reservoir located 20 miles northeast of the City in the Clarks Valley Watershed. The Dam and Reservoir collect water from a 22-square-mile watershed. The Susquehanna River provides CRW with a backup water supply and currently is only used in case of severe drought, emergency, or routine short-term operational exercise. The Susquehanna River had been used as a primary water source up until the construction of the DeHart Dam in 1940.

Components of the Water System were first established in 1839 when the Commonwealth of Pennsylvania granted the City permission to withdraw water from the Susquehanna River to serve City residents in the central part of the City. Over the years, numerous upgrades and expansions were undertaken to meet new regulations and to expand services City-wide and to other municipalities located in Dauphin County.

As was noted in the 2023 Drinking Water Quality Report and 2023 Water Allocation Permit Compliance Report, the Water System includes almost 220 miles of water mains ranging in size from 6-inches to 42-inches in diameter, approximately 1,800 fire hydrants, approximately 5,370 main valves, and approximately 19,900 service valves. The sources of supply, pumping, and treatment facilities are summarized in **Table 2-1**.

**Table 2-1: Summary of Supply, Pumping, and Treatment Facilities**

| Facility | Item | Capacity |
|---|---|---|
| DeHart Dam and Reservoir | Full Storage Capacity<br>Reservoir Yield<br>Allocation | 6.0 billion gallons<br>10.5 MGD<br>13.5 MGD |
| Susquehanna River Intake | Source Allocation<br>Pumping Capacity | 15 MGD (Secondary)<br>30 MGD |
| Dr. Robert E. Young Water Services Center Treatment Facility | Design Flow | 20 MGD |
| Upper Reservoir | Storage Capacity | 28 MGD |
| Lower Reservoir #1 | Storage Capacity | 6.0 MGD |
| Lower Reservoir #2 | Storage Capacity | 6.0 MGD |
| Susquehanna River Pump Station | Pumping Capacity | 14,000 GPM (2 duty, 1 spare) |
| Gate House Pump Station | Pumping Capacity | 8,000 GPM (1 duty, 1 spare) |
| Union Square Industrial Park Booster Station | Pumping Capacity at:<br>-Triplex Constant Pressure<br>-Fire Pump | <br>750 GPM<br>1,200 GPM |

## 2.2 Management and Staffing

CRW is governed by a five-member Board of Directors. A management team headed by the Chief Executive Officer is responsible for the technical and administrative operations of CRW, as well as the implementation of programs, policies, and procedures, and the execution of contracts upon approval by the Board. In addition to providing drinking water services, CRW also provides wastewater services. CRW operates as one entity; however, CRW separately tracks and records the provision of services associated with each of the utilities that it manages and operates.

CRW's organizational chart is made up of six departments as well as an Executive Team. The six departments are as follows: Finance, Engineering, Drinking Water, Wastewater, Shared Services, Strategic Initiatives. An overview of the current organizational structure of CRW is shown in Figure 2-1.

CAPITAL REGION | WATER.

# Organizational Structure

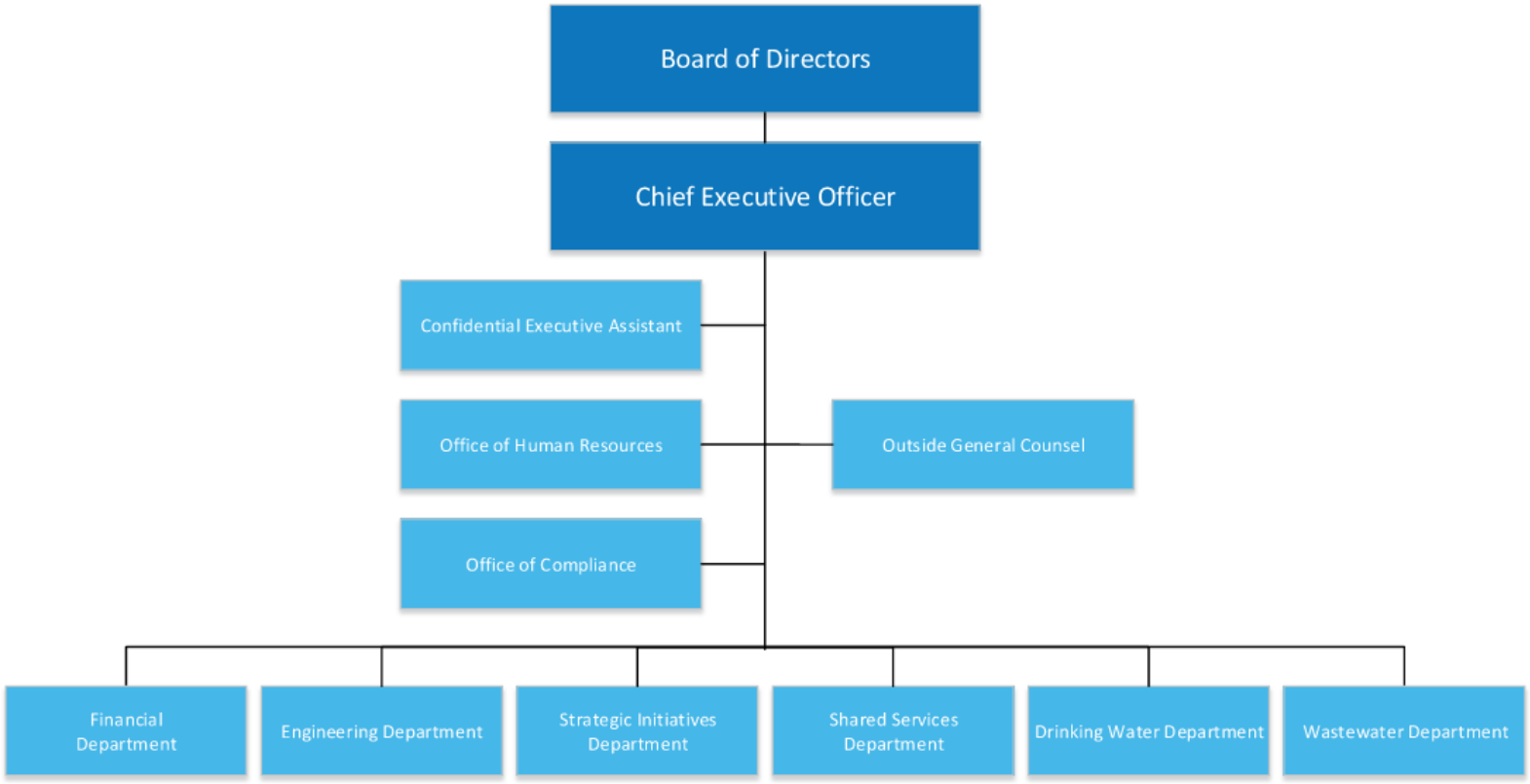


**Figure 2-1: CRW Management Level Organizational Chart**

### 2.2.1 Organizational Structure Description

The Drinking Water and Wastewater Departments are responsible for the operation and maintenance (O&M) of facilities, permit compliance, tracking and reporting, energy management, monitoring, long-term planning, repair and construction, and assistance in budget preparation and tracking. The Drinking Water Department includes plans for 38 positions, with 37 positions filled as of July 2024. The Drinking Water organizational chart is provided in **Figure 2-2**.

The Shared Services Department provides office management, information technology, customer service, and procurement services. The Engineering Department provides engineering support, project coordination, GIS coordination, wet weather coordination, and asset management services. The services currently provided by the Finance Department include accounting, billing and collections, customer service, and payroll. The Executive Team provides legal services. Human Resources was previously a separate department but is now part of the Executive Team. The Risk and Safety Department was replaced by the Compliance Department, which is now under the Executive Team. A Strategic Initiatives Department provides diversity and inclusion as well as community relations and other external affairs.

It is understood that CRW plans to staff the Shared Services Department, Engineering Department, Finance Department, Strategic Initiatives, Human Resources, Compliance, and Executive Team with a total of 48 positions (19 for Shared Services, 10 for Engineering, 8 for Finance, 5 for Strategic Initiatives, 3 for Human Resources, 1 for Compliance, and 2 for Executive), and as of July 2024, 46 of the 48 positions have been filled. Personnel expenses associated with these departments are allocated to each of the utilities based on budgeted time allocated to each of the services.

In summary, CRW's FY 2024 Drinking Water System budget includes estimated costs associated with the current and planned employees dedicated to the Drinking Water System and the Water System's share of costs associated with the planned positions under the Shared Services, Engineering, Strategic Initiatives, Finance Department, Human Resources, and Compliance Departments as well as the Executive Team, which all provide support to CRW's water and wastewater utilities. These employees are all employees of CRW, with the majority belonging to a collective bargaining unit.

The organizational structure of CRW provides strong opportunities for economies of scale through the sharing of shared services, engineering, finance, and executive services between the water and wastewater utilities. The structure is generally consistent with similar-sized, combined utilities, and it appears that all required Drinking Water System functions of CRW are adequately staffed and without excessive vacancies.

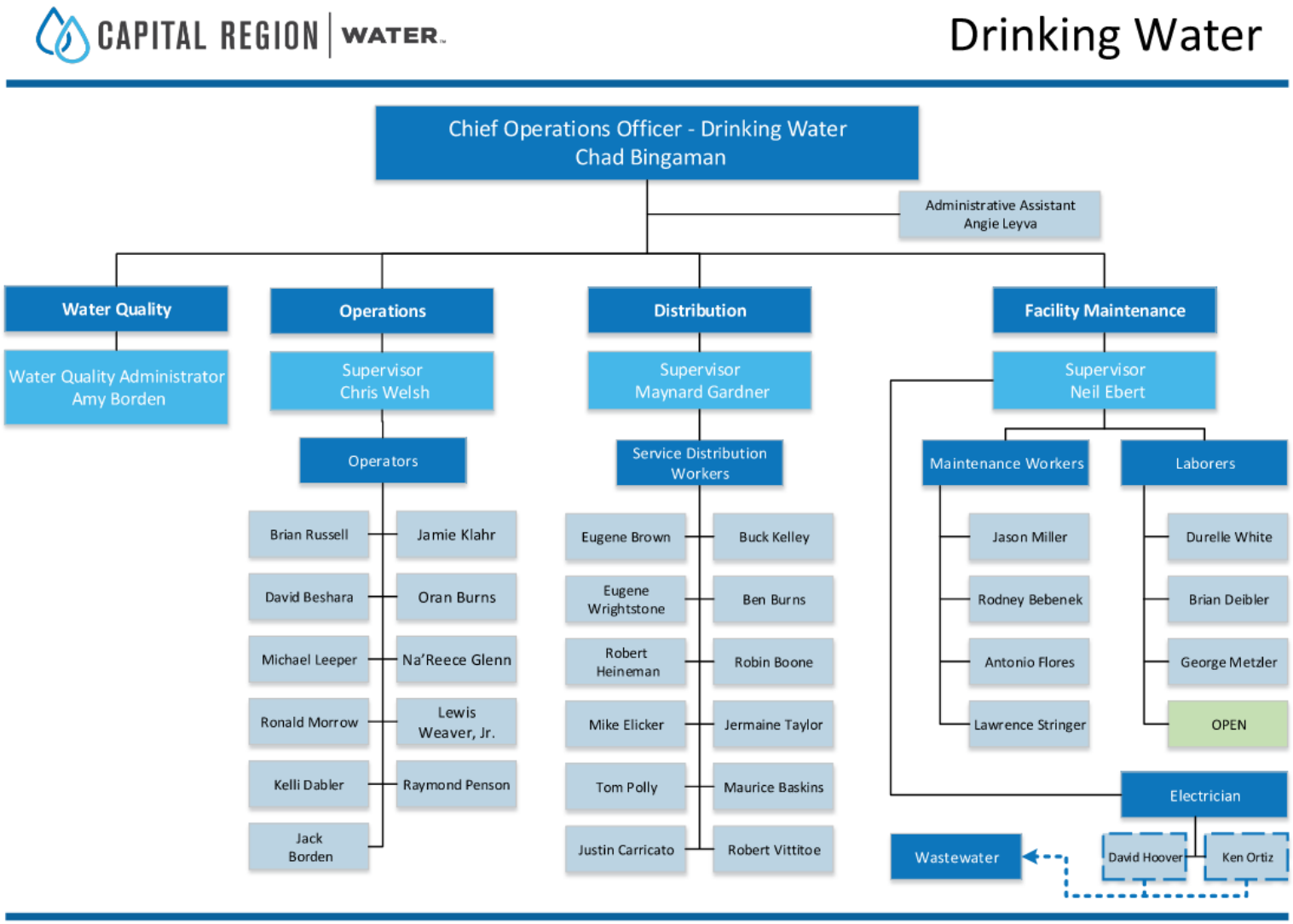


**Figure 2-2: Drinking Water Operations Division Organizational Chart**

# 3.0 WATER SYSTEM PERFORMANCE

## 3.1 Service Area

The service area of the Water System includes the City and portions of Penbrook Borough, Lower Paxton Township, Swatara Township, and Susquehanna Township. Except for a portion of the distribution system piping and related equipment, the majority of CRW's water assets are located within the municipal boundaries of the City. **Figure 3-1** below shows the water system infrastructure map.

