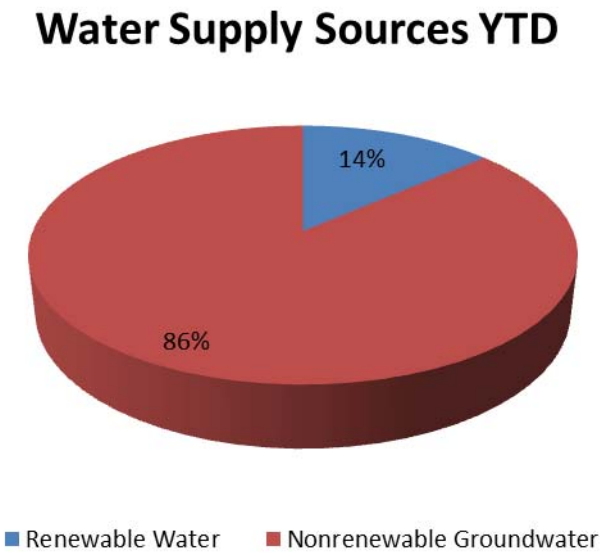
Castle Rock Water
Securing our future drop by drop

February 2016

2016 Water Demands

By: Sheri Scott, Water Resources Program Analyst

The maximum daily water demands are plotted by month from 2013 to the current month. As observed by the data, the maximum demand for the month of February was 4.3 million gallons per day (MGD) which was about 10% more than the 5-year average maximum daily demand. Summer time maximum demands inform us of the size of the infrastructure necessary to provide water service over short periods of time and help us to plan future water resources needs. An average of the winter month (November, December, January, and February) usages, reflect indoor or base demand. The water demand total for February was 109.5 million gallons (MG), which was about a 5% decrease from the January 2016 total of 115.5 MG, and a 2% decrease from the February 2015 demand of 111.6 MG. The maximum day demand in February, however, did exceed the maximum day demand in the previous three years.



The Town's nine alluvial wells produced a total of 13.8 MG of renewable water during February, which represents 11.6% of the total water supply for the month and 14% (31.7 MG or 97 acre-feet) of the

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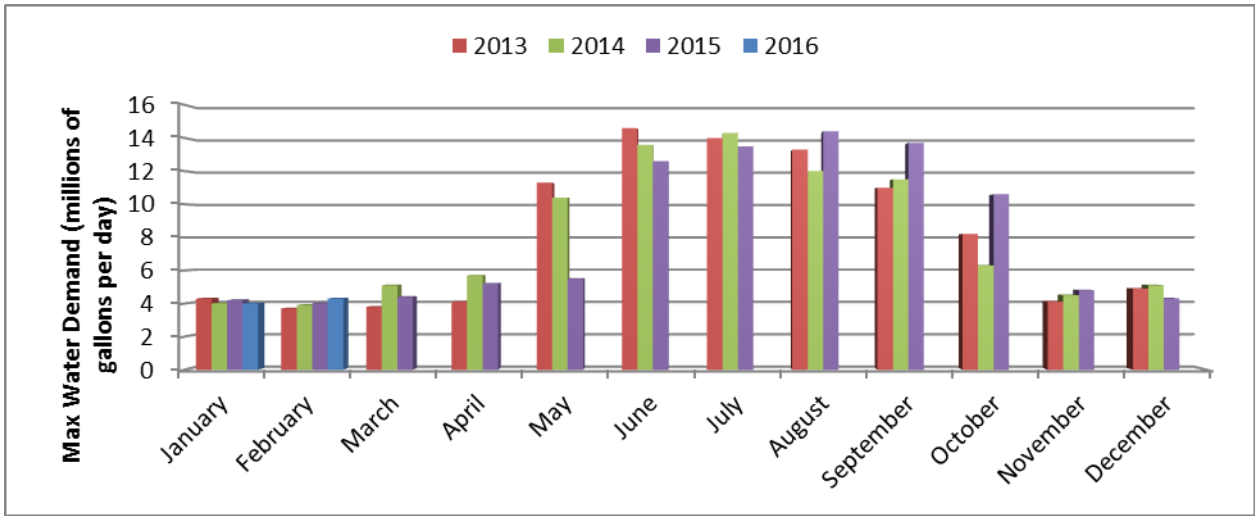
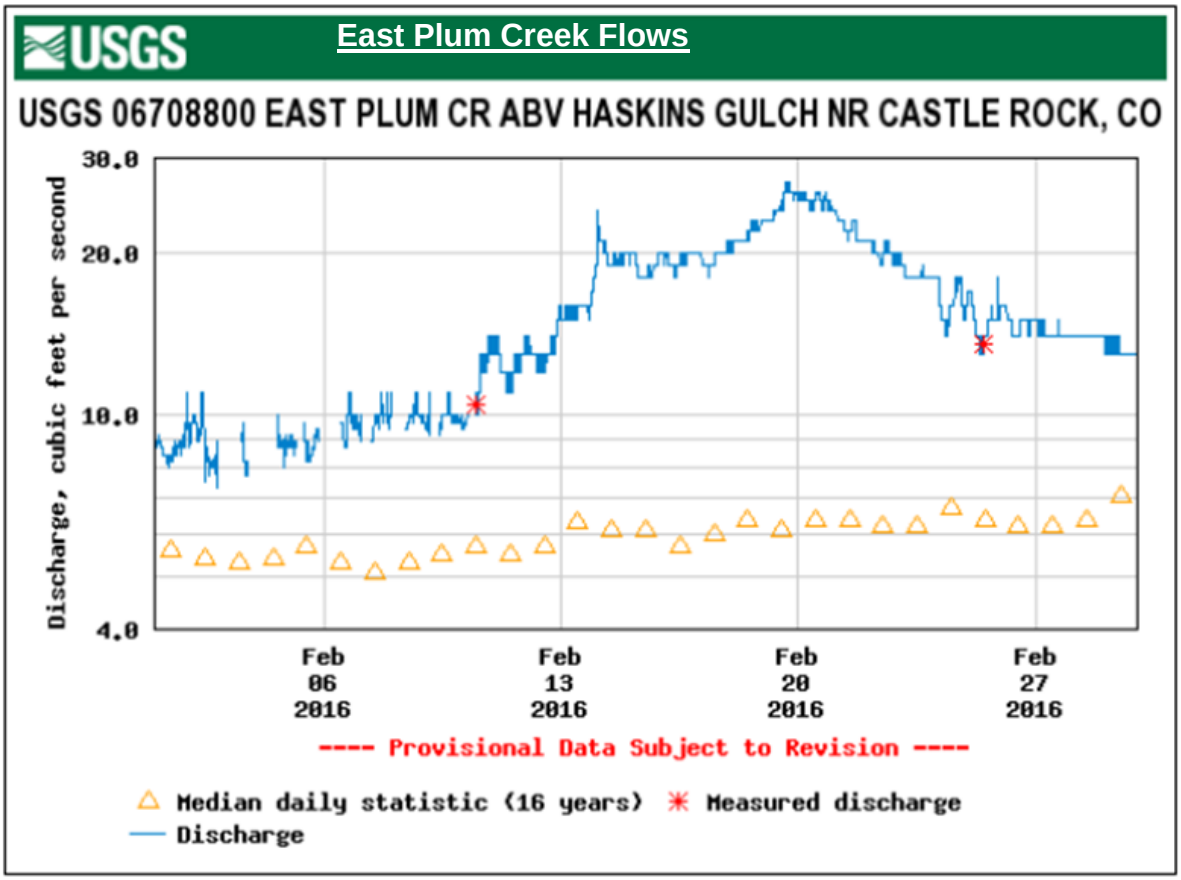


