### 2020 Fort Collins Drinking Water Quality Policy Annual Report





Fort Collins Water Treatment Facility

In October 1993, Fort Collins City Council Resolution 93-144 adopted the Drinking Water Quality Policy (Attachment A) to ensure the continuous delivery of high-quality drinking water to Fort Collins Utilities' (Utilities) customers. This 27 annual report is a requirement of the Drinking Water Quality Policy and summarizes the actions taken in support of policy goals during 2020.

### **GOAL 1**

The City will provide water services that meet or exceed customer expectations for quality, quantity and reliability.

#### **Reliability, Capacity and Redundancy**

Utilities owns an 87-million gallon per day capacity water treatment facility that operates 24 hours a day, seven days a week to ensure that a continuous supply of high-quality drinking water is delivered to our customers. Staff is available at all times to respond to customer complaints and concerns regarding drinking water quality and reliability of service.

In 2020, the plant produced 8.7 billion gallons of drinking water. Peak day production occurred on June 17, and was 49.00 million gallons/day, or 56% of plant capacity. At this rate, available treated water storage would meet 16.4 hours of peak demand, exceeding the benchmark of storage capacity for 12 hours of peak demand.

The treatment plant has multiple systems and processes in place to provide high reliability with low risk of failure. For example, Utilities has two water sources, three raw water pipelines, multiple chemical storage tanks, delivery systems, treatment trains, filters and storage reservoirs.

Utilities also has a robust asset management and preventative maintenance program that helps ensure the provision of safe drinking water to the community and that standards are met for community firefighting and emergency needs.



Figure 1. The Microhydro Generator

The Microhydro unit, commissioned in 2019, uses the pressure of the incoming Horsetooth raw water source to generate electrical energy. The generator has performed well and met 16% of the plant's electrical energy demand in 2020. The unit was offline for the entirety of the Horsetooth Outlet Project, which decreased the total output for the year.

Including the solar field, 21% of the plant's electrical demand was met by on-site renewable generation.

#### **Regulatory Changes**

The national revised lead/copper rule, addressing lead service line inventory and replacement, and monitoring in schools/licensed daycare facilities, is currently under EPA review and may be finalized in 2021. While some of the final rule's new requirements apply to the City of Fort Collins within three years of rule publication, other requirements apply at a later date.

Colorado's Storage Tank Rule was updated in 2020, changing the required inspection frequency from quarterly to twice per calendar year. Despite the rule change, CDPHE's recommended frequency remains quarterly as does the City's practice.

Approximately every five years, EPA requires utilities across the nation to monitor for a list of unregulated contaminants in the source and/or finished water. The list varies each monitoring period, and the results help EPA determine which contaminants warrant future regulation. The results from monitoring in 2020 are in Table 1 (below).

UNREGULATED CONTAMINANTS						
Contaminant	Year	Average	Range	Number of	Unit of	Sample Site
				Samples	Measure	
Bromochloroacetic	2020	1.42	0.43 – 2.2	16	ug/L	Distribution
Acid						System
Bromodichloroacetic		1.15	0.78 – 1.8			
Acid						
Dichloroacetic Acid		13.5	3.8 – 20			
Trichloroacetic Acid		11.7	9.9 - 14			
Manganese		1.25	1.1 - 1.4	2		Finished Water
ТОС		4100	2600-7900	4		Raw Water

#### Table 1

The following contaminants were also monitored but not found above the detection limit: chlorodibromoacetic acid, dibromoacetic acid, monobromoacetic acid, monochloroacetic acid, tribromoacetic acid, germanium, bromide, anatoxin-a, cylindrospermopsin, total microcystin, alpha-hexachlorocyclohexane, chlorpyrifos, dimethipin, ethoprop, oxyfluorfen, profenofos, tebuconazole, total permethrin, tribufos, 1-butanol, 2-methoxyethanol, 2-propen-1-ol, butylated hydroxyanisole, o-toluidine and quinolone.

#### Water Quality Complaints

In 2020, the City received 18 drinking water quality complaints, equating to a rate of 0.14 per 1,000 customers. This was a decrease of 27 complaints, or 60%, from 2019, and remains well under benchmark goals. In order to protect the health and preserve the critical functionality of the laboratory, staff did not visit customers' homes to collect samples after the onset of the COVID-19 pandemic. Based on the 2017 Benchmarking Manual from the American Water Works Association, 23 other participating utilities had a median number of technical water complaints of 5.4 per 1,000 customer accounts. The "best" quartile rate observed by other participating utilities was 1.1 per 1,000. At 0.14 per 1,000, the City of Fort Collins was "better than the best."