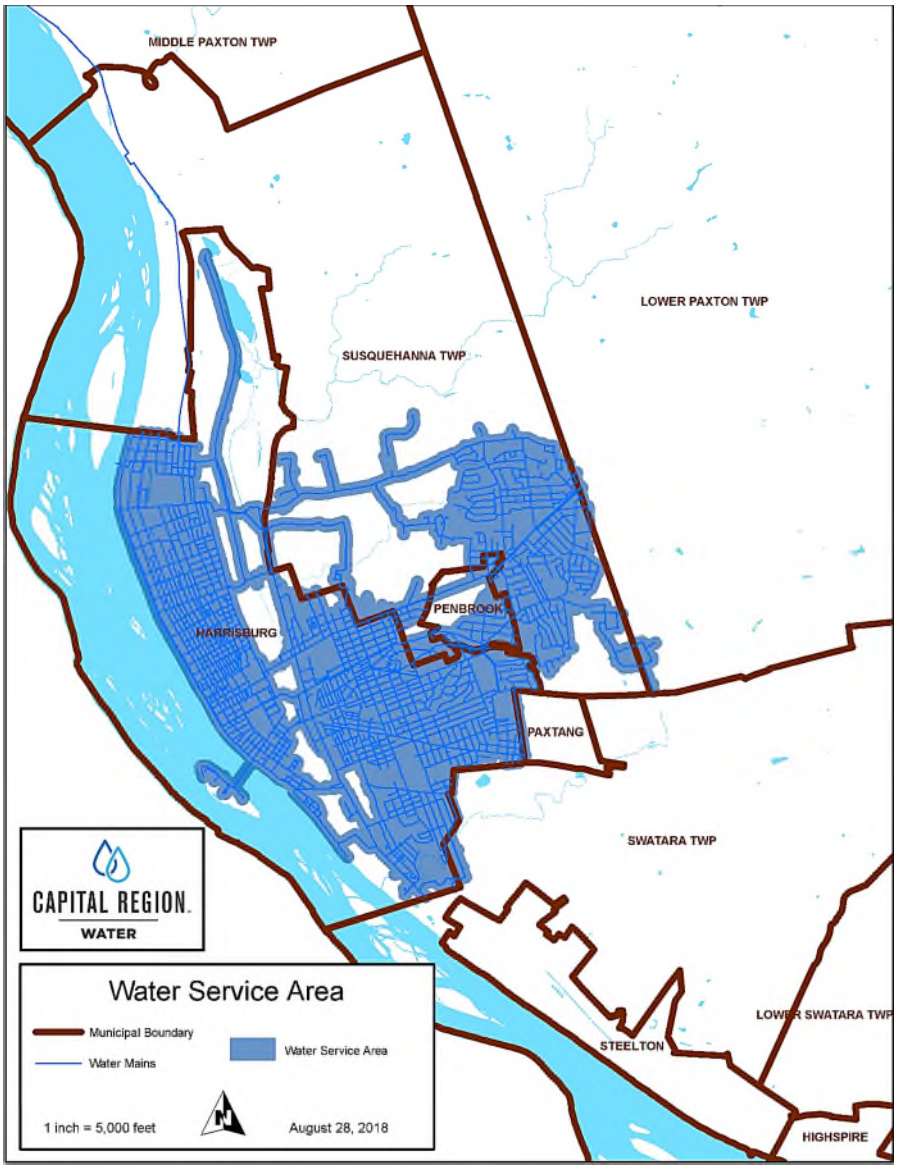


**Figure 3-1: Water System Infrastructure Map**

## 3.2 Customer Base

CRW maintains approximately 19,793 active metered connections and 6 unmetered connections within its service area, with the majority located within the City. The remainder are located in portions of Susquehanna Township, Swatara Township, and Penbrook Borough. CRW maintains only three domestic connections in Lower Paxton Township. The total estimated population served by the Water System is approximately 61,400.

A summary of the total number of connections and the total metered water consumption based on CRW records for fiscal year 2023 is shown in **Table 3-1**.

**Table 3-1: FY 2023 Customer Accounts and Metered Water Use**

| Water Customer Base Table | | |
|---|---|---|
| Description | Accounts | Consumption (1,000 gal) |
| **City of Harrisburg** | | |
| Residential | 14,675 | 766,670 |
| Commercial | 1,478 | 348,277 |
| Industrial | 23 | 258,585 |
| Public\Institutional | 178 | 161,693 |
| **Total** | **16,354** | **1,535,225** |
| | | |
| **Suburban Communties** | | |
| Residential | 3,405 | 174,740 |
| Commercial | 112 | 56,321 |
| Industrial | 1 | 31,475 |
| Public\Institutional | 14 | 10,557 |
| **Total** | **3,532** | **273,093** |
| **Total** | **19,886** | **1,808,318** |

Source: FY23 Customer and Billing Data provided by CRW

## 3.3 Water Supply and Demand

Pursuant to its Water Allocation Permit (Permit # WA-22-53B) issued by PADEP, CRW maintains a 13.5 million gallon per day (MGD) water supply allocation from the DeHart Dam and Reservoir and a 15.0 MGD secondary allocation from the Susquehanna River. However, the DeHart Dam has an estimated safe yield of 10.5 MGD. The design flow capacity of CRW's water treatment facility is 20.0 MGD. No changes to the water allocation permit or CRW's water treatment capacity are currently anticipated.

Average metered daily consumption was approximately 5.53 MGD in FY 2023 and peak day water production was 9.03 MGD in FY 2023. In addition, non-revenue water (NRW) has increased from 30 percent in FY 2022 to 31.1 percent in FY 2023 and remains high at an average daily rate of approximately 2.25 MGD of the average daily finished water production.

This NRW is an overall increase from historic levels due to changes required by PA DEP for longer filter backwashes. The 2021 Filter Plant Performance Evaluation required that one full filter volume should be purged via extended terminal subfluidization wash (ETSW) prior to filter to waste (FTW) being initiated. In

order to return a filter to service, FTW is to be conducted for one full filter volume at normal production rate and until effluent turbidity is <0.30 NTU prior to returning a filter to service. In 2023 Gannett Fleming offered recommendations to CRW of ways to reduce the NRW associated with the longer filter washes required by DEP. The recommendations are as follows:

- Reduce filter to waste duration to 20 minutes from 35 to 39 minutes while routinely reviewing the backwash turbidity profile to verify that the filter to waste period is long enough to get past the post-backwash turbidity spike.
- Collect backwash waste turbidity data to optimize high wash duration. This would require manually collecting a sample from the waste trough every 30 seconds during the high wash period. Turbidity data from those samples could be reviewed to look for a definition of the volume required to complete the solids transport operation and associated opportunities to potentially reduce the high wash duration.
- Evaluate the effectiveness of the Extended Terminal Subfluidization Wash (ETSW).

CRW continues to work to optimize backwash rates to reduce NRW; however, the NRW for the system still remains high. The Pennsylvania Public Utility Commission considers losses greater than 20.0 percent of total water production to be excessive. In 2023 CRW's NRW as a percentage of total water production was 31.1%. Regardless, it appears that CRW currently has sufficient access to raw water supplies and has the storage and treatment capacity to meet demand. A summary of the current water supply and demand statistics is shown in **Table 3-2**.

**Table 3-2: Water Supply and Demand**

| Description | Million Gallons Per Day | | |
|---|---|---|---|
| Water Supply | FY 2021 | FY 2022 | FY 2023 |
| Water Supply Yield<br>-Primary<br>-Secondary | <br>10.50<br>15.00 | <br>10.50<br>15.00 | <br>10.50<br>15.00 |
| Water Treatment Capacity | 20.00 | 20.00 | 20.00 |
| Water Demand | | | |
| Average Metered Daily Consumption | 4.91 | 5.14 | 5.53 |
| Peak Day Water Production | 8.37 | 8.82 | 9.03 |
| Non-Revenue Water | 2.16 | 2.24 | 2.25 |
| Total Average Daily Water Production | 7.01 | 7.38 | 7.23 |
| Performance Ratios | | | |
| Non-Revenue Water as a % of Water Production | 31% | 30% | 31.1% |
| Average Daily Production as % of Treatment Capacity | 35% | 37% | 36.2% |
| Peak Day Production as % of Treatment Capacity | 42% | 44% | 45% |

Sources: FY 2023 Customer and Billing Data, 2023 Water Loss Audit Report and 2023 CRW Annual Water Supply Report

## 3.4 Water Quality

Water quality is regulated by the Federal Safe Drinking Water Act and enforced through laws and regulations administered by the PADEP. CRW publishes an Annual Drinking Water Quality/Consumer Confidence Report as required by the United States Environmental Protection Agency (EPA). The Drinking Water Quality Report provides general information on the Water System and the results of water quality tests on drinking water for that calendar year as compared to permitted maximum contaminant levels (MCLs). CRW's 2024 Drinking Water Quality Report (which reports the results for calendar year 2023) concluded that CRW's recent testing results met and exceeded all state and federal drinking water standards.

In addition, water samples are taken and tested by a certified laboratory for the DeHart Dam influent, the finished water, and the distribution system for the following parameters: pH, total alkalinity, temperature, iron, total dissolved solids, and total hardness. The DeHart Dam and finished water are also routinely monitored for turbidity and total organic carbon. Finished water is also tested for fluoride, aluminum, chlorine residual levels, and orthophosphate levels. Orthophosphate levels are also monitored in the distribution system. A summary of the key test results for 2023, as published in CRW's annual Drinking Water Quality Report or reported by CRW's certified laboratory, and their comparison to established MCLs is provided in **Table 3-3**.

CRW completed quarterly testing for PFAS compounds and lithium in 2023 under the Fifth Unregulated Contaminant Monitoring Rule (UCMR5) program for the EPA. None of the compounds included in the UCMR5 testing were detected in any of the four quarterly samples. In addition, CRW began quarterly testing for PFOA and PFOS in 2024, and for additional PFAS included in the recently promulgated federal PFAS regulation in the third quarter of 2024. The PFAS included in the 2024 sampling were all below the detection limit.