OUR VISION

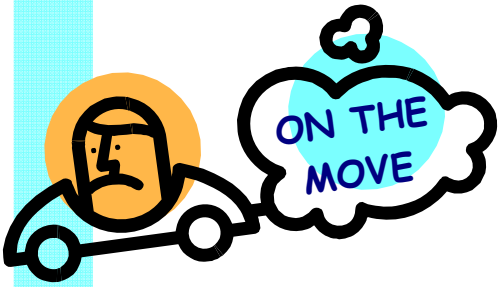
We will be a national leader among water utilities focused on customer satisfaction and delivering outstanding quality and value.

Water Demands, *continued*

water supply year to date. The renewable supplies used during February decreased from January because an alluvial well (12R) was offline while a piping leak was corrected, the Plum Creek Water Purification Facility (PCWPF) was shut-down for annual maintenance for 5 days, and two alluvial wells (78 & 80) were taken offline as part of the alluvial well rehabilitation program. As part of the alluvial well rehabilitation program, eight of the nine alluvial wells will be cleaned over the next couple months to increase renewable water production from these wells. The total renewable water produced since the opening of the PCWPF has surpassed 776 MG, which represents 11.4% of the Town's total water supply since the alluvial wells began pumping in May of 2013. Currently, the Town's renewable water rights surpass the capacity of the alluvial wells. The alluvial well project the Town is currently constructing will help close this gap.



The flow hydrograph represents stream flows in East Plum Creek taken from the stream gauge located at Haskins Gulch. The hydrograph shows that the East Plum Creek basin experienced stream flows between 8 to 27 cubic feet per second (cfs) during the month with increases mid-month from melting of the snow received the first week of February. Flows remained around 13 cfs towards the end of the month. During the month there were no calls on the main stem of the South Platte, therefore a Free River condition existed and no out-of-priority depletions needed to be made up. The river call may change at any time as a result of downstream water diversion calls. We are currently about 75% through the snow accumulation season in the West.



Congratulations on your recent promotion!

Eric Layton
Maintenance Technician II

Barbara Horton
Project Manager - CIP

Thomas Hecker
Sr. Maintenance Technician

Chris Damrow
SCADA Supervisor

Welcome to our Team!

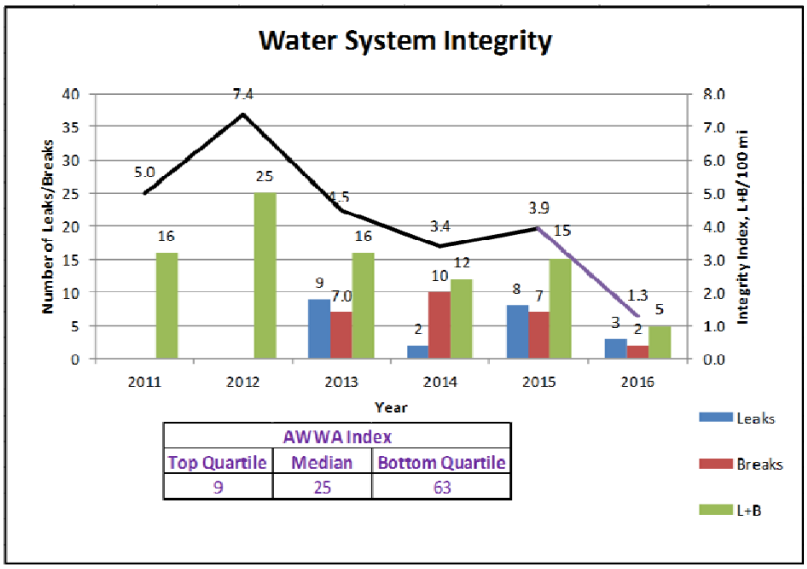
Brittaney Murphy
GIS Technician

Evan Bahn
Water Quality Technician

Water System Integrity

As the Water System Integrity chart indicates, our water line break occurrence rate has generally decreased over the last four years. We have been in the top quartile (top 25%) for water system integrity based on the American Water Works Association (AWWA) benchmarking since 2011.