## GOAL 2

# The City will protect and maintain high water quality in the development of all codes, policies, plans and specifications related to the acquisition, production and delivery of water services to its customers.

The quality of Fort Collins drinking water remains very high. During 2020, the plant produced an average filtered water turbidity of 0.0229 NTU, which is far below our maximum goal of 0.10 NTU. The system maintained disinfectant levels well above the minimum 0.2 mg/L level required by regulation at all times.

Staff developed and implemented plans for source redundancy during the planned Horsetooth shutdown by Northern Water in 2020.

#### **Code Updates**

• Ordinance No. 053, 2020, Amending Chapter 26 of the Code of the City of Fort Collins to adopt a Water Shortage Action Plan (Previously known as the Water Supply Shortage Response Plan)

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#### Partnership for Safe Water (PSW)

The Water Treatment Facility maintained its President's Award status for 2020, for the fifth year in a row. The President's Award is the first tier of Phase IV of the PSW, which is the final phase. The award is bestowed upon top-tier water plants that have demonstrated

commitment to providing superior quality water to their customers, beyond the requirements of the EPA regulations. While the Director's Award, which has been maintained by the Water Treatment Facility for the last 20 years, requires higher performance of the overall filtered

water quality, the President's Award requires the performance of each individual filter to be evaluated. Only 36 treatment facilities throughout the nation have achieved this level of recognition. Staff have set a goal of achieving the Excellence in Water Treatment Award, the second tier of Phase IV, and the highest level achievable in the program, in 2021. The PSW is an alliance of six drinking water organizations including the EPA. This voluntary program strives to enhance water quality through continuous optimization of treatment processes. Operators, managers and administrators are provided self-

> assessment and optimization tools to improve performance above and beyond current and proposed regulatory levels.

> The PSW was originally designed with a focus on the treatment of drinking water but has expanded to inspire and recognize

excellence in distribution systems. The City's distribution system was awarded the Partnership's Director's Award for distribution excellence in 2015 and has maintained that status in 2016–2020, making five years in a row.

#### **Environmental Management System**

The Water Treatment Facility has established a formal Environmental Management System (EMS) that is certified to conform to the ISO 14001:2015 standard.

A key aspect of the EMS is reduction in energy use and greenhouse gas footprint. In



**ENVIRONMENTAL** 

MANAGEMENT SYSTEM

support of this, the facility has participated in the Colorado Industrial Energy Challenge, sponsored by the Colorado Governor's Energy Office and the

U.S. Department of Energy. Electrical power purchased from the grid was flat from 2019 to 2020. Between the solar field and the microhydro unit, 21% of the facility's energy needs is generated on site through renewable sources. Purchased energy use levels equate to a 39% reduction in greenhouse gas footprint from 2005 levels, which greatly exceeds the City's Climate Action Plan goal of 20% reduction by 2020.

Plant staff continue to pursue energy efficiency improvements to reduce the greenhouse gas footprint and control operating costs associated with energy.

Another significant aspect of our EMS is waste stream management, of which treatment residual solids make up 96%. Cooperation began with the Low Impact Design program to provide some of this material for testing as treatment media for removal of phosphorous from stormwater runoff. If successful, this beneficial use has the potential to divert 100% of the total residuals generated from the landfill. This program has completed laboratory research and field pilot studies and has received final approval from CDPHE to begin full implementation. Work will begin in 2021 to identify necessary updates to City Code and revisions to operational procedures to implement the program.

#### **Environmental Leadership Program**

The Environmental Leadership Program (ELP) is a statewide environmental recognition and reward program administered by the CDPHE Sustainability Program.

The ELP offers benefits and incentives to members that voluntarily go beyond

compliance with state and federal regulations and who are committed to continual environmental improvement.



As the result of process improvements and the ISO 14001:2015 certification of the EMS, the facility has received and maintained recognition as an ELP **Gold Leader**.

### GOAL 3

The City's water supply, treatment, storage, delivery and laboratory facilities will be planned, designed, constructed, maintained, staffed and operated to assure safe, reliable and cost-effective service to the residents of Fort Collins and all those served by the City's water utility.

#### **Source Water Quality Monitoring**

The City of Fort Collins' drinking water supply comes from two sources: the upper Cache la Poudre River (Poudre River) and Horsetooth Reservoir. Beginning as rain and snow in the mountains, Poudre River water originates on the eastern slope of the Continental Divide, northwest of Fort Collins. Horsetooth water is delivered from the Colorado River Basin on the western slope via the Colorado-Big Thompson (C-BT) Water Project.