**Table 3-3: Summary of Key Test Results for 2023**

| Contaminant | Units | MCL | Levels Detected (2022) | Levels Detected (2023) |
|---|---|---|---|---|
| Barium | ppm | 2 | Not detected | 0.017 |
| Chlorine (Distribution Disinfectant Residual) | ppm | 4 | 0.26 – 2.07 | 2.08 |
| Fluoride | ppm | 2 | 0.51 | 0.59 |
| Nitrate | ppm | 10 | Not detected | Not detected |
| Total Trihalomethanes[1] | ppb | 80 | 60 | 52.9 |
| Haloacetic Acids[1] | ppb | 60 | 57.0 | 52.5 |
| Arsenic | ppb | 10 | Not detected | Not detected |
| Radium-226 | pCi/L | 5 | 0.222 | Not detected |

| Contaminant | Units | MCL | Levels Detected (2022) | Levels Detected (2023) |
|---|---|---|---|---|
| Chlorine (Entry Point Disinfectant Residual) | ppm | Min. of 0.2 | 0.69 | 0.26 (Lowest level detected) |
| Fecal Coliform or E.coli | ppm | 0 | 0 | 0 |
| Turbidity | NTU<br>% samples below 0.3 NTU | 1<br>95% | 0.109<br>100% | 0.215 (Highest)<br>100% |
| Lead | % samples below 15 ppb | 90% | 100% | 100% |
| Copper | % samples below 1.3 ppm | 90% | 100% | 100% |

Sources: 2022 and 2023 Drinking Water Quality Report
[1]MCL and reported values are based on maximum Locational Running Annual Average (LRAA) value

As shown in Table 3-3, the drinking water quality of the Water System consistently meets MCLs. Capital Region Water incurred two late reporting violations in the year 2023. These violations were the result of the contracted laboratory failing to report test results to PADEP by the deadline, although the samples were collected on the required schedule.

Under the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2), CRW's two water sources, the DeHart Dam and the Susquehanna River, were tested for *Cryptosporidium*. Testing conducted to date shows no indication of this organism at the DeHart Dam, and as such is classified as "Bin 1". Data from the second round of LT2 monitoring detected higher levels of *Cryptosporidium* in the Susquehanna River, and as such, the river was classified as "Bin 2" and requires an additional 1-log treatment when the river is in use.

Most of the water samples taken from the distribution system have measured DBP values below the respective MCL values for Total Trihalomethanes (TTHMs) and Five Haloacetic Acids (HAA5), although there are individual HAA5 measurements that exceed the MCL at several locations in the distribution system. Higher values are typically observed in samples collected in the 3rd or 4th quarters. Because the MCL is based on the annual average of DBP measurements at each location (Locational Running Annual Average, LRAA), this is not a violation of the MCL; however, if values are unusually high in one quarter, they can result in the LRAA exceeding the MCL. The highest HAA5 LRAA value in 2023 approached the regulatory limit, so CRW should consider whether there are opportunities to reduce HAA5 values in the distribution system.

CRW's copper and lead survey analyses, which have been completed once every three years since 2007, have shown that copper and lead concentrations at residential taps remain well below MCLs. These results verify the success of CRW's corrosion control program, which includes the addition of soda ash and caustic soda to raise pH levels in the water supply to promote corrosion control. Orthophosphate is a key component of corrosion control in combination with the pH control strategy as evidenced by historic sampling results.

## 3.5 Future Safe Drinking Water Regulations

Regulations affecting the Water System continue to become more stringent. The following serves to summarize the status of several key regulatory actions that could impact CRW's operations, with each being described in more detail in the following paragraphs:

- Microbial and Disinfection Byproducts
- Fourth Six-Year Review
- Fourth Unregulated Contaminant Monitoring Rule (UCMR4)
- Fifth Unregulated Contaminant Monitoring Rule (UCMR5)
- Fifth Candidate Contaminant Monitoring Rule (CCL5)
- Sixth Candidate Contaminant Monitoring Rule (CCL6)
- Lead and Copper Rule Revisions
- Per- and Polyfluoroalkyl Substances (PFAS)
- Hexavalent Chromium (Cr-6)
- 1,4-Dioxane

### 3.5.1 Microbial and Disinfection Byproducts

The EPA is required to conduct a review of drinking water regulations every six years. As part of this process, the EPA evaluates all the existing drinking water regulations and determines if a revision is necessary based on new information regarding health effects, analytical methods, occurrence, and treatment data. The results from the Third Six-Year Review were published in January 2017. The EPA determined that eight contaminants were eligible for regulatory revision: chlorite, *Cryptosporidium*, *Giardia lamblia*, haloacetic acids (HAA5), heterotrophic bacteria, *Legionella*, total trihalomethanes (TTHMs), and viruses. Each of these contaminants is related to the balance between pathogen control and disinfection byproducts (DBPs). For example, higher disinfectant residuals may be required to address some of these contaminants, particularly in premise plumbing; however, this would need to be balanced with potentially increased DBP formation and lower maximum contaminant levels (MCLs) for DBPs.

- The EPA currently anticipates proposing new microbial and DBP regulations in the summer of 2025. These regulations may update the requirements of existing regulations for the eight identified contaminants:Stage 1 and Stage 2 Disinfectants and Disinfection Byproducts Rules,
- Surface Water Treatment Rule,
- Interim Enhanced Surface Water Treatment Rule, and
- Long Term 1 Enhanced Surface Water Treatment Rule.

In addition, the EPA is also considering regulatory action for DBPs that are currently unregulated including chlorate and nitrosamines .

### 3.5.2 Fourth Six-Year Review

The EPA is required to conduct a review of drinking water regulations every six years. As part of this process, the EPA evaluates all the existing drinking water regulations and determines if a revision is necessary based on new information regarding health effects, analytical methods, occurrence, and treatment data.

The Fourth Six-Year Review is a voluntary Information Collection Request (ICR) for contaminant occurrence data and treatment technique information collected from 2012 to 2019 for all regulated contaminants. The results for the Fourth Six-Year Review were announced in July 2024. The EPA concluded that the contaminants currently regulated under the NPDWR are not appropriate for revision at this time based on available information; therefore, the EPA did not identify any additional candidates for regulatory revision.

### 3.5.3 Fourth Unregulated Contaminant Monitoring Rule

The Unregulated Contaminants Monitoring Rule (UCMR) framework was designed to enable evaluation and prioritization of contaminants for inclusion in federal drinking water regulations to protect public health. The ongoing series of rule documents the occurrence of the contaminants on the most recent version of the Candidate Contaminant List (CCL) to determine if future regulation is warranted. The UCMRs require designated water systems (including all large systems exceeding a threshold size and a select group of smaller systems) to conduct sampling for the included contaminants over a finite period of time (e.g., 12 consecutive months over a 3-year window).

The Fourth Unregulated Contaminants Monitoring Rule (UCMR4) required monitoring for 10 cyanotoxins (nine cyanotoxins and one cyanotoxin group) and 20 additional contaminants (two metals, eight pesticides plus one pesticide manufacturing byproduct, three brominated haloacetic acid (HAA) DBP groups, three alcohols, and three semivolatile organic chemicals (SVOCs)). The most recent UCMR4 data set (i.e., 2018 – 2020) was released in March 2024. Seven of the thirty contaminants monitored were detected at levels above the reference concentration – this included manganese and three groups of HAAs (HAA5, HAA6Br, and HAA9).

### 3.5.4 Fifth Unregulated Contaminant Monitoring Rule

The finalized Fifth Unregulated Contaminant Monitoring Rule (UCMR5) was released on December 27, 2021. It includes the monitoring of 29 per- and polyfluoroalkyl substances (PFAS) and one metal, lithium. The rule requires Public Water Systems to conduct monitoring over a 12-month period between January 2023 and December 2025. Systems could potentially experience increased sampling costs and stakeholder pressure to address PFAS, if detected. Though not required, many systems proactively implemented PFAS treatment based on findings from the Third Unregulated Contaminant Monitoring Rule (UCMR3). USMR5 sample results from the from the first two quarters of 2023 were non-detect for all 30 contaminants.

### 3.5.5 Fifth Candidate Contaminant List (CCL5)

The Fifth Candidate Contaminant List (CLL5) was finalized by the EPA on November 14, 2022. It includes a total of 81 contaminants or groups consisting of 66 chemicals, 12 microbial contaminants, and three chemical groups. The chemical groups include one group of cyanotoxins, one group of 23 disinfection byproducts, and one group of PFAS chemicals. EPA is in the process of evaluating these contaminants to determine which ones have sufficient information available to make a regulatory determination. Research will be encouraged for those contaminants without enough data to make a determination. A regulatory determination is required within 5 years after the previous round of regulatory determinations is completed, so regulatory determination for CCL5 is expected by 2026.

### 3.5.6 Sixth Candidate Contaminant List (CCL6)

The EPA requested nominations of contaminants for the Sixth Candidate Contaminant List (CCL6) on February 17, 2023. The deadline for submitting nominations was April 18, 2023, and EPA is currently evaluating the nominations for potential inclusion in CCR6. The draft CCL6 is anticipated in 2026.

### 3.5.7 Lead and Copper Rule Revisions/Lead and Copper Rule Improvements

On January 15, 2021, the EPA published the final Lead and Copper Rule Revisions (LCRR), which became effective as of December 16, 2021 and focuses on improving public health protection via a proactive and holistic approach by requiring earlier action and improved transparency and communication by utilities to reduce risks around lead in drinking water. The compliance date is October 16, 2024. As of August 2024, CRW has completed 65% of the required lead service line inventory, and is in the process of identifying lead service lines for replacement. CRW is on target to meet the October 16, 2024 compliance date for the LCRR. The LCRR includes significant changes in all areas from monitoring and treatment to service line inventories and customer communication. Key changes include:

- **Action Level (AL) and Exceedances.** Although the existing lead AL of 0.015 mg/L would be maintained, the LCRR includes a new "trigger" level (TL) of 0.010 mg/L for lead, which would initiate requirements if exceeded at the 90th percentile. This approach initiates upfront action for systems, including additional requirements for monitoring, corrosion control treatment (CCT), LSL replacement, and public education to reduce lead in drinking water before exceeding the AL.

- **Lead Service Line (LSL) Definition.** The LCRR provided additional information around the definition of a LSL. Per 40 CFR part 141, a LSL is a portion of pipe that is made of lead, which connects the water main to the building inlet. A galvanized service line is considered a LSL if it ever was or is currently downstream of any LSL or service line of unknown material. If the only lead piping serving the home is a lead gooseneck, pigtail, or connector, and there is no galvanized downstream it is not considered a LSL.

- **Lead Service Line Inventory (LSLI) and Replacement.** Systems with known or possible LSLs must develop and maintain a publicly accessible inventory and a LSL replacement plan within the first three years of the published rule. Systems with LSLs that exceed the lead TL or AL at the 90th percentile would be required to conduct full LSL replacement at a goal-based rate agreed upon by the primacy agency/EPA or at a 3-percent rate per year based on a 2-year rolling average, respectively.

- **Tap Sampling.** The LCRR shifts tap compliance sampling to locations with the highest lead, requiring systems to collect from 100% LSL sites, if available. Sampling protocols for sites served by a LSL are also updated – the rule requires a first liter copper sample and fifth liter lead sample.

- **Corrosion Control Treatment.** Systems with existing CCT that exceed the AL or TL would be required to conduct a CCT study and comply with new study requirements including the evaluation of pH/alkalinity adjustment, and orthophosphate doses of 1 and 3 mg/L as PO4-3 in a CCT study. Additionally, systems would not be allowed to exclude orthophosphate from testing solely based on expected downstream impacts (i.e., open reservoirs, publicly owned treatment works) due to increased phosphorous loading.

- **Public Notification.** Systems with a 90th percentile lead level exceeding the AL must notify customers within 24 hours, and systems with customers whose individual lead tap samples exceed 0.015 mg/L must notify customers not later than three days after obtaining results.