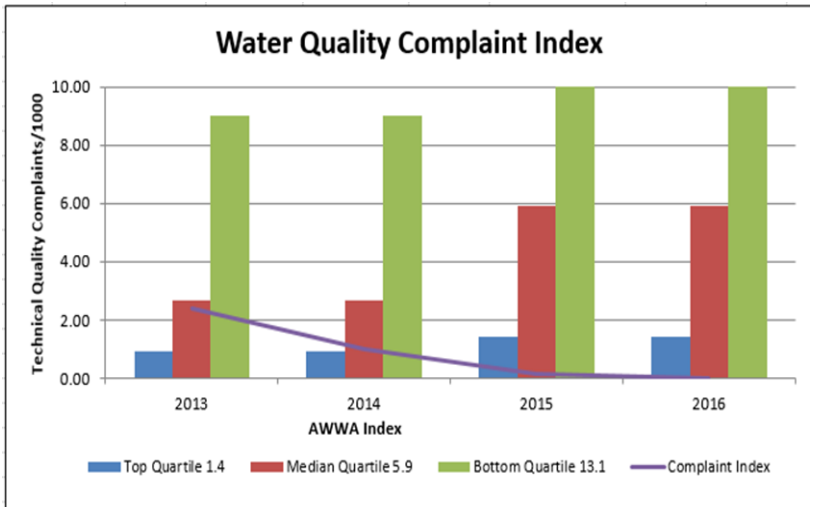
There were two incidents in February.



Water Quality Complaints

The Water Quality Index shows that we are doing very well in this category, rating in the Top Quartile (25%) in 2015 and staying in that top quartile so far in 2016, according to the AWWA. There were no water quality complaints in February.

For more information, view the current water quality report at CRgov.com/**waterquality**.

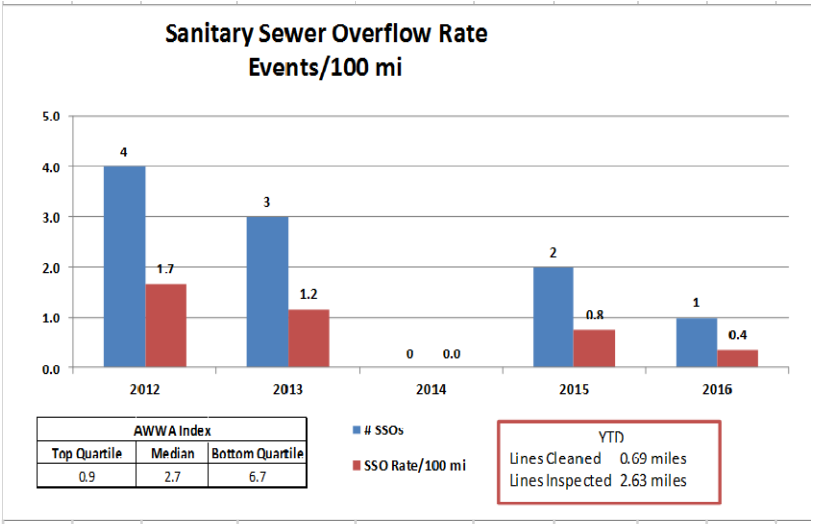


Sanitary Sewer Overflows

We are also tracking in the Top Quartile in the Sanitary Sewer Overflow Rate since 2014 according to the American Water Works Association. There were no overflow incidents in February.

How do we avoid overflows?

Our team runs a camera through the sewer mains to look for problems. When problems are identified they are cleared with a high pressure water jet.



February Levels of Service

Drinking Water Compliance

Castle Rock Water will deliver water that meets or exceeds both Primary Drinking Water Regulations and Secondary Maximum Contaminant Levels 100% of the time.

Sixty routine samples were completed. All samples were within the parameters set forth by the Safe Drinking Water Act and Colorado Drinking Water Standards. Due to continued population growth, effective March 2016, we will increase our testing to 70 samples per month for bacteriological analysis.

Pressure Adequacy

< 1% of our customers will experience less than 43 pounds per square inch (psi) of pressure at the meter during normal operations.

The first four days of February showed we were at or slightly below 43 psi in one area of town where two pressure reducing valves (PRV) were being overhauled. These valves are now complete.

Sewer System Effectiveness

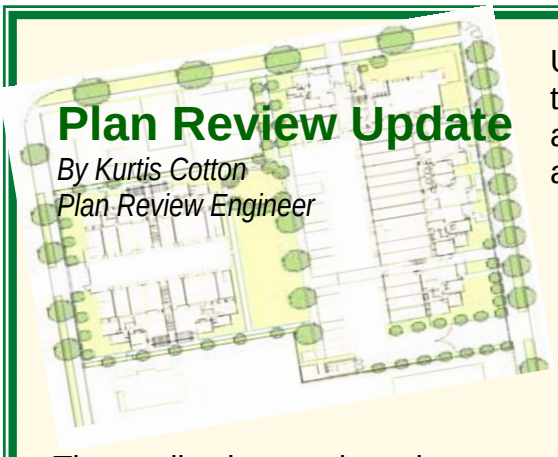
<1% of our customers will experience a sewer backup caused by the utility's sewer system per year.

There were no sanitary sewer issues in February.

Drinking Water Supply Outages

<5% of our customers will experience water outages for one or more event totaling more than 30 hours/year.

On Sunday, February 28, a 2-inch hole developed in a section of 8-inch ductile iron pipe, causing a significant sink hole. Ten homeowners experienced limited or no water pressure for three hours.



Plan Review Update

By Kurtis Cotton
Plan Review Engineer

Utilities reviewed 79 applications this month which compares to 73 during the same time period in 2015. The average assigned due date by Development Services was 1.4 weeks, and Utilities completed the reviews in 1.2 weeks, which included:

- 6 Agreements
- 1 Annexation
- 2 County Referrals
- 3 Use by Special Review
- 5 Plats
- 3 Preliminary Project Applications
- 16 Construction Drawings
- 11 Site Development Plans
- 6 Technical Criteria Variances
- 14 Field Change Orders
- 10 Grading, Erosion and Sediment Control (GESC) Plans
- 4 Grading, Erosion and Sediment Control (GESC) Permits

The applications reviewed consisted of:

- 36 1st Submittals
- 21 2nd Submittals
- 22 Special reviews

In addition to completing the above listed applications as scheduled, Utilities completed 106 single family utility reviews and associated system development fees.