Utilities collaborates with other local drinking water providers and water stakeholders to monitor water quality trends in the <u>Poudre River</u>, <u>Big Thompson River</u> and <u>Horsetooth Reservoir</u>. Monitoring includes more than 25 different chemicals and physical and microbiological contaminants at 35 locations throughout our source watersheds. As in previous years, 2020 water quality data indicated that the City's source watersheds continue to provide high-quality water.

#### Upper Cache la Poudre River

Since 2008, the Utilities' Watershed Program has led the collaborative upper Cache la Poudre Water Quality Monitoring Program. Partner utilities include the City of Greeley and Soldier Canyon Water Authority. This monitoring program assists partners in meeting current and future drinking water treatment goals by reporting seasonal, short term and long-term trends in source water quality. Seasonal, annual and five-year water quality reports are available on the Watershed Program website, *fcgov.com/upper-poudre-monitoring*.



Figure 3. Map showing the locations of Upper Cache la Poudre River Monitoring Program study sites within the Poudre River Watershed in reference to the Cameron Peak Wildfire burn scar.

The <u>Cameron Peak Wildfire</u> ignited just west of Chambers Lake in the Rawah Wilderness on August 13, 2020 and was not considered fully contained until December 2, 2020. The fire is the largest in Colorado history and burned nearly 209,000 acres of forest types ranging from high elevation spruce fire communities near the Medicine Bow and Mummy Ranges to low elevation Ponderosa Pine forests and scrublands in the foothills of the lower Poudre River and Big Thompson River Watersheds. High intensity, large scale wildfires like the Cameron Peak Wildfire can result in significant post-fire water quality pollution from ash and hillslope erosion.

The Watershed Program developed a Cameron Peak Post-Fire water quality response plan while the fire was still active which outlined the City's strategy for monitoring our raw water supplies. The Watershed Program has since been developing a water quality monitoring recovery plan, which outlines how the City will monitor water quality during the recovery phase of the fire. The recovery plan utilizes long-term monitoring and reporting as part of the Upper Cache la Poudre Monitoring Program to better understand the



*Fig. 4. Photo showing a stand of lodgepole pine near Chambers Lake that was burned at high intensity during the Cameron Peak Wildfire.* 

fire's short-and long-term impacts on water quality and the timeline for recovery. The watershed program will also be using two meters installed in the Poudre River approximately two miles and 20 miles upstream of the City's Poudre River Drinking Water intake to provide real-time data to Utilities' staff and our regional partner utilities. These meters provide early-warning alerts to water treatment staff when a post-fire pollution event is occurring on the river. These events are often tied to localized, intense precipitation events and subsequent erosion. And lastly, Watershed Program staff have been leading a cost share collaborative science and monitoring efforts to address post-fire recovery questions. Targeted studies will address how ash impacts water quality; how high mountain reservoirs may be impacted and water quality implications to our raw water supply; and whether smoke-related taste and odor compounds are present in raw and finished water.

#### **Horsetooth Reservoir**

Utilities has actively monitored the water quality in Horsetooth Reservoir since the mid-1980s. In 2015, Utilities entered into a cost-share agreement with Northern Water for the monitoring of Horsetooth Reservoir water quality to conserve resources. Northern provides up-to-date information about water quality conditions, periodically analyzes data and writes trend reports. In exchange for these services, the Fort Collins Water Quality Lab provides chlorophyll-*a* analysis for up to 200 samples collected from sites within Northern Water's monitoring network as an in-kind contribution to the program. Northern Water's water quality network includes streams, canals, lakes and reservoirs throughout the Colorado Big-Thompson (C-BT) and Windy Gap projects. Water quality data and Northern Water's most recent Horsetooth water quality report are available at <u>northernwater.org/WaterQuality/MonitoringPrograms.aspx</u>.

The <u>East Troublesome Wildfire</u> ignited on October 30, 2020 near Kremmling, CO, and burned nearly 194,000 acres before being considered contained on November 30, 2020. The fire rapidly advanced across the landscape as a crown fire and ultimately burned a substantial portion of the watersheds contributing to the C-BT west slope collection system in the upper Colorado River Basin. The impacts of the East Troublesome fire on C-BT water quality, including Horsetooth Reservoir, are currently unclear. Watershed Program staff are in the process of developing a Horsetooth Reservoir Water Quality Monitoring Recovery Plan. The plan utilizes the Horsetooth Reservoir Water Quality Monitoring Program to understand short-and-long term water quality trends; real-time and additional weekly sample collection at the inlet to the reservoir; monitoring for algae blooms; and possible future water quality modelling to better anticipate changes in water quality.