- **Find-and-Fix Assessment.** New to the LCRR, for any lead sample (compliance or voluntary) that exceeds 0.015 mg/L, systems would be required to sample water quality parameters within five days and collect a follow-up lead tap sample within 30 days to "find" the cause and then "fix" it if within the utilities control.

- **Schools and Childcare Facilities.** New to the LCRR, CWSs would need to collect lead samples at 20 percent of all schools and childcare facilities per year.

Following the effective date, on August 4, 2022 the EPA released additional LSLI guidance to help support public water systems on how to develop and maintain service line inventories and effectively communicate and notify customers served by a lead service line to ensure compliance with the LCRR.

Additionally, the EPA proposed further updates for lead and copper control in the Lead and Copper Rule Improvements (LCRI) in November 2023. EPA anticipates finalizing the rule prior to October 16, 2024, but the final regulation has not yet been promulgated. The proposed LCRI regulation includes:

- **Service Line Replacement:** The proposed LCRI would require most water systems to replace lead services lines within 10 years.
- **Service Line Inventory:** Under the proposed LCRI, water systems would be required to regularly update the service line inventories being developed under the LCRR, create a publicly available service line replacement plan, and identify the materials of all service lines of unknown material.
- **Sample Collection:** Water systems would be required to collect first liter and fifth liter samples at sites with lead service lines and use the higher of the two values when determining compliance with the rule.
- **Action Level:** EPA is proposing to lower the lead action level from 15 µg/L to 10 µg/L. Water systems with multiple lead action level exceedances would be required to conduct additional outreach to consumers and make filters certified to reduce lead available to all consumers.

PADEP also released guidance for investigating and classifying service lines in their July 2022 Drinking Water Newsletter. It includes evidence-based verification methods for service lines categorized as "non- lead" and definitions for other service line categories. Notably, service lines should be categorized as "Galvanized Requiring Replacement" if the service line ever was or is currently downstream of a lead service line; a lead gooseneck pigtail, or connector; or is currently downstream of a "Lead Status Unknown" service line. In July 2024, PADEP released a brief memo to provide guidance for water systems in completing and submitting their inventory.

### 3.5.8 Per- and Polyfluoroalkyl Substances (PFAS) Rules

Per- and polyfluoroalkyl substances (PFAS) are man-made chemicals that are used in a variety of industries and consumer products such as carpeting, apparels, upholstery, food paper wrappings, fire- fighting foams, and metal plating. PFAS are prevalent in the environment, and studies have shown adverse human health effects at extremely low levels.

In November, 2021 Pennsylvania Department of Environmental Protection promulgated the PFAS MCL Rule, setting MCL values for PFOA and PFOS in drinking water of 14 ng/L and 18 ng/L, respectively. CRW tested finished water for PFAS under the UCMR3 in December 2015 and independently in 2019. DEP performed tests in on February 24, 2021. Additional PFAS sampling was conducted under the UCMR5 in the first two quarters of 2023. All test results were below detection limits.

On April 26, 2024, the USEPA promulgated a national primary drinking water regulation for PFAS. The regulation implemented MCL values for six PFAS compounds. Two of the PFAS compounds are regulated with individual MCLs, three are regulated both with individual MCLs and as part of a mixture, and one is regulated only as part of the same mixture, as summarized in Table 3-4. The four PFAS included in the mixture are regulated by defining a hazard index that is the sum of the concentrations of the PFAS divided

by health-based concentrations set for each of the PFAS compounds in the group. Water systems are required to complete initial monitoring for PFAS and begin public notification of PFAS concentrations by April 26, 2027, and must be in compliance with the MCLs by April 26, 2029.

**Table 3-4: USEPA PFAS MCLs**

| Compound | Proposed MCL |
|---|---|
| PFOA | 4.0 ppt |
| PFOS | 4.0 ppt |
| PFNA | 10 ppt |
| PFHxS | 10 ppt |
| HFPO-DA (GenX Chemicals) | 10 ppt |
| Mixture of PFNA, PFHxS, HFPO-DA, and PFBS | Hazard Index of 1.0 |

The EPA has also proposed or finalized a number of other regulations to help in monitoring and controlling the production, use, and disposal of PFAS, which ultimately will help to reduce the prevalence of PFAS in the environment and may help to reduce the need for treatment to remove PFAS from drinking water in the long term. In July 2020, EPA finalized a Significant New Use Rule (SNUR) that requires manufacturers (including importers) of products or chemicals containing PFOA and certain PFOA-related chemicals to notify EPA 90 days before manufacturing, selling, or importing in the United States. In January 2024, EPA finalized another SNUR that would prevent anyone from resuming use of inactive PFAS, which are not covered under the existing SNUR. The EPA also finalized a list of 172 PFAS chemicals that are subject to Toxic Release Inventory reporting in 2020. Additional PFAS were added in 2021, 2013, and 2024 bringing the total to 196 PFAS chemicals listed. Other rules related to the reporting of use and manufacture of PFAS in the United States were also proposed or finalized in 2023 and 2024.

On May 8, 2024, the EPA issued a regulation designating PFOA and PFOS as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). As of July 8, 2024, facilities are required to report PFOA or PFOS releases that meet or exceed the reportable quantity, potentially accelerating privately financed cleanups and mitigating adverse impacts human health and the environment. There is also the potential for significant impacts on the management of water treatment plant residuals (e.g., spent granular activated carbon (GAC) and ion exchange (IX) resin) and associated costs.

In December 2022 EPA issued guidance on addressing PFAS in National Pollutant Discharge Elimination System (NPDES) permitting. Guidance for PFAS in discharges has the potential to reduce PFAS in source waters, but may also impact water treatment facilities with NPDES permits.

### 3.5.9 Other

#### *3.5.9.1. Hexavalent Chromium*

The EPA has an enforceable drinking water standard of 100 micrograms per liter (µg/L) for total chromium, which is the sum of the concentrations of all states of the metal chromium (Cr), including chromium (III) and chromium (VI) (i.e., Cr-6 or hexavalent chromium). The EPA released a draft human health risk assessment

for Cr(VI) in 2010, and the date for issuance of a final assessment has not yet been published, a step that would be required prior to the EPA establishing a new drinking water regulation for Cr(VI). As a part of the Third Six-Year Review, the EPA declined to review the existing chromium standard due to the ongoing human health risk assessment. A draft toxicological review for Cr(VI) was released in October 2022 for external review. Within three years following completion of the assessment, the EPA will determine if the existing regulation is appropriate.

In the interim, EPA requested voluntary Cr(VI) sampling of finished water at points-of-entry and at maximum residence time sampling locations. CRW has conducted voluntary Cr(VI) sampling of the finished water at AWTF and River Pump Station (the spot in the distribution system with high water age), from January 2017 through November 2020. Results have ranged from non-detect (<0.10 µg/L) to 0.39 µg/L.

#### *3.5.9.2. 1,4-Dioxane*

The EPA has indicated that it has not determined if there is value to move forward with federal regulation of 1,4-dioxane in drinking water. In July 2023, a draft update to a December 2020 risk evaluation incorporating assessment of risk associated with drinking water was released, and was open for public comment until September 8, 2023. In the draft risk determination, EPA proposes to determine that 1,4-dioxine, as a whole chemical substance, presents unreasonable risk to human health. If the final risk determination is that 1,4-dioxane presents unreasonable risk to human health, then EPA will begin developing proposals to reduce the risk, which may include limitations on drinking water. However, some states have established or are moving forward with the process of establishing an MCL for 1,4-Dioxane in drinking water as described in **Table 3-5**.

**Table 3-5: Current 1,4-Dioxane Regulations by State**

| State | Value (µg/L) | Type | Status |
|---|---|---|---|
| Massachusetts | 0.3 | Guideline | Promulgated |
| California | 1 | Notification Level | Promulgated |
| | 35 | Response Level | |
| New York | 1 | MCL | Promulgated |
| Virginia | n/a | MCL | In development |
| Florida | 0.35 | Health Advisory Level | Promulgated |
| New Jersey | 0.33 | Recommended MCL | In development |
| Minnesota | 1 | Guidance | Promulgated |

### 3.5.10 Summary

CRW has been in discussion with the PADEP regarding the potential need to increase the spillway of the Dam to meet 1990 regulations, which require spillway capacity equal to the maximum storm flow. PADEP completed a state-wide precipitation study in March 2020 enabling CRW to proceed with plans to expand spillway capacity for storms of record. AECOM facilitated a Probable Failure Modes Workshop for the DeHart Facility with participation by PADEP Dam Safety Division and CRW in August 2020. The findings from that

workshop are informing the design of improvements to CRW's DeHart Dam spillway and embankment. A spillway design project began in 2021 to increase the spillway capacity and is planned to enter construction in 2025.

EPA has released final MCLs for six PFAS in drinking water. Based on UCMR5 data and PFAS data collected to date in 2024, CRW's Entry Point has PFAS concentrations below the proposed MCL and will not require treatment; however, it is recommended that CRW track activity for ongoing federal level drinking water PFAS regulations and closely follow Congress's actions for designating various PFAS compounds as hazardous substances under CERCLA.

# 4.0 WATER SYSTEM CONDITION

## 4.1 Overview

CRW staff aim to ensure the entire Water System is properly operated and maintained. The cost to provide routine and preventative maintenance is included in CRW's annual operating budget. CRW uses a proactive preventative maintenance program and a systematic replacement policy for inventory parts to minimize downtime.

Additionally, CRW developed a comprehensive asset management program for the drinking water systems which will further enhance preventative maintenance and increase system reliability. Asset registries have been developed for all CRW treatment plants, pumping stations, storage facilities, and the DeHart Dam facility. CRW has developed a risk register for CRW's buried assets and established high-level replacement, rehabilitation, and condition assessment cost estimates. Currently, CRW is using a non-invasive acoustic based inspection technology and is annually budgeting and performing condition assessments in the water distribution system.

Development of the Drinking Water System Asset Management Plan was completed in July 2020. The plan provides CRW with strategies for operations, maintenance, capital investments, and funding.

## 4.2 Condition Assessment

Gannett Fleming conducted a limited condition assessment of the key components of the Water System on July 22, 2024, which included a review of existing information provided by CRW, discussions with CRW staff, and visual observations during field visits. Based on the type of facilities, available documents related to the facilities, and previous experience with similar facilities, a representative sample of facilities was inspected on a limited basis to visually confirm the information provided, identify any apparent capital improvement needs, and discuss reliability and O&M performance with the operation and maintenance staff. No field investigations were conducted for buried infrastructure.

The condition assessment of the facilities in the Water System was based on numerical ratings for the following criteria:

- Appearance of mechanical, structural, and electrical components
- Reliability
- O&M performance
- Capacity
- Regulatory compliance

Based on the evaluations using the above categories, an overall risk rating was assigned to each of the major assets. The risk ratings for each of the five categories above are outlined in **Table 4-1**.