Plum Creek Water Purification Facility (PCWPF) Annual Cleaning and Maintenance

As part of our routine maintenance program, the PCWPF was taken out of service for four days allowing Plant Operations and Maintenance staff to perform a number of preventative maintenance activities and a full cleaning of the process equipment.

Pumping down the membrane feed well

Tim Lambert, cleaning the sedimentation basin

Sedimentation basin after cleaning

Draining the flocculator basin

Removing sediment from the recycle basin

2015 - A Look Back

The following pages provide you with highlights of Castle Rock Water's progress in 2015.

Awards

We received a number of significant awards in 2015. Just to recap:

Environmental Leadership Program Silver Award

Colorado Department of Public Health and Environment; voluntarily going beyond compliance with State and Federal regulations, increasing sustainability and commitment to continual environmental improvement.

Excellence in Operations Management - Cartegraph

National customer recognition for implementation and cost savings parameters using asset software in the operation and maintenance of our infrastructure.

Best Tasting Water in the Region

First place for best taste, odor and appearance among other regional water providers. Presented by the Rocky Mountain Section (Colorado, New Mexico, Wyoming) of the American Water Works Association.

State Water Plan

Castle Rock Water was recognized in the State Water Plan for our statewide leadership in water conservation. We want to thank our customers for their commitment to making us a leader in this area.

Community Events

Spring Up the Creek!

Year	Volunteers	Bags Collected
2010	223	212
2011	163	200
2012	142	78
2013	226	214
2014	172	352
2015	173	182

Save the date!!

Spring up the Creek is May 7, 2016!

Another popular community event is the Household Chemical Round-up. In 2015, 856 vehicles dropped off a variety of household chemicals, including aerosol cans, flammable materials, paint products, motor oil, tires, fluorescent light bulbs and pesticides. In all, over 126,000 pounds of waste was collected which is comparable to the amount collected in 2014. These are materials that will not end up in our creeks, aka our water supplies.

Household Chemical Round-up

Business Solutions

2015 was a busy year for our entire Business Solutions Team (includes meter services, customer billing, customer outreach and financial staff).

Meter Services Statistics

0.57%	Average of skipped reads per month *(lower than national average shows great work maintaining our meters)*
803	Meter sets *(shows continued system growth)*
1,362	Meter set inspections *(shows continued system growth)*
3,002	Final reads for transfer of service *(people moving in and out of our area need attention)*
8,270	Service work orders *(maintenance, maintenance, maintenance)*
225,997	Meters read *(that's a lot of meters)*
755	Disconnections / Reconnections *(working to minimize need for this)*
506	Large meters audited *(finding non-revenue water which helps all our customers by keeping rates as low as possible)*
686	Meadows retrofits

Customer Billing Statistics

223,719	Accounts billed
11,413	Disconnection letters mailed
5,290	Customer walk-ins
21,743	Customer calls
4,512	Property transfers
1,169	Customer email correspondence
$31 million	Billed revenue

This picture depicts the new equipment being used for meter reading. The equipment on the left is a vehicle gateway base (VGB) station and is mounted in the trucks and used to collect monthly meter reads. The small white box on the right is mounted on the side of the house and sends radio signals to the VGB.

Other major accomplishments includes:

- Preparation and development of an updated Financial Management Plan
- Water and Sewer Revenue Bond Refunding
- Advanced Metering Infrastructure Study and public / private partnership
- Review and update of special charges
- Automatic meter reading retrofit project

The goal of these projects is to manage rates and fees to be as low as possible for our customers.

Certifications

The water, wastewater and stormwater utility business is highly technical and regulated. As such, Castle Rock Water has to maintain an extensive staff of professionally licensed individuals. Most of these licenses require specialized education and the passing of state testing, as well as proof of continuing education. Below is a list of certifications held by the staff at Castle Rock Water.

Commercial Driver's License	23
Wastewater Collection (Class 1-4)	20
Class I Plant Maintenance Technologist	3
Water Distribution (Class 1-4)	20
Class A Industrial Wastewater (National)	1
Class C Industrial Wastewater	2
Water License (Class A-D)	13
Wastewater License (Class A-D)	5
PACP - Pipeline Assessment	6
Backflow Prevention Assembly Tester	5
40-hour HAZWOPER (specialized safety training)	14
Flagger Training Certification	10
CDOT Erosion Control	3
Plant Maintenance Technologist	1
Excavation Safety Training for Competent Persons	9
National Assn. of Sewer Service Companies; Manhole, Pipeline & Lateral Assessment Certification; and Inspector Training; and Cured-in-Place Pipe	1
Professional Engineer (Colorado)	13
Professional Engineer (Texas, Georgia, Nebraska, Wyoming, Oklahoma, South Dakota)	6
Project Management Bootcamp	5
American Water Works Association Supervisory Certificate	7

Safety

Castle Rock Water continued its focus on safety this year. All required safety training, including CIRSA and FEMA training was completed ahead of schedule.

As part of the ongoing efforts to work safely every day, our safety team hosted a safety fair. Each division focused their display on safety issues they keep in mind when out in the field or in offices. The demonstrations included flooding, recognizing aggressive dog behavior, use of safety equipment, onsite cameras, etc.