#### **Big Thompson River Watershed**

Utilities is a major funder of the Big Thompson Watershed Forum (BTWF), along with the City of Greeley, City of Loveland and Northern Water. Watershed Program staff serve on the BTWF's board of director's as vice-chair. The BTWF manages a routine water quality monitoring program, through a contract with the U.S. Geological Survey, on the Big Thompson River, a major component of the C-BT system, which delivers water to Horsetooth Reservoir. Northern Water also monitors additional C-BT Project canals and reservoirs upstream of Horsetooth. This collaborative approach to monitoring large watersheds reduces sampling costs and provides a significant shared knowledge base between partners. For more information, visit: *btwatershed.org*.

#### **Source Water Protection**

In 2016, Watershed Program staff, with assistance from the Colorado Rural Water Association, Colorado Department of Public Health and Environment (CDPHE) and a local steering committee completed a Source Water Protection Plan (SWPP) for the Poudre River and Horsetooth Reservoir. This document guides the City's water quality monitoring and water supply protection priorities and directly supports the City's Drinking Water Quality Policy:

"The City will protect raw water sources from contamination or any other activities that would diminish the quality of water provided to customers, or that would result in increased treatment costs."

The SWPP (<u>fcgov.com/source-water-monitoring</u>) identifies potential sources of contamination to water supplies; ranks those sources according to risk to the City's drinking water infrastructure and source water quality; and identifies best management practices to mitigate those risks. The Watershed Program plans to update the SWPP in 2022, using a regional cost-share collaborative approach.

### Forest Health/Wildfires – High Priority

Forest health and the threats of water quality pollution and damage to the City's drinking water infrastructure from future wildfires continues to be a high priority threat to the City's source water supplies.

Since 2013, Utilities has worked collaboratively with the Coalition for the Poudre River Watershed (CPRW) and other stakeholders to improve the health and resiliency of the Poudre River. The City provided an initial two years of funding for establishing the organization and retains a reserved seat on CPRW's Board of Directors alongside other partner utilities and stakeholders.

In 2016, CPRW worked with community stakeholders to complete the Poudre River Watershed Resiliency Plan (*poudrewatershed.org*), which is used by Utilities to prioritize watershed protection projects in the watershed.



Figure 5. Map showing the forest health and wildfire risk reduction priority watersheds that were identified as part of the Upper Poudre Watershed Recovery and Resiliency Plan.

Utilities continues to allocate funding for collaborative wildfire restoration and mitigation projects to protect our source watersheds. Restoration efforts have largely focused on projects within the 2012 High Park Fire burn area to control soil erosion. Unnamed Tributary-3 is a small tributary to the Poudre River near the Munroe Tunnel Inlet. Heavy debris flows from the drainage following the High Park Fire completely clogged the tunnel, interrupting water supply and damaging infrastructure. The drainage was identified as a high priority for restoration following the fire due to its instability and risk for additional erosion. In 2012, CPRW began a multi-year project with Fort Collins Utilities and other partners to stabilize the drainage. The project was completed in spring 2019.



Figure 6. Project partners and volunteers work together to stabilize the Unnamed Tributary-3 drainage

In addition, several forest thinning projects have successfully been completed outside of the burn area to reduce fuel loads and mitigate the risk of future large, high-severity wildfires that could impact our source water. The 2017 Elkhorn Creek Forest Health Initiative is a great example of a collaborative project that successfully reduced fuels in a priority area of the Poudre River. The project was completed using funding, labor and equipment from more than a dozen partners, including Utilities. Wildfire risk was significantly reduced with treatments that included hand thinning, piling and burning; mechanical treatment; and prescribed fire. The successes of this project provided a project implementation template that was used at a larger scale on additional wildfire mitigation projects within the Elkhorn Creek Watershed and Lory State Park on the west side Horsetooth Reservoir in 2019.

The Lory State Park Project was a cost-share collaborative wildfire mitigation project including the Colorado State Forest Service, Colorado Parks and Wildlife, Peaks to People Water Fund, Northern Water Conservancy District and City of Fort Collins Utilities that was completed in 2019. Approximately 146 priority acres were treated, primarily by mastication, with some areas of hand thinning and slash piling. Fort Collins Utilities contributed \$20,000 to this project.