**Table 4-1: Summary of the Rating System**

| Numerical Rating | Interpretation of Rating | Description |
|---|---|---|
| 1 | Little to no risk | Relatively new and in good physical and operating condition. |
| 2 | Some risk | Good condition, no known capital requirements. |
| 3 | Moderate risk | Aged or worn but generally in good operating condition may require capital investment within five years. |
| 4 | Significant risk | Operational but nearing end of life and/or requires investment to bring to full operating condition. |
| 5 | High risk | Should be on high priority for renewal and/or replacement. |

The following **Table 4-2** presents a summary of the risk ranking for each of the major facilities based on a review of the available information and limited visual inspections.

| Major Asset | Risk Rating | Change from Prior Year |
|---|---|---|
| DeHart Dam and Reservoir | 3.2 | Increased |
| Dr. Robert E. Young Water Services Center | 1.2 | No Change |
| Upper Reservoir | 2.0 | No Change |
| Lower Reservoir #1 | 2.7 | Increased |
| Lower Reservoir #2 | 2.7 | Increased |
| Pump Stations<br>Susquehanna River Pump Station (1.0)<br>Gate House Pump Station (1.1)<br>Union Square Booster Station (1.2) | 1.1 | No Change |
| Transmission Mains<br>Mountain Line (3.4)<br>Susquehanna Line (1.1)<br>Plant-Gate-House-Reservoir Line (1.7) | 2.1 | Increased |
| Distribution System | 2.5 | Decreased |
| **Overall System Rating** | **2.2** | **Increased** |

**Table 4-2: Major Assets Risk Rating**

Overall, the Water System is in good condition and the risk rating only increased slightly over the year prior. Some system components are aged and will require investigation and capital investment to preserve the asset and maintain high-quality water and adequate delivery of services. The rating of the DeHart Dam and Reservoir increased, due to the outstanding issues planned to be addressed in the upcoming construction project starting in 2025. Although various upgrades (chemical systems, new/refurbished equipment) were implemented at the Water Services Center, the risk rating remains unchanged due to the overall criticality of the asset and the overall age of the facility. The criticality of the Mountain Line increased due to the length of time since the last electromagnetic inspection; this increased the criticality of the Transmission Mains to 2.0. The risk for both the Lower Reservoirs was increased to 2.5 following an inspection that revealed both reservoirs were in fair condition but are in need of exterior and interior repairs/maintenance. The rating for the Distribution System was lowered to 2.5 based on the ongoing meter replacement project and continued CRW investments in water main replacement efforts.

The following subsections provide a summary of the current condition of the major components, the rationale for the risk scores assigned, and the improvements needed to address moderate, significant, and high risks.

### 4.2.1 DeHart Dam, Reservoir Control Building, and Chemical Feed Facility

CRW routinely monitors and evaluates the DeHart Dam to ensure operational efficiency and regulatory compliance. These regulations include annual inspections, followed by a PADEP on-site review. The implemented O&M tasks include the management of vegetation encroaching the embankment on the upstream and downstream faces of the dam and vegetation clearing along the mountain line pipeline route. Out of the approximately 12 to 16 miles of pipeline that require vegetation clearing, all vegetation clearing has been completed. Crews continue to upgrade the pathway along the pipeline for improved vehicle and equipment access. Crews replaced multiple panels in the spillway in late 2019/early 2020. A spillway design project began in 2021 to increase the spillway capacity and is planned to enter construction in 2025.

In addition to the O&M items above, AECOM completed a Preliminary Engineering Report which was used to aid in the development of design alternatives to address the current deficiencies at DeHart Dam.

Deficiencies previously noted in past reports included the following:

- Lack of Embankment Seepage Control and Collection System. The existing embankment does not have a comprehensive system to filter and collect all seepage, and adjacent soils need to meet filter compatibility requirements to prevent soil particle migration or internal erosion that can lead to failure of the dam embankment under certain reservoir level and associated seepage conditions. In the summer of 2018, a comprehensive geotechnical evaluation was conducted on the existing embankment to determine its filter compatibility requirements. A report including the geotechnical evaluation findings was submitted April 2019.
- Insufficient Spillway Capacity. The existing spillway at Dehart Dam is not capable of passing the Probable Maximum Flood (PMF) Spillway Design Flood. Evaluation of the hydrologic and hydraulic analysis was completed in February 2020. Construction on the spillway is set to begin in 2025.
- Questionable Structural Adequacy of the Spillway Channel. Due to the use of channel slab construction that is no longer common practice, and the limited footprint of the existing underdrain system, the structural integrity of the slabs can be compromised if water from spillway channel flows is able to penetrate beneath the slabs. Evidence of undermining and deterioration of the existing spillway slabs and walls was noted during the inspection.

- Insufficient Drawdown Capacity. The Dehart Dam does not have adequate drawdown capacity per the PA code that is intended to ensure that the reservoir could be lowered as a risk reduction measure in the event of a developing incident or failure mode.

Following AECOM's 2023 Annual DeHart Dam inspection, the list of recommendations below was made in their report:

- Fill in the areas disturbed by animals beneath the fence line at the crest.
- Monitor the low spots near the left and right spillway abutment cutoff walls.
- Investigate the cause of the erosion around the embankment fence post supports.
- Fill in the low spot observed in the upstream slope protection. In conjunction with the future rehabilitation project, extend the riprap protection on the upstream slope to the embankment crest.
- Remove vegetation growing on the upstream slope of the embankment.
- Monitor the wet spots observed at the project, particularly the new wet spots observed on the embankment downstream slope, approximately mid-height at the maximum section, on the access roads that were constructed during previous subsurface investigations.
- Monitor the active seepage along the left embankment groin and toe.
- In conjunction with the future rehabilitation project, armor the access road at the downstream slope of the embankment (constructed during previous subsurface investigations, and replace displaced rip rap along the groin of the embankment dam.
- In conjunction with the future rehabilitation project, remove the woody vegetation at the main embankment downstream slope. Remove minor woody vegetation from the downstream slope.
- Remove the wasp nest from piezometer B-8 while the weather is still cold. Continue to monitor the piezometers, weirs, and reservoir level at the specified frequency intervals.
- In conjunction with the future rehabilitation project, install survey monuments across the crest of the embankment dam in order to monitor movement.
- The 8-inch culvert between the logging road and the embankment groin at the left abutment should be cleared of debris.
- Monitor the wet area observed downstream of the embankment toe at the edge of the walking path.
- In conjunction with the future rehabilitation project, replace the spillway bridge, which was found to be in poor condition.
- In conjunction with the future rehabilitation project, repair the noted chute wall deficiencies. In the meantime, continue monitoring for further deterioration or misalignment. Fill in animal burrow observed on right wall at the stilling basin.
- In conjunction with the future rehabilitation project, repair the noted spillway channel slab deficiencies. In the meantime, continue monitoring for further deterioration or additional removal of shotcrete overlay.
- In conjunction with the future rehabilitation project, repair the noted spillway weir deficiencies. In the meantime, continue monitoring for further deterioration or erosion of slab at toe of weir.

Work completed since last CEAR:

- Broken windowpanes on the intake house were replaced.

- Vegetation clearing completed for 12-16 miles of pipeline that require vegetation clearing.
- Filled in areas beneath the fence line at the crest disturbed by animals.
- Removed leaves and debris from clogged culvert pipes.
- Filled in animal burrow observed on right wall at the stilling basin.
- Removed wasp nest from piezometer B-8.
- Removed trees and woody vegetation from upstream slope of embankment.
- Removed minor woody vegetation from downstream slope.
- Repaired cracked deck on the floating dock.
- Generator and transfer switch were replaced.
- Riprap along the embankment line was replaced.
- Meters were replaced on the drain line.
- Laid 90 tons of stone on access roads and parking lot.
- All doors at the Dam facilities were equipped with card readers.
- Painted floor in gatehouse control room

AECOM's December 2020 Preliminary Engineering Report developed three alternatives for modification to the spillway crest structure in order to pass the spillway design flood with adequate freeboard. The alternatives were developed with the understanding that improvements to the spillway chute, stilling basin, embankment dam, and outlet works would be made that are common to each spillway crest alternative. An engineer's opinion of construction cost was prepared for each alternative in this report.

Currently, the rehabilitation of the spillway crest and chute is scheduled to begin in 2025. The DeHart Dam rehabilitation project consists of preliminary design and laboratory investigations, along with permitting, final design, bidding, and construction. The CIP shows approximately $22M for spillway rehabilitation with construction starting in 2025 and completed by 2027.

### 4.2.2 Dr. Robert E. Young Water Services Center Treatment Facility

The Dr. Robert E. Young Water Services Center (WSC), located at the intersection of Pine Drive and Stanley Drive on the City's municipal border with Susquehanna Township, treats raw water conveyed from either the DeHart Reservoir or the Susquehanna River. It also contains CRW's maintenance garage. It utilizes chemical addition, flocculation, coagulation, sedimentation, filtration, and disinfection to produce the Water System's finished water.

Based on the calendar year 2023 and 2024 Drinking Water Quality Reports, the water provided by the plant was of high quality and consistently exceeded performance requirements as determined by State and Federal regulations. In addition, PADEP gave the filter plant a "satisfactory" performance rating for its ability to consistently produce high-quality water and provide long-term reliability in its 2021 Filter Performance Evaluation Report, maintaining its previous rating in the 2016 Report. Nonetheless, PADEP identified the following issues and concerns requiring investigations or improvements:

- The current combination of Extended Terminal Subfluidization Wash (ETSW) and filter to waste appears to be insufficient in sending the post backwash turbidity to waste. One full filter volume should be purged via ETSW prior to filter to waste being initiated.

- The even filters and odd filters empty into two respective clearwells that operate in parallel and the interconnection at the head of each clearwell is normally kept open. Each clearwell has a separate flow meter and separate high service pumps. Due to the fact that these clearwells operate in parallel and can have differing effluent flow rates, CRW is being asked to begin calculating LogG (Giardia Log Inactivation) on each clearwell.

- Required alarms for turbidity, entry point disinfectant residual and water levels to maintain adequate Giardia inactivation are not tested at least quarterly and recorded. Begin testing alarms and maintain a written log as required.

- CRW had implemented a filter bed evaluation program in 2019, but it is not currently implemented. Ensure that all activities are completed at the minimum frequencies.

The next Filter Plant Performance Evaluation with DEP is scheduled for the fall of 2024.

A Filter Upgrade Project was completed in 2020 which repaired underdrain deficiencies and replaced all filter media to improve the operational performance of the Filtration Process. The controls associated with the filters were replaced in 2022. In the past year, CRW installed the instrumentation necessary to facilitate the calculation of LogG for each clearwell.

The chlorine disinfection system at the WSC has several safety features, including automatic shut-off valves, exhaust fans, and a chlorine gas scrubber capable of collecting and neutralizing chlorine gas from an accidental 1-ton tank discharge.

The plant appears to be in good overall physical condition. However, some capital investments will be required and some additional O&M expenditures should be incurred to improve the resiliency of its operation and satisfy the expectations of the regulatory agency.

During the site inspection, a variety of improvements were noted to have been performed in the last year.

The windows in the filter room and the maintenance building were replaced. The effort to move the SCADA system from the control room to PLC 16 & 16A continued; it is 90% complete with just the sludge system controls remaining in the control room. The structural evaluation of the salt shed was completed, and all necessary upgrades were implemented. Two new filter effluent sample pumps were installed. Additionally, two actuators were installed on the post-clearwell finished water lines. All remaining turbidimeters were equipped with bubble traps to improve reading reliability.

The water quality office was swapped with the bacteriology laboratory. A new scale system was installed in the chlorine room along with a new camera, hoist, gas heaters, exhaust fan, and chlorine gas monitor. The yearly service was performed on all chlorinators. A heat exchanger was added to the soda ash system to help dissolve soda ash and the eductor was upsized to 1.5". Additionally, the operations center and the stairs & landing in the corridor adjacent to the chlorine room were painted.

Remote actuator heads & disconnects are being added to all overhead valves in the pipe gallery. At the time of inspection half of these had been completed and the other half was anticipated to be completed soon. Flow meters were added to monitor usage of the process/carrier water, domestic uses, and the bulk filling station. Additionally, new pressure transmitters were installed on the plant booster pumps, replacing the previous analog gauges, to allow for pressure monitoring and alarming to SCADA if pressure is lost.

A new control board was installed on the chlorine analyzer for all the even filters. New AEDs were installed throughout the plant (added 2 & replaced several). The air release valves on the finished water pumps and the gatehouse line were replaced. Additionally, all the air scour, backwash, and filter to waste actuators were replaced. CRW is still working on fine-tuning the backwash flow rates and durations to offset the additional lost water created due to the requested modification from DEP to increase the filter to waste volume after backwashes.