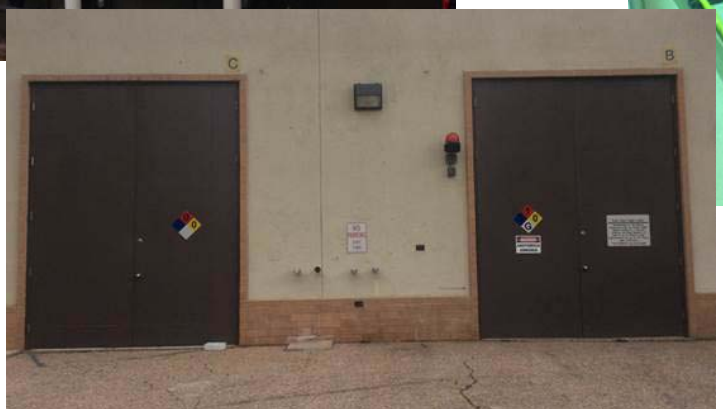
Field Services

Maintaining our 600+ miles of underground pipe for distribution and collection takes a great deal of effort. In 2015, the team accomplished:

	2015
Distribution	
Leaks Repaired	14
Hydrants Repaired	70
Valves Inspected	5,916
Hydrants Inspected	2,475
Tanks Inspected	6
Collections	
Miles of Line Cleaned	19.62
Miles of Line Inspected (CCTV)	31.67
Stormwater	
Infrastructure Inspections	829
Cubic Yards of Material Removed	6,708
Cubic Yards of Material Placed	372
Locating	
Utility Locating Requests	15,847

In-house Chemical Room Improvements

Plant Mechanics performed chemical room improvements at Ray Waterman and Meadows water treatment plants. They painted the repaired walls and doors, and repaired and improved process piping to make the facilities look good as new.



Mitchell Creek Mixer Wetwell Mixer Installation

Plant mechanics, working with collections staff, installed a new mixer to prevent grease balls from building up inside the wet well. At the Mitchell Creek lift station. The pictures below shows the compressor and wet well diffusers.

Water Plant Tours

Tours of the Plum Creek Water Purification Facility continue to be a huge success. Over 300 school children, scout groups and their parents toured the facility in 2015. In addition to touring the plant, they learn about where our water comes from, the importance of water conservation, and the impact of stormwater on water quality.

To arrange a tour, visit CRgov.com/watertours.

Waterman Center Filter Media and Underdrain Replacement

Project Manager: Walt Schwarz, P.E.

The filter underdrains installed during construction of the Ray Waterman Regional Water Treatment Center (RWRWTC) in 2005 were a plastic material with slotted openings on top. During normal operations filtered water collects in the underdrain, is then conveyed through piping to the clearwell, and is ultimately pumped into the water distribution system.

Installed directly onto the plastic underdrain assemblies were seven layers of varying sizes of graded gravel. The gravel base layers were to support the overlaying filter media (greensand and anthracite) and prevent smaller filter media from passing through the slots of the plastic underdrain. In years 2010 & 2013 the Operations Team (with significant effort) cleaned a total of about 21,500 pounds of filter media out of the clearwell. The media and underdrain systems were not functioning in an optimum manner.

Utilities contracted with AWI-Anthratec to remove the existing media and all the plastic underdrain systems, then install new stainless steel underdrains for all eight filter beds. The steel underdrains are fabricated with laser cut slits that allow filtered water to flow through but will retain all media (no gravel base layer needed). Construction started in November 2015 and will be complete by May 2016. The AWI contract was for $553,000.

Showing three stages – vacuum media out, demo underdrain & remove, and prepare base, filter gullet and air scour piping for new underdrains.

Castle North Valve Repair Project, Phase 3

Project Manager: Matt Hayes, P.E.

The Castle North Valve Repair Project was initiated in 2013 to repair valve components that were failing due to corrosion, reducing operational readiness and with the potential to cause significant property damage. The water main valves in the Castle North Area had shown a high rate of failure upon operation. In 2013, the first phase of the Castle North Valve Project repaired 29 critical main line valves in the neighborhood. Another 36 main line system valves in the area were repaired during Phase 2 in 2014. The previous repair projects proved to be timely - a water main break on Oakwood Drive in early 2015 was more easily managed due to the repairs completed over the previous two summers. Phase 3 of the valve repair project involved the repair of the remaining fire hydrant guard valves in the area and the replacement of six valves that had failed recently due to their age. The total cost for this Phase 3 of the project was $172,000. The total cost for all three phases was $392,000. All work was completed within budget and on schedule.

Cutting valve out to install new valve

Meadows Water Treatment Plant Roof Replacement

Project Managers: Jeanne Stevens, P.E. and Thomas Vogt, Preventative Maintenance Technician

Meadows Water Treatment Plant (MWTP), placed into service in 1987, is one of the Town's older treatment facilities. The facility, expanded in 2003, has a treatment capacity of approximately 8.0 million gallons per day (MGD). The roof over the original building had skylights that were leaking. Staff contracted with Douglas Colony Roofing to remove the skylights, an unused roof access hatch, replace roofing membrane, and install sufficient new ballast to meet current building roof requirements. This important project was completed for $47,263.

Pictures showing the many skylights in the filter bay at Meadows WTP before the new roof – most were leaking

Founders Water Treatment Plant Improvements Project

Project Managers: Josh Hansen, P.E., Walt Schwarz, P.E., and David Montgomery, Treatment Services Superintendent

The Founders Water Treatment Plant was built in the mid-1980's and was in need of some repairs and rehabilitation. Engineering and Operations staff worked on various improvement projects. Door hardware was replaced on doors that were no longer closing well. Painting was done to freshen up the walls. Old, inoperable basin hatches were replaced. Staff contracted with Coblaco Services to line the equalization basin - the basin leaked and the leaks damaged the exterior stucco of the building. Staff also contracted with Stonhard Services to recoat the chemical room floor that was stained and pitted from years of normal operations. The equalization basin lining, chemical room floor coating and new hatch were completed in 2015 for $46,985.

Before and after photos of the hatch and freshly painted walls

The Founders Water Treatment Plant was constructed in about 1987. This plant was designed to treat Denver Basin groundwater and has a capacity of 3.45 million gallons a day. It is a critical part of the Town's water system. Roof replacement was completed in 2015 on budget for $12,962.

Before and after photos of the new roof at Founders Water Treatment Plant

Plum Creek Water Purification Facility Process Improvements

Plum Creek Water Purification Facility (PCWPF) uses aqueous ammonia to generate chloramines as part of the disinfection process. Engineering and Operations collaborated on several improvements to the safety systems related to the ammonia system and overall process control.