Figure 7. Forest fuels reduction efforts within the Elkhorn Creek drainage

The 2019 North Rim Road wildfire mitigation project was located to the south of and above Elkhorn Creek, was funded by City of Fort Collins Utilities (\$42,000), the Colorado State Forest Service (\$42,000), and the Colorado Department of Local Affairs (\$130,000). Approximately 85 acres were treated at the project site, on two private properties adjacent to US Forest Service lands. The majority of the treated area was masticated, with the remainder treated by hand thinning and slash piling. Slash piles were burned during late spring 2020 by the Forest Stewards Guild. The before and after treatment photos demonstrate the effectiveness of these treatments in reducing forest fuels.



Figure 8. Forest treatment crews create (left) and burn (right) slash piles

The Watershed Program also continues to participate in the <u>Northern Colorado Fireshed</u> <u>Collaborative (NCFC)</u>, which consists of local federal natural resource agencies, state agencies, local government, researchers, community groups and non-profits. NCFC partners work closely together to prioritize and align their wildfire mitigation projects to achieve broader landscape level watershed protection and further leverage project funding. The Watershed Program committed \$17,250 in 2020 to a cost-share collaborative project on the South Fork of the Poudre River near Jack's Gulch. The project is managed by CPRW and partners include Colorado State Forest Service, City of Greeley and private landowners. The project will include forest treatments on more than 160 acres of high-priority acres. This project will be aligned through the Northern Colorado Fireshed Collaborative to achieve a greater broader wildfire mitigation effect. The project was delayed in 2020 due to the Cameron Peak Wildfire, but and is rescheduled for 2021.

In 2020, the Watershed Program also committed \$20,000 to help fund a cost-share collaborative wildfire mitigation project in the Big Thompson Watershed. The project is managed by the Big Thompson Watershed Coalition and includes partners Colorado State Forest Service and Northern Water. The Cedar Park forest thinning project will take place on more than 100 acres of the Sylvan Dale Ranch, which shares a boundary with planned USFS Cedar Park treatments as part of the Northern Colorado Fireshed Collaborative. The targeted treatments have been identified as high risk to the City's source water supplies. The project contract has been awarded, but it was delayed due to the Cameron Peak Wildfire.

Utilities' Watershed Program completed a Drinking Water Infrastructure Wildfire Risk Assessment for the Cache la Poudre River in 2019. The study combined site visits and desktop analyses to determine a range of best management practices designed to reduce the risk damage from future wildfires to key infrastructure, such as intakes, diversions, pipelines, reservoirs, ditches and diversions. The study also identified additional wildfire mitigation priorities near key infrastructure such as Joe Wright Reservoir and Halligan Reservoir. The Watershed Program is currently pursuing cost-share collaborative wildfire mitigation projects to address these concerns.



Figure 9. Photos show a diversion tunnel, reservoir and section of pipe that were evaluated as part of the Drinking Water Infrastructure Wildfire Risk Assessment.

The Watershed Program is currently pursuing agreements with the U.S. Forest Service, Fort Collins Conservation District, Big Thompson Conservation District and the Big Thompson Watershed Coalition that will allow the City to fund additional wildfire mitigation projects across both the Poudre River and Big Thompson River Watersheds.

#### State Highways – Moderate Priority

State highways were identified in the SWPP as a moderate threat, in part, due to chemical spills from vehicle accidents. To address this threat, the Watershed Program completed a Source Water Spill Response Plan in 2019 to reduce the risk of spills to the City's Horsetooth and Poudre River drinking water supplies. The Source Water Spill Response Plan includes procedures, methods, equipment and other necessary information to help Utilities prepare for and respond to water contamination from chemical spills within their source water protection areas (SWPAs). The Watershed Program has facilitated a staff training for the Source Water Spill Response Plan and the plan was implemented in January 2020.



Figure 10. Photos show a truck accident in 2009 on the banks of the Poudre River (left) that resulted in an asphalt spill and spill contaminant booms (right) that were deployed to contain the spill.

#### **Certified Laboratory**

The City is required to comply with state and federal drinking water standards. These standards mandate that a certified laboratory perform all regulatory compliance testing. The City's Water Quality Laboratory staff provides state-certified regulatory compliance and other testing and reporting for Utilities as well as 13 other regional water agencies.