Two new sample pumps (one for each train) were installed for raw water post-chemical addition samples. The ultrasonic level transmitters on the fluoride bulk tanks were replaced, the elevation of the overflow was raised to allow greater storage volume in the bulk tanks, and a second connection port was added to the fluoride line at the chemical fill station. Aluminum sulfate (alum), zinc orthophosphate, and caustic soda bulk tanks were inspected in July 2024 by Blasco. The alum feed lines were equipped with flow meters for pacing, and an alarm was connected to SCADA for alert in case of feed loss. The pressure switch in the sprinkler system was replaced along with the emergency lighting in the sublevel pump gallery, sludge room and the filter pipe gallery. Additionally, the settling basin sample wall was reconfigured and pH controllers and probes, turbidity, and temperature transmitters were replaced.

During the site inspection CRW indicated several recommended/planned O&M improvements at the facility including the following: upgrades to the plant laboratory and locker room, which are currently in the design phase and should be completed within the next year, rebuilding or replacing the sludge pumps, and relocating the chlorine tanks to enable a safe and quick exit from the storage room. Gannett Fleming noted some areas where pipes required recoating and CRW indicated that they intend to complete this during the winter of 2024/2025 repainting several lines and areas throughout the plant. In the future it's planned to add another meter to more specifically monitor carrier water flows to provide more information relative to water loss calculations for the system. CRW also plans to relocate the chlorine tanks in 2024 to facilitate exit from the storage area in case of emergencies. New railing is scheduled to be built around the sedimentation and flocculation basins in August 2024; the concrete around the basins will be resurfaced upon completion of the railings.

### 4.2.3 Finished Water Reservoirs

The Water System utilizes three reservoirs to store finished water for distribution throughout its service area. The reservoirs are located at Reservoir Park within the City and serve two different pressure districts.

The reservoir park consists of 3 separate reservoirs, 2 lower reservoirs, and an upper reservoir. The lower reservoirs consisted of two six-million-gallon cylindrical concrete ground storage tanks, with decorative facades. These tanks were constructed in 2002. The lower reservoir facility serves consumers located west of Eighteenth Street in the City. The Lower Reservoir has an overflow elevation of 504 feet and connects to the distribution system through a supply pipe that ranges in size from 30 to 36 inches in diameter. Gannett Fleming completed an interior and exterior inspection of the lower reservoirs in 2024. Gannett Fleming used a Remote Operated Vehicle (ROV), to inspect the interior condition of the lower reservoirs, the overall tank condition is fair. Extensive cracking with efflorescence and biological staining were on the exterior sidewalls and the tank roof. The interior presented severe corrosion on the interior piping systems. The lower reservoirs also presented areas of heavy sediment throughout. The valve vault appeared in good condition,

the floor was dry, and coating systems appeared in good condition. Minor rust spots were located on the influent and effluent pipes, which are not of large concern now. It is recommended to fully pressure wash the tank's exterior and recoat the concrete surfaces with a latex-based concrete coating. It was noted by CRW staff that the existing facades were installed in conjunction with the community, and consideration should be given to community impact/involvement in the new coating system. The interior should be cleaned, and the piping should be repaired as needed.

The Upper Reservoir is an underground reinforced concrete reservoir constructed in 1927. It has a storage capacity of 28.0 million gallons and is divided into two compartments east and west. The Upper Reservoir serves the Water System's high-pressure zone. It supplies water to customers located east of Eighteenth Street within the City and in portions of Penbrook, Susquehanna, Swatara, Paxtang Borough, and Lower Paxton. A rehabilitation project of the upper reservoir was completed in early 2019. Gannett Fleming used their ROV to inspect the interior conditions of the upper reservoir and the as found conditions are good. The reservoir is in good condition, with no structural deficiencies, and all repaired areas indicated on Gannett Flemings 2019 drawings appeared in excellent condition. Minor stress cracking was seen on the shotcrete floor but did not present structural issues. Minor sediment was on the floor, but no cleaning was needed then. The influent and effluent pipes presented areas of edge corrosion.

### 4.2.4. Susquehanna River, Gate House, and Union Square Pump Stations

CRW's Water System utilizes three pumping stations to convey water and maintain adequate distribution system pressure. The Susquehanna River Pump Station is located within the City, between Front and River Streets, north of Graham Street, and is used to transfer raw water from the Susquehanna River to the Dr. Robert E. Young Water Services Center. The facility draws water from the river via an inlet tunnel connected to four wedge wire screens located in the river. It was constructed in 1994. CRW typically exercises the equipment at the facility once per year for a ten-day period because of CRW's preference for utilizing water from the DeHart Reservoir. Overall, the facility appears to be in good condition and able to perform adequately. The pumps and associated piping were painted in early 2024. Additionally, the existing potassium permanganate feed system is in the process of being replaced with a sodium permanganate drum feed system. The switch is scheduled to be completed in August 2024.

The Gate House Pump Station is located at the City's Reservoir Park and is used to transfer finished water from the Lower Reservoir or the Dr. Robert E. Young Water Services Center to the Upper Reservoir. It was constructed in the 1920s. The most recent significant upgrade was in 1994. CRW typically operates at least one pump for 12 hours each day, and the lead pump is rotated quarterly to balance pump runtime between the pumps. The facility appears to be in good condition and able to perform adequately. Painting of the pump station interior walls was completed in late 2020. Additionally, finished water pumps, motors, and seals were rebuilt in 2022, and disconnects were added. The stairs, pipes, and floors in the pump station were repainted in 2022. A backup generator was installed in late 2021, and the heaters were repaired inside the pump station in June 2022. Gannett Fleming recommends the installation of a camera on the pump station building to monitor activity around the lower reservoirs.

The Union Square Industrial Park Booster Station is located within Susquehanna Township along Susquehanna Township's municipal border with Lower Paxton Township and is used to increase the water pressure within the outer reaches of CRW's distribution system, which serves the Union Square Industrial Park. It was constructed in the mid-1990s. CRW rarely operates the facility because the system pressure is adequate for normal demands. The facility appears to be in good condition and able to perform adequately. The piping, pump, supports, and fuel tank were painted in July 2020. The ceiling of the pump station was repainted in early 2024. A man gate was installed at the pump station entrance last year. Additionally, the

pump station system was tested in July 2024. This testing identified that the jockey pump at this station needs to be rebuilt. CRW plans to switch the pump control panel from a toggle switch to a selector switch.

### 4.2.5. Water Transmission System

CRW has several water transmission mains. The most important transmission mains are the DeHart Dam raw water line, known as the Mountain Line, the raw water transmission main connecting the Susquehanna River Pump Station to the Dr. Robert E. Young Water Services Center, and the finished water transmission main connecting the Dr. Robert E. Young Water Services Center to Reservoir Park.

The Mountain Line is a reinforced concrete and pre-stressed concrete cylinder pipeline that was placed into service in 1940. The portion of the pipeline through the Dauphin Narrows was relocated by the Pennsylvania Department of Transportation in 1965 when it was widening State Route 22/322 and again in 1999 as a result of work by Conrail.

CRW retained Pure Technologies Ltd. to investigate the Mountain Line in 2016 using its Smartball™ leak detection technology. The draft Condition Assessment 42- and 36-Inch Raw Water Transmission Main Report, dated August 2017 noted that three leaks were identified in the inspected portions of the Primary Transmission Main, and zero leaks were found on the A-Line and B-Line. Recommendations for the long-term management of the transmission main were included in the condition assessment and include the following:

- Calibration testing including excavation of pipe segment with anomalies to qualify the distress detected.
- Complete an electromagnetic inspection of the B-Line.
- Confirm the air release valve in Chamber #4 at Station 118+55 on the B-Line is properly working.
- Verify there is a pipeline feature located at Penwood Road and Antoine Street where a Type 3 anomaly was identified.
- Electromagnetically re-inspect the Raw Water Transmission Main every 5 to 7 years to monitor the rate of distress.

Following the condition assessment in 2017, CRW performed the recommended calibration testing to address the identified anomalies; however, the recommendations that involved destructive testing of the pipeline were not performed due to being detrimental to operations. CRW is committed to $82,500 per year for repairs to the Mountain Line.

It is noted that it has been 7 years since the Mountain Line was inspected, and the recommended inspection frequency is every 5-7 years. CRW should consider scheduling this re-inspection to monitor the rate of distress in the raw water transmission main.

The Susquehanna River transmission main is a pre-stressed concrete cylinder pipeline that was placed into service in 1994. The Susquehanna River PS and associated transmission main are operated once per year for a 10-day period to exercise the equipment as recommended by PADEP. In 2017 the Susquehanna River PS was operated for 10 days and provided the full flow to the WTP. The 2017 operational exercise was helpful in draining and maintaining the Mountain Line. Between October 23rd and November 5th, 2023, CRW operated the Susquehanna River PS to provide 50% of the capacity to the WTP with the remaining 50% capacity coming from the DeHart Dam. This strategy is an operational exercise for reliability during a potential emergency. In the upcoming year's Susquehanna River supply exercise, CRW aims to achieve a flow of 100% from the Susquehanna River.

The finished water transmission main from the Dr. Robert E. Young Water Services Center was installed in 1994 and constructed out of 36-inch diameter prestressed concrete cylinder pipe. The transmission main is approximately 3,400 feet in length and connects to the existing 30-inch diameter ductile iron pipe transmission main to Reservoir Park at the intersection of 18th Street and State Street. This main is arguably the most critical main in the Water System. CRW has indicated that there are no known issues with the pipe and that it has corrosion control measures in place. The physical condition of this pipe is unknown. CRW is committed to the annual execution of condition assessment utilizing internal workforce and contracted specialty services. For 2024, $100,000 was budgeted for this effort and will be increasing to $150,000 annually moving forward.

### 4.2.6. Water Distribution System

CRW's water distribution system includes approximately 220 miles of water main distribution pipe, 1,800 fire hydrants, 5,370 main valves, and 19,900 service valves.

#### *4.2.6.1 Delivered Water Quality*

CRW provides the PADEP with monthly reports on the quality of its delivered water and publishes an Annual Drinking Water Quality/Consumer Confidence Report, as required by the EPA. The Drinking Water Quality Report provides the results of water quality tests on CRW's drinking water for the year as compared to permitted MCLs. CRW's 2024 Drinking Water Quality Report (which reports the results for the calendar year 2023) concluded that CRW's water quality continues to consistently exceed all state and federal standards.

CRW has a routine sampling plan. Its day-shift plant operators collect more than the minimum number of routine total coliform samples required from sites of commercial customers including customers located where the longest detention time is expected. CRW also maintains a detectable disinfection residual in its distribution system verified by the same sampling program used to monitor the absence of total coliform organisms in the water. It also monitors for disinfection by-products as required by the EPA and has been in compliance since 2012.

CRW maintains records of aesthetic water quality complaints and their resolution. It reports the number of water complaint calls in the Water Division Monthly Report. Aesthetic complaints are infrequent and most often a consequence of CRW's hydrant flushing program.

CRW monitors 30 sites triennially in accordance with a sampling plan as required by the EPA for systems complying with the lead and copper rule. In addition, CRW flushes its distribution system at all hydrants beginning in the spring of each year starting with the finished water storage and working to the outskirts of the distribution system.

Additional detail regarding CRW's water quality is covered in Sections 3.4 and 3.5. CRW's delivered water quality program appears to be consistent with Section 4.1 of American Water Works Association (AWWA) Standard G200 - Distribution Systems Operation and Management, based upon a limited review of documentation and an interview with CRW staff on July 22, 2024.

#### *4.2.6.2 Distribution System Management*

CRW maintains the water in its finished water storage reservoirs at levels high enough to avoid low pressure complaints from customers. It monitors the water levels in the reservoirs but does not otherwise monitor the pressure in the distribution system. It posts "boil water" notices on its website for repairs or maintenance causing loss of pressure to customers.