Stainless Steel Piping and Automatic Tank Isolation Valves *Project Manager: Walt Schwarz, P.E.*

Operations and Supervisory Control and Data Acquisition (SCADA) staff installed stainless steel piping and automatic isolation valves, that shut the chemical feed off in the event of an ammonia leak on the 10,000 gallon ammonia storage tanks. Stainless steel piping provides stronger piping to contain the aqueous ammonia. The automatic isolation valves are tied to the permanently mounted gas detectors that monitor the atmosphere for an ammonia leak. Two new gas detectors were installed in the hallway outside the chemical storage room and in the main bay above the ammonia injection point. This provides plant operators improved warning of an ammonia gas leak. SCADA personnel installed the new gas detectors.

Ammonia Gas Detector Improvements

Project Manager: Casey Devol, Plant Mechanic I

Additional ammonia gas detectors were installed to improve monitoring and alarming of gas leaks. The existing ammonia gas detectors were installed in the ammonia bulk chemical storage room. This work was done at a cost of $17,336.

Turbidity Analyzers, ORP and pH Sensors

Project Manager: Monty Anderson, Plant Mechanic II

New Hach turbidity analyzers used for state water quality reporting provide the treatment operators with more precise nephelometric turbidity unit (NTU)[1] resolution for improved process control. A new Hach ORP sensor, four pH sensors and the interface modules used to connect the sensors to SCADA were also installed for improved process control. This work was completed at a cost of $21,809.

Interface Module and pH Probe

[1] nephelometric turbidity unit - measure of water clarity

Capital Improvement Projects for Water Resources

Aquifer Storage and Recovery Pilot Project

Project Manager: Josh Hansen, P.E. and Heather Justus, P.G.

Contractor making the connection between the potable water line and the raw water line back to the injection wells. The potable water is protected from cross-contamination by the blue backflow preventer shown in the photo.

Aquifer Storage and Recovery (ASR) is the process where treated renewable water is injected via wells into subsurface aquifers, and stored to be recovered in the future through well pumping. A well field in The Meadows development was selected for the pilot testing of this technology. Inspection of the wells demonstrated that a thorough cleaning and rehabilitation was needed, which was completed in May of 2014. That phase was followed by the equipping phase, completed over the summer of 2014, which involved the installation of special flow control valve (FCV) systems that allow operators to either inject potable water down into the aquifers or pump water from the wells to meet water system demands. Concurrent with the fieldwork, staff worked with the Federal and State regulators on the permitting process. Final permits were received in December 2014.

The construction project was awarded to 53 Corporation to connect buried raw well water piping to the treated potable water distribution piping, and to install a backflow preventer to protect the potable water system from any untreated water. Construction began in January of 2015 and took about a month to complete. Once completed, staff implemented pilot testing of the ASR process in both wells. The pilot testing involved conducting repeated cycles of injection / storage / and recovery in the aquifer over increasing time periods to measure effects on the aquifer water level and water quality.

WISE Project

Project Manager: Matt Benak, P.E.

The Water Infrastructure Supply Efficiency (WISE) Project continues to move forward with the goal to be delivering renewable water to our customers by 2017. Western Summit Contractors, Inc. (WSCI) has been on schedule with the modifications to the WISE core infrastructure since they were given the notice to proceed in May of 2015. The contract award was $13,558,676, with one change order of $188,000, to date. As of January 2016, they are approximately 45% complete with the work with substantial completion scheduled for November of 2016. Key progress includes erection of the two million gallon WISE storage tank located at E-470 and Smoky Hill Road, along with initial civil work for the Quebec Street Water Treatment Plant. Additionally, the connection sites were submitted to the City of Aurora for review.

The Parker Water and Sanitation District (PWSD) has made great progress with CH2M Hills' design of the Ridgegate Line, which will connect to the Western Pipeline. This project was issued for construction bids in January of 2016. PWSD has also begun preparing three separate intergovernmental agreements (IGAs) for cost participation and capacity sharing of the Ridgegate Line, other infrastructure (including the Canyons Pipeline), and a 'wheeling' agreement, which will define how PWSD will charge the Town to transport water through their system.

The Town has been working with Burns and McDonnell on the design of the WISE local infrastructure, which includes a 5.2 mile, 36-inch pipeline that will connect to infrastructure owned by PWSD. This pipeline will terminate at the Ray Waterman Water Treatment Facility, which will give the Town the ability to pump directly to distribution, boost chloramines if necessary, or re-route to the head of the plant if additional treatment is needed. The project will be issued for construction bids in the Summer of 2016.

Chatfield Reallocation Project

Project Manager: Matt Benak, P.E.

2015 was a milestone year for the Chatfield Reallocation Project. More than twenty years of effort by various regional water entities has culminated in the official formation of the Chatfield Reallocation Project and the Chatfield Reallocation Management Corporation (CRMC). Overall, this project reallocates 20,600 acre-feet (AF) of storage space in the reservoir for use by participants to store water for their needs without any expansion of the dam.

The Town owns 287 AF of storage space now, and will be adding storage capacity each year per an option purchase agreement made with the Colorado Water Conservation Board in 2015. Ultimately, the Town's goal is to own between 1,500 and 2,000 AF of storage space in the reservoir. This project gives the Town another place to store wet water that can be used to exchange back up with East Plum Creek for treatment when we need it, or to lease to other entities. There may even be a point down the road when infrastructure is available to pump water out of Chatfield and return it to the Town for treatment.