The Water Quality Lab first achieved certification in bacteriology testing in 1978. Since that time, the lab has gained certified status for a large array of water quality tests. Certified status is achieved through a multistep process shown in Figure 10.

#### Audits Annual audits involve analysis of samples from Inspections certified providers that Evaluation of lab staff Application contain unknown quantities includes review and of unknown The application process verification of their formal constituents. This rigorous includes documentation educational qualifications, approach covers an array of regarding the lab training and lab-related parameters and weeds out qualifications of lab work experience, as well as possible reporting of false hands-on demonstration of staff, training, positive and false negative laboratory skills. In addition. equipment, quality results. details of written and actual assurance test methods and documentation. procedures are audited to facilities and budget, as ensure "to-the-letter" well as proof of compliance with successful analysis of required EPA specifications. "unknown" Certification inspections also CERTIFIED performance audit include review of the lab's samples each year. budget, equipment, facilities **STATUS** and work processes.

#### Figure 11 – Certified Status Achievement Process

The Water Quality Services Division completed a master plan in 2017, which included a condition assessment of the Water Quality Lab and evaluated different alternatives for renovation or replacement. Opportunities for constructing a new combined laboratory or other replacement options are currently being explored.

In addition to the State certified laboratory, the Water Treatment Facility performs chemical and physical analyses at key process control points in order to optimize treatment processes. In 2020, process analysts performed:

- 20,650 laboratory analyses for process control, including 16,427 control instrumentation validation quality assurance checks.
- 16 jar tests to optimize plant performance.
- 32 odor profile analyses on raw and finished samples. These are normally performed weekly, which was the case until mid-March. At that time, it was determined that the regular protocols for this analysis were not safe to continue during the COVID-19 pandemic and the analysis was discontinued to protect employee health. When the Cameron Peak Fire broke out, the results of this analysis became more valuable, so the protocols were evaluated and modified to preserve employee health and safety. During the fire, this analysis was performed on a daily basis using the modified protocols.
- FlowCam analyses and microcystin screening tests during late summer and fall as part of the Cyanotoxin Monitoring Plan.

#### **Asset Management**

Utilities continued risk-forecasting efforts within its water production and distribution asset base throughout 2020. The asset management risk forecast is a process to evaluate the condition of the equipment, piping and facilities, the types of risks associated with the system, and determinations as to timeline for replacement.

Some 2020 highlights:

#### Water Production

- Completed 2,658 preventative maintenance work orders with 7,864 hours of work and 67 corrective maintenance work orders with 379 hours of work. This is a rate of over 95% planned maintenance, which exceeds our target of at least 80% planned maintenance.
- Cleaned and performed a comprehensive inspection of the west half of the south tank, and the east reservoir.
- Zetasizer was moved twice to improve the process.
- CCB hatch covers converted to skylights.
- Painted inlet pipes to T5 & T6.
- Replaced numerous furnaces in plant.
- Worked with Marine Diving Services to inspect Joe Wright Outlet conduit and gates, realign 42" gate stems, replace 6" gate and rebuild and replace 42" gate operators.
- Finished extending Joe Wright Emergency Spillway underdrains to daylight.
- Performed annual inspection of Joe Wright Dam.
- Replaced and upgraded PLC 50.
- Installed electric power supply Automoatic Throwover Switch (ATO) for plant reliability;.
- Replaced roofs on Filters/ T4 /Maint area/lime area.

- Installed new air handler MAU1441 in safer location.
- Installed new flow meter to foothills with shutoff valve.

## Meter and Distribution System Maintenance

The Water Distribution crews are responsible for the operation and maintenance of the City's water distribution system. Some of the main responsibilities of the group are to manage, implement and set annual goals for defined maintenance programs.

#### System Statistics

- 546 miles of water mains
- 835 water main locator stations
- 394 cathodic protection test stations
- 13,426 valves
- 3,832 fire hydrants
- 39,279 service lines
- 35,840 water meters
- 35,694 communication devices
- 2,025 bypasses



Figure 12 – Repairing a main leak

In 2020, the group was responsible for responding to 873 customer complaints during regular hours and 270 after hours. They repaired 57 valves, 48 fire hydrants, 60 service lines and 34 service leaks. Additionally, 78 water main breaks were repaired: 42 - electrolysis, 31 - beam breaks, 5 -longitudinal breaks and 0 - miscellaneous repairs to the water mains.