CRW has updated its Cross-Connection Control Manual in compliance with Part VII, Cross-Connection Control / Backflow Prevention of the PADEP Public Water Supply Manual. Program implementation requires appropriate municipal ordinances and up to five years to educate customers, have customers install backflow preventers as appropriate, and to initiate a backflow device testing program. A concrete date for the backflow prevention implementation has not been established. CRW is unconcerned about organic solvents permeating into the system through PVC piping because it does not have any PVC piping in its system.

In 2016 CRW initiated a leak detection program that includes full system leak detection on an annual basis. The leak detection program involves the evaluation of mains and service lines and the preparation of meter calibration reports to summarize findings. Small and Large Meter Testing Programs are incorporated as part of the leak detection program to ensure accurate readings are being taken and water loss is minimized. Small meters are calibrated by CRW staff on a certified calibration stand. while large meters are calibrated by a contracted calibration service and are assisted and witnessed by CRW staff.

Large meters that are expected to be replaced that have turbine technology, are of Neptune brand, are older than 15 years of age, or otherwise have a condition that makes replacement financially favorable over testing. On average, CRW can replace approximately 25 large meters per year. In addition, CRW replaces on average between 300 and 400 small meters per year due to inaccurate readings, freezing, and theft. An analysis of CRW's existing small meters showed that a large number of meters in the system are nearing the end of their useful life and are experiencing degrading accuracy. Further, newer technologies are available for advanced metering infrastructure that enable the automation of the meter reading system, improved communication capabilities, and will allow CRW to achieve revenue more equivalent to the actual service area consumption. As such, a project was developed to upgrade the existing small meters throughout the system, and two bids were received by CRW in July 2023 for CRW's Advanced Metering Infrastructure Upgrade Project and a Notice of Intent to Award has been issued. This project will include the replacement of 19,000 water meters and transmitters. As of July 2024, approximately 5,500 small meters have been replaced. Large meters will be evaluated/replaced separately by CRW. Replacement activities will continue through the fall of 2026.

It is recommended that CRW conduct a compliance field audit of all 250 large meter accounts and all accounts with fire meters within the system with the primary purpose of ensuring compliance with CRW's Rules and Regulations. The Rules and Regulations require a properly working accurate and testable meter that cannot be bypassed without notification. This compliance audit was recently started for the large meter accounts.

CRW meters the finished water entering the distribution system to determine peak flows and maximum day peak flows. Most of the customer meters in the system were replaced between 1999 and 2002.

A five-year comparison of the amount of NRW, as well as the number of water main breaks for the Water System is shown in **Table 4-3**. CRW reports that an increase in NRW in 2021 was due to PADEP requiring longer filter backwashes, which is then sent to the sanitary sewer.

**Table 4-3: Non-Revenue Water and Water Main Breaks**

| Year | Water Produced (MGD) | Non-Revenue Water (MGD) | Non-Revenue Water % | # of Water Main Breaks |
|---|---|---|---|---|
| 2019 | 6.55 | 1.39 | 21.2% | 18 |
| 2020 | 6.54 | 1.72 | 26.2% | 18 |
| 2021 | 7.01 | 2.16 | 30.8% | 17 |
| 2022 | 7.38 | 2.24 | 29.7% | 22 |
| 2023 | 7.23 | 2.25 | 31.1% | 16 |
| **Average** | **6.84** | **1.95** | **27.80%** | **18** |

Sources: 2023 Water Loss Audit Report for Finished Water and 2023 Main Break Water Loss Report

The amount of NRW includes authorized usage attributable to fires, line flushing, street cleaning, lab testing, etc., as well as NRW attributable to a number of factors such as meter inaccuracy, finished water reservoir leaks, water main leaks, private service connection leaks, and potential theft or unmetered connections.

CRW implemented a valve exercising program and has acquired equipment to exercise valves. This program will help CRW satisfy AWWA G200 Paragraph 4.2.5. Currently, two staff members, working four days per week work to exercise the valves in the system. Since this program started, CRW has exercised 200 valves in 2016, 397 valves in 2017, 401 in 2018, 103 valves in 2019, 428 valves in 2020, 173 valves in 2021,150 valves in 2022, and 342 valves in 2023; totaling 2,194 valves of the approximately 5,368 valves in the system. CRW reports valves replaced, valves exercised, and valves repaired on Exhibit I, Distribution System Activities, in its Water Division Monthly Report. Approximately 90 percent of the valves in the system are thought to be operational.

CRW attempts to test all hydrants annually. Hydrants tested, replaced, and repaired are shown in Exhibit I, Distribution System Activities, in the Water Division Monthly Report. More than 99 percent of the hydrants in the system are thought to be operational. In 2022, 7 damaged hydrants were returned to normal operating condition by either repair or replacement.

CRW ensures that only NSF/ANSI Standard 61-approved coating and linings are used throughout its distribution system whenever new material is installed. However, much of the system predates the standard. Many service connections still have lead goosenecks where they connect to the mains. CRW has completed the Lead Assessment (incorporating their water service line index cards into their GIS) to allow for reporting and analysis of materials and assumptions based on dates and locations. The lead gooseneck replacement consists of CRW's internal policy to remove them when they are excavated for any reason regardless of if they are private or not, that includes a long-term plan of removing them with new main installations, which CRW is actively doing. CRW is actively working on establishing a lead inventory within its service lines to meet the requirements of PADEP. Small and large meters were tested according to the AWWA Manual M6 and replacement protocols for no lead brass are being followed. CRW indicated that 65% of their system has been investigated as part of their lead service inventory project.

The distribution system is capable of delivering the maximum day demand and satisfying fire flow requirements based on information obtained from records and interviews. However, no hydraulic model results or reports were reviewed. CRW does record information related to main breaks including location, pipe material, diameter, type of break, and soil type. Most breaks are reported to be random except for one particular neighborhood that has aggressive soils. CRW does not have an external corrosion monitoring plan.

CRW reviews construction projects for potential impacts on its Water System. It has records for projects completed since the 1990s but not for earlier periods.

CRW's distribution system management program appears to be consistent with Section 4.2 of AWWA Standard G200 - Distribution Systems Operation and Management, based upon a limited review of documentation and an interview with CRW staff on July 22, 2024.

#### *4.2.6.3 Facility Operation and Maintenance*

CRW has been inspecting storage reservoirs on a five to eight-year cycle. CRW maintains the treated water in its finished water storage reservoirs at levels high enough to avoid low pressure complaints from customers. The reservoirs draw down and refill approximately 10.0 percent on a daily basis. This is relatively low turnover, but it is mitigated by the excellent quality of the water being delivered. In 2018 CRW depth tested the chlorine residual of both reservoirs during the year and the results showed that the chlorine residual was consistent at all water levels tested, which indicated that there was no significant degradation of water quality within the reservoirs. Furthermore, CRW is capable of increasing the turnover rate of the reservoirs if it suspects there may be degradation of water quality in the reservoirs. CRW did not depth test the chlorine residual in 2023.

CRW maintains a standard operating procedures document binder where all written standard operating procedures are compiled in one location. It has written operating procedures for the Susquehanna River Pump Station but not for its other pumping stations. Its SCADA system records operational conditions. It has written maintenance procedures for all three of its pumping stations. CRW has poor records as to the history of its distribution system pipelines. The average age of the distribution system is unknown as records regarding the installation dates of pipes are not available for about 40 percent of the distribution system. Where records are available, they indicate an aged system, with over 90 percent of the records showing an installation date prior to the 1960s, and almost half of those installations occurring over 100 years ago. A nominal replacement rate of 12,500 linear feet per year (~1% of the system) might be justified based on the age and size of the system. In July 2020 CRW completed a Water Transmission and Distribution System Asset Management Plan that will be used to inform future water main and water meter rehabilitation and replacement strategies. CRW will continue to invest in annual distribution system assessments while developing a long-term strategic approach for the distribution system.

CRW's distribution system operation and maintenance program appears to be consistent with Section 4.3 of AWWA Standard G200 - Distribution Systems Operation and Management, based upon a limited review of documentation and an interview with the Water Operations Supervisor on August 18, 2022.

#### *4.2.6.4 Documentation*

CRW continues to update and expand its GIS system including integration with its City Works asset management program. GIS continues to improve existing services and create new ones for Cityworks to consume.

As an additional way of communicating with our rate payers, CRW's GIS department has increased online presence through the development of more apps and dashboards. Internally, CRW is creating a GIS roadmap that will identify our strengths and weaknesses. Once completed, it will help us improve existing systems and develop new ones with the goal of improving efficiency and communication. CRW's plan is consistent with Section 5.1 "Documentation required" of AWWA Standard G200. It is recommended that CRW continue to expand this program.

# 5.0 CAPITAL IMPROVEMENT PLAN

## 5.1 Overview

CRW prepares a CIP that identifies the major planned projects and initiatives for the Water System. The CIP includes projects that are required to meet future regulations, replace aging infrastructure, enhance or expand services to customers, provide resiliency and redundancy, and increase cost-effectiveness and efficiency. While certain projects are required by regulations or needed to maintain proper operations others are discretionary in that the project is being undertaken to meet CRW's established goals but are not necessarily critical to the continued operation of the Water System. As such, the schedule for implementation of discretionary projects is often subject to change.

A review of CRW's long-term CIP, its past accomplishments, and the current observed condition of key assets was completed to assess the overall condition of the Water System and to identify potential capital improvements that should be considered for implementation by CRW in FY 2024. The following presents a summary of the findings of our review.

## 5.2 CRW Updated Capital Improvement Pan

A summary of the recommended CIP for CRW for the period FY 2024 through FY2032 that reflects the capital improvements that were identified and recommended based on the document reviews, visual inspections, and discussions with CRW as part of this report, are shown in **Table 5-1.**

## 5.3 Discussion

CRW's capital plan is in general alignment with Gannett Fleming's observed requirements for the Water System. CRW generally has a good understanding of capital project needs and should prioritize projects based on urgency and affordability. CRW may proceed to reschedule and reprioritize various projects to balance the capital needs over the next several years. It is recommended that CRW update its cost estimates and capital funding plans for these projects as additional information becomes available.