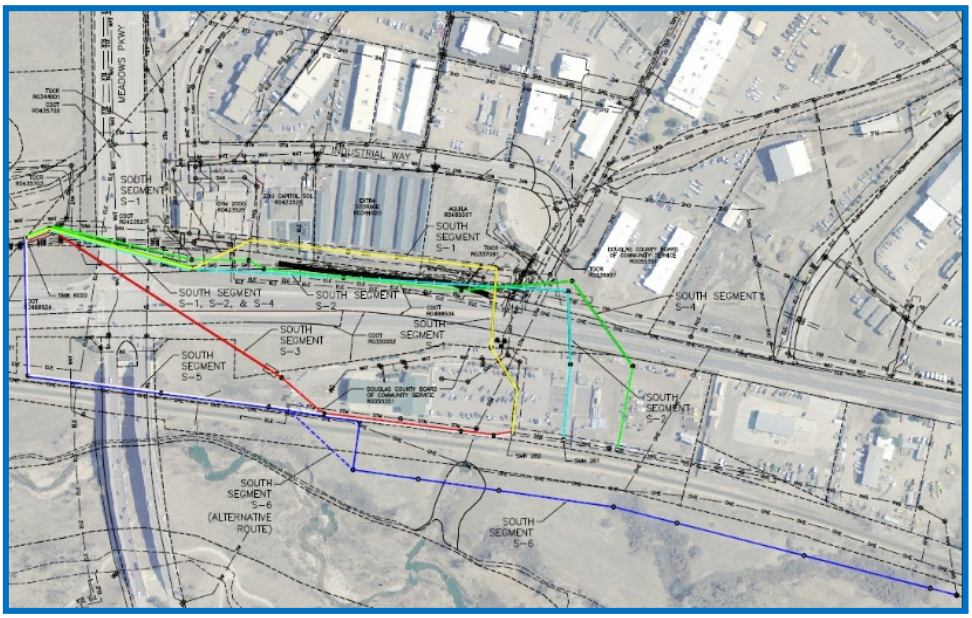
The CRMC has hired CDM Smith as Program Manager for the project mitigation and construction efforts. CDM Smith has parsed the project into multiple projects and they will be competitively bidding those projects to qualified consulting firms and contractors during 2016. The total reallocation project cost is currently estimated at $134 million and water storage into the reservoir is slated to begin in 2017.

Capital Improvement Projects for Wastewater

Plum Creek Sewer Interceptor Project Design

Project Manager: Josh Hansen, P.E.

The existing Plum Creek Sewer Interceptor was constructed in 1987. Since that time, several segments of the interceptor have been upsized due to growth related development along or adjacent to the interceptor. Staff had identified roughly another 4,000 feet of sewer interceptor in need of upsizing to handle current and projected future flows. Dewberry Engineers was selected to complete the design of this segment in 2015. The existing interceptor runs along Highway 85 through several existing commercial properties, as well as planned commercial developments. The corridor is congested with many existing utilities and the existing pipeline is extremely deep in some locations. Because of these difficulties, six different potential alignments were developed and evaluated. Staff selected an alignment (shown in blue below) that will function in parallel with the existing interceptor and will run adjacent to Plum Creek and the Union Pacific Railroad. The option allows sewer pipeline depths to remain relatively shallow in most locations, will help minimize disruption to existing businesses and utilities, and is also estimated to have the lowest construction cost per foot of the six alignments. Total construction costs could exceed two million dollars. Dewberry will complete final design for the project in 2016 and construction is anticipated to begin in the fall of 2016.



Interceptor Alignment Alternatives

Castlewood Lift Station #2 Fence Project

Project Manager: Wade Reeves, Sr. Utilities Construction Inspector

Three rail commercial fencing was installed for approximately 400 feet on both sides of the access road to Castlewood Lift Station #2 to prevent encroachment to this critical wastewater collection facility and protect the public.

Meadows 5 Lift Station Control Cabinet Upgrade

Project Manager: Matt Hayes, P.E.

The Meadows 5 Lift Station is approximately 27 years old but is a key part of our sewer collection system. The original panel was modified and upgraded a number of times over the years; however, most of the electrical equipment in the cabinet had reached the end of its useful life, was archaic and had limited communications with the Town's Supervisory Control and Data Acquisition (SCADA) network. The Town selected Velocity Plant Services for the replacement of the panel. The lift station had to remain operating during the panel replacement as the sewer system for our customers in this area cannot be shut down, even temporarily. The project team developed a plan to keep the lift station pumps operating with temporary power during the new panel installation. The panel installation took five days to complete. The total cost for this project was $43,000.

New Control Panel

Mitchell Creek Lift Station Mixers

Project Manager: Matt Hayes, P.E.

The Mitchell Creek Lift Station is located in the Founders Village subdivision and is responsible for pumping the wastewater generated in the Founders Village and Castlewood Ranch subdivisions into the gravity sanitary collection system. This facility has had an ongoing issue with fats, oil and grease (FOG) (for more information on FOG and keeping it out of the collection system, visit http://www.crgov.com/faq.aspx?qid=280) and solids accumulation within the wetwell. The solids material is able to separate from solution and float to the surface between pumping cycles, where it conglomerates into a solids sludge mat. Once this material separates from solution and forms a mat, it cannot be pumped out of the wetwell. This material has to be manually broken up, worked back into solution, and the wetwell continually pumped down in manual mode until the blanket is gone. This requires a crew of three, a fire hose, and a vacuum truck for approximately four hours each time. With labor and equipment, the cost for each cleaning is approximately $1,000. The estimated annual cost to remove this material is approximately $24,000. Installing a mixing system eliminated this labor-intensive process and will pay for itself in less than two years. The total cost for this project including labor, equipment and materials was $48,365.

Before start-up

1 hour after start-up

24 hours after start-up

Capital Improvement Projects for Stormwater

2015 Flood Recovery Efforts

The flood season, which generally runs between April and October, started strong in 2015. Gage data recorded between three and five inches of rain over a three -day period in early June, following above average moisture conditions in the spring. This resulted in flood damage along East Plum Creek, its tributaries and some reports within residential areas. The Stormwater Division responded to several issues to address flood damage to public utilities and trails. The estimated cost for Utilities to respond to this series of storms is $1.625 million. Several emergency repair projects were completed, and other activities are scheduled for completion in early 2016. A brief summary of a few key areas is provided below:

Industrial Tributary Sanitary Sewer Protection at Topeka Way -
A sanitary sewer manhole was exposed along the north bank of Industrial Tributary. The utility was backfilled and protected using rock riprap. A channel realignment project is scheduled for 2016. The estimated cost of this future work is $300,000.

Hangman's Gulch Trail Protection – Flooding caused the stream to shift laterally, undermining the adjacent trail in two locations and sand deposits caused trail interruptions. Approximately 2,400 cubic yards of sediment were removed from the trail corridor and channel banks were armored with rock riprap to prevent future undermining of the trail. A channel stabilization project is scheduled for 2016. The estimated cost of this future work is $655,000.