Figure 13 – Repairing a main leak

Annual Main Breaks 140 120 100 80 60 40 20 0 2016 2012 2013 2014 2015 2018 2019 2017 2020 2011

Figure 14

- Crews inspected 784 bypasses on meters sized 1.5 inches and larger to ensure the valves were properly positioned and secured.
- Operators performed 177 inspections and installed 152 meters on new construction single-family, multi-family residential and commercial services.
- 1,017 meter tests were conducted. Of those, 1,005 were done on City-owned meters. 12-meter tests were performed for external customers and were repaired and re-conditioned as requested. Meters were tested using state-of-the-art technology, to ensure they met the American Water Works Association (AWWA) standards for accuracy and reliability. Tests were performed prior to installation and upon removal.
- The Meter Shop had a contractor start installing meter boxes in yards so the meter could be moved out of crawl spaces. 45 meters were relocated this year.

- Crews performed maintenance checks on 2513 valves and 1590 fire hydrants.
- Watermain flushing was cancelled this year due to 2020 pandemic. Crews flushed the water mains on the east side of the water distribution system from College Avenue to Northern Lights, operating 1,084 fire hydrants during that program.
- Leak detection operations were performed on 81.6 miles of water main and 394 cathodic protection test station readings were collected.



Figure 15

- Cross Connection Control performed 137 backflow surveys and inspections.
- Crews supported Connexion by reviewing permits and standbys making sure separation requirements were being met and restoration of potholing our utilities was completed correctly.
- Construction crews replaced a total of 8,005 feet of water main and installed 59 new valves and 14 fire hydrants during our annual water distribution system replacement program.

#### Figure 16



Additional distribution maintenance information is available in the asset management section on the previous two pages.

### Following is a list of replacement projects:

- 3500 Rolling Green Dr. Collindale 2nd Condos, 1150 LF
- 3500 Blk. Rolling Green Dr. Horsetooth Rd. To Tuckaway Ct, 875 LF
- Bent Tree Ct. 1100 Blk. Bent Tree Ct, 600 LF
- 1600 Blk. Plum St. W. Elizabeth St. to 1601 W. Plum St – 1,680 LF
- 100/300 Blk. Hickory St. College Ave. to Railroad tracks, 1200 LF
- McMurry Ave. 4200 Blk. McMurry Ave, 1500 LF
- Harvard St. 2600 Blk. Harvard St, 600 LF

### The following capital projects were undertaken in support of goal three:

Northeast Loop Water Line Cathodic Protection Project

- Funding Source: Water
- Estimated Project Budget: \$1,610,000
- Final Cost: Estimated \$1,500,000
- Status: Complete on-line

· Project Details: This project included the design and construction of five rectifiers along the Northeast Loop Water Line that supply an impressed current along the pretensioned concrete cylinder water line to cathodically protect the line from further corrosion. Five 10-inch diameter well bores were drilled approximately 300-400 feet deep at each location, six anodes were hung on electrical wires within each well bore column and wires were connected to rectifiers that apply an electrical current to the pipe. Installation of antennas allowed the transmission of the electrical monitoring information back to the SCADA system. This system helps protect the water main that supplies water to Fort Collins and a major brewery.

Westside Water Line Cathodic Protection Project

- Funding Source: Water
- Estimated Project Budget: \$521,000
- Final Cost: TBD
- Status: under construction

• Project Details: This project includes the design and construction of one rectifier on the Westside Water Line to supply an impressed current on the 60" pre-tensioned concrete cylinder water line and cathodically protect the line from further corrosion. One 10-inch diameter well bore is to be drilled approximately 300–400 feet deep, with six anodes hung on electrical wires within the well bore column and wires connected to a rectifier to apply an electrical current to the pipe. Installation of antennas will provide for the transmission of the electrical monitoring

information back to the SCADA system at the WTF. This system will help protect the water main that supplies water to west and south areas of Fort Collins and surrounding water districts.

Horsetooth Alternative Water Supply Project • Funding Source: Water

- Estimated Project Budget: \$3.2 million
- Final Cost: approximately \$1,300,000 (including design of two preliminary alternative water supply locations, final design of water supply location, procurement, construction and demobilization)
- Status: completed and demobilized from temporary site

• Project Details: Northern Water shutdown the Horsetooth Reservoir Outlet at the Soldier Canyon Dam starting Oct. 15-Nov. 5, 2020 to repair an inline valve under the dam and replace the inlet trash racks. During this period, the Cache la Poudre River was Fort Collins' only water source. Fort Collins Utilities worked and cost-shared with the Tri-Districts and Platte River Power Authority on this project to supply Horsetooth water via an alternative location - the Hansen Feeder Canal off the north end of Horsetooth Reservoir. The project included construction of a permanent connection on the Pleasant Valley Pipeline and a temporary pump station connected between the Hansen Canal and the Pleasant Valley Pipeline. All remnants of surficial equipment and materials have been removed and demobilized from the temporary easement site.