**Table 5-1: Capital Improvement Plan**

| Description | FY 2024 | FY 2025 | FY 2026 | FY 2027 | FY 2028 | FY 2029 | FY 2030 | FY 2031 | FY 2032 | FY 2033 |
|---|---|---|---|---|---|---|---|---|---|---|
| Mountain Line Repairs | $ 82,500 | $ 82,500 | $ 82,500 | $ 110,000 | $ 110,000 | $ 110,000 | $ 110,000 | $ 110,000 | $ 110,000 | $ 110,000 |
| DeHart Spillway Improvements (PV) - Construction | $ - | $ 8,400,000 | $ 11,040,000 | $ 500,000 | $ - | $ - | $ - | $ - | $ - | $ - |
| DeHart Spillway Improvements (PV) – Engineering & Construction Management | $ 69,000 | $ 940,000 | $ 1,104,000 | $ 50,000 | $ - | $ - | $ - | $ - | $ - | $ - |
| DeHart Backup Generator | $ 71,644 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Solar Installation Project | $ 700,000 | $ 2,500,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| DeHart Actuators (Control Room & Intake Tower) | $ - | $ 100,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Dehumidifier Replacement | $ - | $ - | $ - | $ 170,000 | $ - | $ - | $ - | $ - | $ - | $ - |
| Recoat Epoxy of the Basin Sedimentation Walls | $ 85,000 | $ 90,000 | $ 100,000 | $ 105,000 | $ - | $ - | $ - | $ - | $ - | $ - |
| Locker Room & Showers | $ 130,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Backwash Magnetic Flow Meter | $ - | $ 5,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |

| Description | FY 2024 | FY 2025 | FY 2026 | FY 2027 | FY 2028 | FY 2029 | FY 2030 | FY 2031 | FY 2032 | FY 2033 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rubber Roof – Chemical Building | $ 392,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Water Small Meter Replacements | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 |
| Water Distribution MXU Replacements | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 | $ 5,000 |
| Cameron Street Water Main Construction & Engineering | $ 8,208,000 | $ - | $ - | $ - | $ - | $ | $ - | $ - | $ - | $ - |
| Water Main Assessment | $ 100,000 | $ 150,000 | $ 150,000 | $ 150,000 | $ 150,000 | $ 150,000 | $ 150,000 | $ 150,000 | $ 150,000 | $ 150,000 |
| Elliot St. Water Main Replacement | $ 482,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Broad St. Market Water Main Replacement | $ 798,600 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Elmerton Ave. Water Pressure Improvements | $ 100,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Water Main Replacement | $ 2,869,393 | $ 2,955,475 | $ 3,044,139 | $ 3,135,463 | $ 3,229,527 | $ 3,326,413 | $ 3,426,205 | $ 3,528,991 | $ 3,634,861 | $ 3,743,907 |
| Operations – Lab Upgrade | $ 92,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| SCADA Trending | $ 17,500 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Maintenance Building Roof Overlay Coating | $ - | $ 130,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |

| Description | FY 2024 | FY 2025 | FY 2026 | FY 2027 | FY 2028 | FY 2029 | FY 2030 | FY 2031 | FY 2032 | FY 2033 |
|---|---|---|---|---|---|---|---|---|---|---|
| Floc & Sed Basins Railings/Kick Plates w/Fall Protection | $ 375,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Plant Water Pump Pressure Transmitters | $ 20,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Claritrac Sludge Removal Pumps | $ 56,400 | $ 13,500 | $ 13,500 | $ 17,000 | $ - | $ - | $ - | $ - | $ - | $ - |
| SCADA Filter Screens | $ 7,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Chemical System HMI Screens SCADA | $ 7,500 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Control Room SCADA Tower Removal & Work Center Upgrades | $ 100,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Actuators (Influent, Backwash, Filter to Waste, Air Scour) | $ 212,566 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Gatehouse WPS Magnetic Flow Meter | $ - | $ 5,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| AMR/AMI Meter Network Conversion | $ 2,708,403 | $ 4,051,104 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Large Water Meter Replacement | $ - | $ - | $ - | $ - | $ 34,000 | $ 35,000 | $ 36,000 | $ 37,000 | $ 38,000 | $ 39,000 |

| Description | FY 2024 | FY 2025 | FY 2026 | FY 2027 | FY 2028 | FY 2029 | FY 2030 | FY 2031 | FY 2032 | FY 2033 |
|---|---|---|---|---|---|---|---|---|---|---|
| PennDOT I-83 Expansion DW Impacts | $ 508,400 | $ 311,990 | $ 3,534,000 | $ 1,425,000 | $ 50,000 | $ 50,000 | $ 1,050,000 | $ - | $ - | $ - |
| Street Restoration | $ 323,575 | $ 333,282 | $ 343,281 | $ 353,579 | $ 364,187 | $ 375,112 | $ 386,365 | $ 397,956 | $ 409,895 | $ 422,192 |
| Fleet Renewal | $ 270,000 | $ 486,000 | $ 374,000 | $ 676,500 | $ 705,000 | $ 410,014 | $ 383,407 | $ 550,981 | $ 264,423 | $ - |
| Gate House Frequency Drive Split | $ 135,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| WSC Laptops | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 | $ 10,000 |
| Water Mains - CRW Upgrades | $ 30,000 | $ 31,000 | $ 32,000 | $ 33,000 | $ 34,000 | $ 35,000 | $ 36,000 | $ 37,000 | $ 38,000 | $ 39,000 |
| Plant Valve Replacements | $ - | $ 37,000 | $ 38,000 | $ 38000 | $ 43,000 | $ 44,000 | $ 45,000 | $ - | $ - | $ - |
| Other Plant Upgrades - Placeholder | $ - | $ - | $ 200,000 | $ 200,000 | $ 500,000 | $ 500,000 | $ 500,000 | $ 500,000 | $ 500,000 | $ 500,000 |
| External Defibrillators (AEDs) | $ - | $ - | $ - | $ - | $ 8,266 | $ - | $ - | $ - | $ - | $ 9,575 |
| External Defibrillators (AEDs) - Admin | $ - | $ - | $ - | $ - | $ 3,306 | $ - | $ - | $ - | $ - | $ 3,830 |
| Administrative Building Landscaping – Phase 2 | $ 21,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Administrative Laptops | $ 15,000 | $ 15,000 | $ 15,000 | $ 15,000 | $ 15,000 | $ 15,000 | $ 15,000 | $ 15,000 | $ 15,000 | $ 15,000 |
| Admin - Fleet | $ - | $ - | $ - | $ - | $ 67,000 | $ - | $ 31,000 | $ - | $ - | $ - |
| Admin - New Billing Software | $ - | $ 100,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| **Total** | **$19,142,481** | **$20,631,851** | **$20,095,420** | **$6,893,542** | **$5,338,286** | **$5,075,539** | **$6,193,977** | **$5,351,928** | **$5,185,179** | **$5,057,504** |

[1] Project costs are presented in 2024 dollars

# 6.0 OPERATIONS AND MAINTENANCE EXPENSES REVIEW

## 6.1 Overview

The Trust Indenture (Section 7.12) requires CRW to adopt a Water System budget each year sufficient to meet all of CRW's projected financial obligations for the upcoming fiscal year. CRW typically adopts a finalized budget in November, two months prior to the start of the new fiscal year. CRW utilizes the capital plan and O&M recommendations in this CEAR to assist in establishing the budget. However, it should be noted that this CEAR only serves to provide advice and recommendations regarding capital additions and the amount of funds that should be expended to meet incremental O&M expenses.

## 6.2 Historical Water System Expenses

A summary of CRW's historical actual O&M expenses for FY 2022 and FY 2023 and the budgeted O&M expenses for FY 2024 are shown in **Table 6-1**. These expenses were reviewed and determined to be in general alignment with the overall O&M needs of the Water System.

**Table 6-1: Historical Water System O&M Expenses**

| | Historical | | Budget |
|---|---|---|---|
| **Description** | **FY 2022** | **FY 2023** | **FY 2024** |
| **O&M Expenses:** | | | |
| Salaries and Wages | $ 2,584,522 | $ 2,558,152 | $ 2,667,372 |
| Benefits and Taxes | $ 869,070 | $ 1,123,636 | $ 1,196,792 |
| Contracted and Professional Services | $ 515,271 | $ 448,467 | $ 1,002,680 |
| Repairs, Maintenance, and Supplies | $ 802,435 | $ 522,579 | $ 640,690 |
| Electricity | $ 224,495 | $ 200,284 | $ 245,000 |
| Chemicals | $ 498,091 | $ 606,357 | $ 595,000 |
| Sewerage | $ 791,442 | $ 775,531 | $ 682,000 |
| Insurance | $ 368,600 | $ 380,340 | $ 498,276 |
| Administrative Fee | $ 2,846,026 | $ 3,093,514 | $ 3,596,953 |
| Other Operating Expenses | $ 354,056 | $ 347,055 | $ 413,895 |
| **Total Annual O&M Expenses** | **$ 9,854,010** | **$ 10,055,916** | **$ 11,538,658** |

Source: Historical actual expenses in FY22 and FY23 and budgeted expenses in FY24 provided by CRW.

## 6.3 Additional Operations, Maintenance, and Repair Costs

Several recommendations regarding the addition of O&M expenses in FY 2025 for the proper maintenance, repair, and operation of the Water System should be considered for implementation by CRW, as discussed in Section 4 of this report. The estimated costs associated with these recommended items are shown in **Table 6-2**

**Table 6-2: Summary of Additional O&M Costs**

| Description | FY 2025 | FY 2026 | FY 2027 | FY 2028 |
|---|---|---|---|---|
| Add Camera for Lower Reservoirs | $5,000 | - | - | - |
| Lower Reservoirs Repairs | - | $2,300,000 | - | - |
| Clearwell Repairs | - | - | $268,600 | - |
| Upper Reservoir Repairs | - | - | - | $34,794 |
| Backflow Prevention Consistent with PADEP | $5,300 | $5,300 | $5,300 | $5,300 |
| **Total** | **$10,300** | **$2,305,300** | **$273,900** | **$40,094** |

Note: All amounts shown in Table 6-2 are in 2024 dollars.

## 7.0 CONCLUSIONS

Set forth below are the principal conclusions that Gannett Fleming has reached regarding our review of the Water System:

1. The Water System is generally being managed in a professional and prudent manner, with an appropriate regard for the level of service afforded to its customers. Based on our review of the data and limited visual inspection, the Water System is generally in good physical and operating condition. However, certain components are aged or worn and will require capital investment within the next five years.

2. The Water System has consistently produced high-quality water and zero non-compliant quarters in 2023. Capital Region Water incurred two late reporting violations in 2023 (January – Total Coliform Samples, July – Dioxin Sample). In both instances, the violations were the result of the contracted laboratory failing to report the test results within the deadline established by PADEP.

3. CRW's water supply and treatment capacity is sufficient to meet the current and near-term projected needs of the service area.

4. CRW's capital plan is in general alignment with Gannett Fleming's observed requirements for the Water System. CRW has a good understanding of additional capital projects needed. The lack of historical records creates challenges for the exception of the prioritization of specific water distribution line replacements, and CRW should endeavor to refine the list of projects based on ongoing engineering analysis.

5. CRW is working diligently to maintain the condition of the Water System. The Water System is generally being maintained and operated in accordance with generally accepted utility standards and overall, the Water System is in good repair and operating condition.

6. It is recommended that CRW prepare for the Lead and Copper Rule Revisions to take effect in October 2024 and review the PADEP service line guidance material. The revisions will have impacts to CRW, ranging from increased sampling to proactive public education and lead service line replacement. Following the April 19th 2024 US EPA rule classifying "PHOA" & "PFOS" as hazardous substances, it is recommended that CRW keeps monitoring the levels of those contaminants from the raw water sources, although previous testing indicated that said contaminants were not detected.

7. CRW is actively working on establishing a lead inventory within its service lines and should continue efforts to comply with the Lead and Copper Rule. CRW should monitor planned federal and state updates to the lead and copper rule in the LRRI.

8. Based on the available information, Gannett Fleming recommends CRW implement additional O&M efforts as described in this report, including the following:

    - At the Lower Reservoirs, pressure wash the exteriors and implement required repairs resulting from inspections. Consider installing cameras and fencing around the lower reservoirs.
    - Implement recommended repairs to clearwells and upper reservoirs.
    - Implement a backflow prevention program.

9. It is recommended that a CRW compliance field audit of all 250 large meter accounts and all accounts with fire meters is conducted within the system with the primary purpose of ensuring compliance with CRW's Rules and Regulations.

This CEAR summarizes the work completed up to the date of the issuance of this CEAR. Changed conditions occurring or becoming known after such a date could affect the material presented to the extent of such changes. Gannett Fleming has no responsibility for updating this CEAR for changes that occur after the date of this report.

In preparation for this CEAR, Gannett Fleming has relied upon financial, engineering, and operational data, and assumptions prepared by and/or provided by CRW. In addition, information and projections have been provided by other entities working on behalf of CRW. We believe such sources are reliable and the information obtained to be appropriate for the review undertaken and the conclusions reached in this CEAR. To the best of our knowledge, information, and belief, the information does not omit material facts necessary to make the statements herein. However, Gannett Fleming has not independently verified the accuracy of the information provided by CRW and others. To the extent that the information is not accurate, the findings and recommendations contained in this CEAR may vary and are subject to change.

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