Omni Tributary Bank Stabilization at Epiphany Lutheran Church – 2015 flooding exacerbated natural unstable banks of Omni Tributary and the channel located on Town property has shifted laterally, threatening private property. Bank stabilization work is scheduled for 2016 to protect private property. The estimated cost of this repair is $25,000.

East Plum Creek Stabilization at Meadows Parkway

Project Team: Barbara Horton, David Van Dellen, Jeanne Stevens, and Barbara Spagnuolo

In 2015, high flows along East Plum Creek (EPC) caused the failure of a sheet pile cutoff wall protecting a 16" waterline. Town crews mobilized quickly to place large sand bags between the sheet pile and eroded bank to redirect flow back over the top of the sheet pile in an effort to maintain stream bed cover over the water main. A new sheet pile cutoff wall spanning the entire width of the 100-year floodplain is scheduled for construction in 2016. The estimated cost of this work is $550,000.

East Plum Creek Emergency Water Line Repair

Project Manager: Barbara Horton, P.E.

In May 2015, the Town became aware of an exposed potable waterline crossing East Plum Creek (EPC) at the Town's South Well Field, near the end of South Perry Street. The water line was originally constructed in the late 1980's with adequate cover and concrete encasement around the section of water line located under the EPC low flow channel alignment at the time. Over the past 20-30 years, the low flow channel has migrated further east. Higher than normal flows within EPC due to storm events resulted in bank erosion, and exposure of the shallower, un-encased section of water line.

The emergency repairs included removal and replacement of approximately 140 LF of water line in order to lower the line below the current streambed elevation. Additional concrete encasement was also constructed to provide protection for the replaced section of water line. Once the water line improvements were completed, the eastern bank was re-graded and riprap protection was placed along the bend to prevent future erosion.

Several members of the Utilities staff worked together to ensure concerns with the exposed line were addressed on an accelerated schedule, and that no customers were impacted. For projects along EPC, Utilities also relies on our Parks Natural Resource Specialist to provide guidance for compliance with Habitat Conservation Plan requirements. Leonard Rice Engineers was consulted with to provide design support and environmental permitting services. 53 Corporation was awarded the contract to construct these improvements, which were completed in August of 2015.

The total construction cost for the Emergency Repair Project was approximately $139,000. Because this was an unanticipated and unbudgeted project, the Water Catastrophic Failure Reserve fund was utilized to cover engineering and construction costs.

Heckendorf Regional Detention Pond Temporary Repairs

Project Team: Barbara Horton, David Van Dellen, Wade Reeves, and Brian Laschanzky

In July of 2014, the Town became aware of a failure at the grouted rundown of the regional detention pond in Heckendorf Ranch, Filing 1 off of Crystal Valley Parkway. Subsequent storm events caused a complete failure of the rundown, leading to the unraveling of approximately 70 feet of dual 42-inch reinforced concrete pipe (RCP) storm sewer outfalling to the rundown. Although design efforts were underway in May, there was an urgent need to perform temporary repair work to help protect the gravel access road adjacent to the failure. 53 Corporation completed this work in two days using only the existing material. They reinstalled one stick of pipe on each line, created a new riprap rundown into the pond, and graded the vertical banks back to a much safer slope. This temporary work was completed prior to the June storms, and proved to be adequate to handle the stormwater flows during the summer of 2015 and prevent additional failure of the system. Permanent improvements are currently under construction and are anticipated to be completed by April, 2016.

Tributary B Sediment Removal

Project Team: David Van Dellen, Barbara Horton, Jon Stapp, John Grahn, Eric Layton, and Casey Stevenson

Tributary B is located near the new North Meadows Extension Project (Castle Rock Pkwy) and the Promenade Development area. Delays in development activity in the upper watershed resulted in only partial infrastructure installation since the late 1990's. This resulted in significant sediment loading to the main piping system and downstream channel reaches. A major effort in 2015 was coordinated between the North Meadows Project, Promenade and Stormwater Field Services to remove sediment from the pipe, channel and detention pond in time for the infrastructure to be completed. The Stormwater Field Services Crew developed an innovative approach to flushing the large 84-inch diameter storm pipe that is over 900 feet in length. This included the rental of a large water pump and recirculation of water to flush material out of the pipe. Through this effort, over 2,500 cubic yards of sediment were removed. Infrastructure is scheduled to be completed on the upper sections of Tributary B in 2016 to minimize sediment deposition in the future. This effort came in slightly under the planned estimate in the amount of $114,000.

Capital Improvement Projects for Special Projects

Operations & Maintenance Building Construction

Project Managers: Tim Friday, P.E. and Josh Hansen, P.E.

Construction of the new Operations & Maintenance (O&M) building began in April 2015. Town Council approved the construction contract with Taylor Kohrs, LLC in the amount of $4,416,330. The O&M building is an important project for Utilities, as it provides much needed space for staff, shop areas for maintenance activities and meter testing, as well as a more secure and advanced space for our Supervisory Control and Data Acquisition Systems (SCADA). The contractor installed service utility lines including sanitary sewer, storm sewer, domestic water, fire line, the fire department connection, electric, gas, telephone, and fiber optic. Utilities Operations coordinated with Public Works to stockpile asphalt millings at the project site. These were utilized for temporary paving of the areas surrounding the building. Millings were generated from the Town's annual pavement improvement program and utilization of the recycled millings helped reduce the overall project cost by more than $40,000.

The O&M Building construction was substantially completed in December of 2015, on-time and within the approved budget. This allowed the department to obtain a temporary certificate of occupancy (C.O.) and use the facility for several events. Appliances and furniture were installed in the beginning of 2016. The contractor was onsite early in 2016 to complete final items. Additional work in early 2016 included installation of security cameras and card reader door access, along with various IT and audio/visual equipment. Utilities staff moved into the building in February of 2016. Landscaping is planned for the spring of 2016, following the winter thaw.

The Finished Project - February, 2016