#### Anheuser Busch Brewery Meter Replacements

- Funding Source: Water
- Estimated Project Budget: \$200,000
- Final Cost: \$172,170
- Status: Completed February 2019

• Project Details: Design and construction as required to replace two 10-inch turbo meters, four 10-inch gate valves, SCADA system, strainers, and all piping in the water metering vault at the brewery

### 27-inch Poudre Canyon Raw Waterline Project

- Funding Source: Water
- Estimated Project Budget: \$3.2 M

• Status: Final Design to be done in 2021 and Construction to begin Fall 2022

• Estimated Completion Date: August 2023

• Project Details: The goal of this project is to ensure the structural integrity and operational longevity of the City's 27" raw waterline in the Poudre Canyon. An existing, exposed section of the pipeline in the river near Gateway Natural Area will be replaced to eliminate the risk of failure which ensures the continued delivery and reliability of raw water from the Poudre River to the Water Treatment Facility. The design will develop a long-term solution which may require pipe alignment modifications, deeper burial depths of the pipeline, consolidation of both pipelines and/or localized river channel stabilization. Mitigating the existing situation provides an opportunity to modify the pipe alignment to provide increased integrity to the system.

### Belt Press Building Project (Solids Handling Facility)

- Funding Source: Water
- Estimated Project Budget: \$575,000
- Status: In Design
- Estimated Completion Date: June 2021

• Project Details: This project will develop a 50% set of design documents for the Water Treatment Facility's solids handling improvements project (known as the Belt Press Building Project). The improvements will reduce the liquid loading of the existing lagoons by mechanically separating the

solids from the sediment basin sludge stream by applying pressure with a belt filter press. This system will prevent violation of water quality and solid waste regulations. The project scope and resulting documents are intended to provide a level of design that can be used to develop and advance the Opinion of Probable Cost and be used in a future solicitation for a Construction Manager at Risk (CMAR) project delivery method. The City will pick up the design of the system at a future date and advance it to 100% with the selected contractor on the team.

#### **Certified Operators**

The Treatment Facility and Distribution System operators are certified by the Colorado Water and Wastewater Facility Operators Certification Board as certified water professionals. As of 2020, the Director of Plant Operations (operator in responsible charge, or ORC), Manager of Plant Operations and both Lead Plant Operators, had earned 'A' certification, the highest level Water Treatment Plant Operator of certification. which also carries the professional credential, "Certified Water Professional." Due to a high level of turnover in operations staff in recent years, only one of the Plant Operators currently holds 'A' certification. Of the other six operators, 4 have obtained 'B' level certification and two obtained 'C' level certification. All are progressing on schedule toward certification at the 'A' level. All staff in the operations oncall rotation are certified 'A' operators. Operation of the Water Treatment Facility requires supervision by a certified Water Treatment Plant Operator A, and all supervisory staff in the operations chain of command meet this qualification.

Operation of our pump stations and storage reservoirs requires supervision by a certified Water System Operator 3. The Director of Plant Operations (ORC) holds a level 4 distribution system Operator Certification, as does the Manager of Plant Operations. Several plant operators and other staff also are certified distribution system operators, varying from level 1 to level 4. Additionally, several non-operations personnel hold operator certifications. Other plant personnel are encouraged to pursue certification as plant operators, as well as other professional certifications that increase their skills. Three maintenance staff hold level D certifications, as does one of the Process Chemists. One staff member holds Professional Operator (PO) certification Certification Council through the for Environmental Professionals. Other certifications held by plant staff include:

- Professional Engineer
- Certified Control Systems Technician
- Certified Water Quality Analyst
- Hazardous Materials Technician
- Occupational Health and Safety
  Technician
- Journeyman Electrician
- DOT Certification

The Water Field Operations Manager (ORC) holds a level 4 Water System Operator certification. All crew chiefs are certified to at least level 2, many to level 4, and most crew members hold certification varying from level 1 to level 4. Operation of our distribution system requires supervision by a certified Water System Operator 4. This report was compiled by the Water Production Division in collaboration with:

- Water Quality Services Division
- Environmental Regulatory Affairs Division
- Water Field Operations Service Unit