City of Santa Fe Water

2019 Annual Report

City of Santa Fe
Alan Webber, Mayor
Jarel Lapan Hill, City Manager

City Councilors
Signe Lindell, Mayor Pro Tem, District 1
Renee Villareal, District 1
Carol Romero-Wirth, District 2
Michael Garcia, District 2
Chris Rivera, District 3
Roman "Tiger" Abeyta, District 3
JoAnne Vigil Coppler, District 4
Jamie Cassutt-Sanchez, District 4

Contributing Departments
ITT Department
Land Use
Utility Billing & Customer Service Division
Water Resources & Conservation
Wastewater

Compiled, Written & Edited
Santa Fe Water Staff

Cover Photo
June 20, 2019 – The spillway at McClure reservoir during a rare overflow event. (R. Jorgensen)

Contents

Executive Summary

Each year City of Santa Fe Water (CSFW) submits a report summarizing operational information from the previous year including water supply, water demand, system efficiency, non-potable water deliveries, capital projects, and water quality.

2018 was a very dry year in Santa Fe, but – beginning with a 100+ year storm and flooding event on July 23, 2018 – late 2018 and early 2019 were above average for precipitation. In 2019, a weather station in the upper watershed between the two reservoirs measured 17.41 inches of precipitation, almost 3.5" more than the average. The relatively high precipitation, and a late and cold spring, filled local reservoirs and reduced total water demand in the Santa Fe Water system.

Gallons per Capita per Day (gpcd) is a metric used to quantify water efficiency for water systems – water use per person per day. In 2019 Santa Fe's average gpcd was 87, the lowest gpcd calculated for this system so far. The credit for this is due to Santa Fe's culture of water conservation and the longstanding practice of Santa Feans to use only as much water as they need.

CSFW supplied 8,268 acre-feet (af) of potable water to utility customers in 2019, 5,040 af of which came from the Santa Fe River and was treated at the Canyon Road Water Treatment Plant (CRWTP). The high production of the CRWTP was the first time in many years that the City was able to produce the full water right from the Santa Fe River. With CRWTP production high and demand low, the Buckman Direct Diversion (BDD) delivered only 2,700 af and the City was almost entirely supplied with renewable surface water (93%) in 2019.

The CRWTP treats Santa Fe River water which collects in two reservoirs: Nichols dam from 1943 and McClure dam from 1926. Both dams have been the focus of numerous capital projects in recent years and CSFW has been working closely with the New Mexico Office of the State Engineer (OSE) Dam Safety Bureau on improvements. Unfortunately, the 2019 annual inspection of the dams resulted in a downgrade of both structures from a Satisfactory rating to a Poor rating. CSFW has major renovations to the dams slated for 2021 (Nichols) and 2023 (McClure) and expects to once again receive at least Satisfactory ratings at both dams once this work is complete.

As part of the management of the Santa Fe River, active vegetation management and prescribed burning is conducted annually. In April of 2019, prescribed burning was conducted on 442 acres. In September a prescribed burn was planned for 350 acres but was not conducted as a result of a court decision related to the Spotted Owl habitat.

CSFW also measures and reports on water quality with sampling and reporting schedules that address many potential contaminants. In 2019, CSFW had no exceedances of measured contaminants.

In addition to providing most of the drinking water utilized by CSFW in 2019, the Santa Fe River also met acequia deliveries and living river goals. Both acequia releases and living river releases are managed on an irrigation year which begins in April. In 2019, high flows in the Santa Fe River led to significant released water from Nichols – more than enough to meet the 1,000 af goal for the living river and the demands of the acequias.

Treated effluent water, released from the Paseo Real Water Reclamation Facility (PRWRF), is also used to meet some irrigation demands within the City and thus reduce the overall use of potable water. In

2019, an upset of the clarification process at the PRWRF resulted in treated water that did not meet standards for reuse and potable water had to be used to replace treated effluent during two periods over the summer of 2019.

Updated balances for the Waterbank, a mechanism the City uses to ensure that adequate water is available to meet the needs of new building stock as it is constructed, reflect the increase in construction in recent years.

CSFW's Engineering Section continues to upgrade and improve the water treatment and distribution system through capital projects. In 2019, notable projects included Nichols and McClure Electric and Security Improvements, the replacement of the 24" line delivering water from Nichols Reservoir to CRWTP, and the development of an Asset Management Plan.

CSFW is prioritizing public input and planning processes designed to facilitate the collection of insightful, representative, and diverse input. In 2019 two planning processes were completed: an informational meeting was held focused on the Rio Grande pipeline project, and the Water Conservation Office (WCO) completed an update to its 5-Year Conservation Plan based on input collected through a series of staff-led community input sessions.

1 - Santa Fe Watershed Association Volunteers posing with the trash they removed from the river. (A. Otto)

Acronyms

af - Acre-Feet = a unit of measurement for large quantities of water based on irrigation standards. An acre-foot is enough water to cover an acre of land in one foot of water, 325,851 gallons. In Santa Fe, that's enough to support roughly five average homes for a year.

afy - Acre-Feet per Year = This unit of measurement is generally used to quantify water rights

BDD – Buckman Direct Diversion, the diversion and treatment facility located NE of the city which diverts SJCP water into the City and County water systems.

BOR – Bureau of Reclamation

BS – Booster Station

CIP – Capital Improvement Projects

CoCoRaHS – Community Collaborative Rain Hail and Snow Network

CRWTP – Canyon Road Water Treatment Plant, the water treatment plant located at the top of Upper Canyon Road that treats Santa Fe River water.

CSFW – City of Santa Fe Water, formerly the Water Division or Sangre de Cristo Water.

DP289 – Discharge Permit 289, the NMED-managed Discharge Permit under which the PRWRF operates

gpcd – gallons per capita per day. This metric is used to measure water system efficiency by determining how many gallons of Santa Fe Water treated drinking water are used each day per resident of Santa Fe.

EPA – Environmental Protection Agency

LF – Linear Feet

MRC – Municipal Recreation Complex, the soccer fields NE of NM599.

NA – Not Applicable

ND – Non-Detect

NMED – the New Mexico Environment Department, the State agency that manages water quality in New Mexico.

NPDES – National Pollutant Discharge Elimination System.

NRCS – National Resource Conservation Service

NTU – Nephelometric Turbidity Units, a unit of measurement used in to measure suspended solids. The word Nephelometric comes from the Greek work for cloud, Nephos.

OSE – Office of the State Engineer, the State agency which manages water rights in New Mexico, including those used by CSFW.

PCi/L – picocuries per liter, a measurement of radioactivity. One PCi is one trillionth of a Curie.

PPB – Parts per Billion, a unit of measurement used in water quality that detects very small levels of contamination.

PPM – Parts per Million, a unit of measurement used in water quality that detects small levels of contamination.

PRV – Pressure Reducing Valve.

PRWRF – Paseo Real Water Reclamation Facility, the wastewater treatment plant located on Airport Rd west of NM 599.

RTU – Remote Terminal Unit

RWS – Raw Water System

SFCC – Santa Fe City Code

SFCWU – Santa Fe County Water Utility

SJCP – San Juan – Chama Project. This is a Bureau of Reclamation project that diverts water from the San Juan Basin, which is a tributary of the Colorado River, into the Rio Grande basin via the Chama River. The diversion consists of roughly 60 miles of tunnels beneath the Continental Divide and delivers water from the Colorado River for municipal use in the middle Rio Grande.

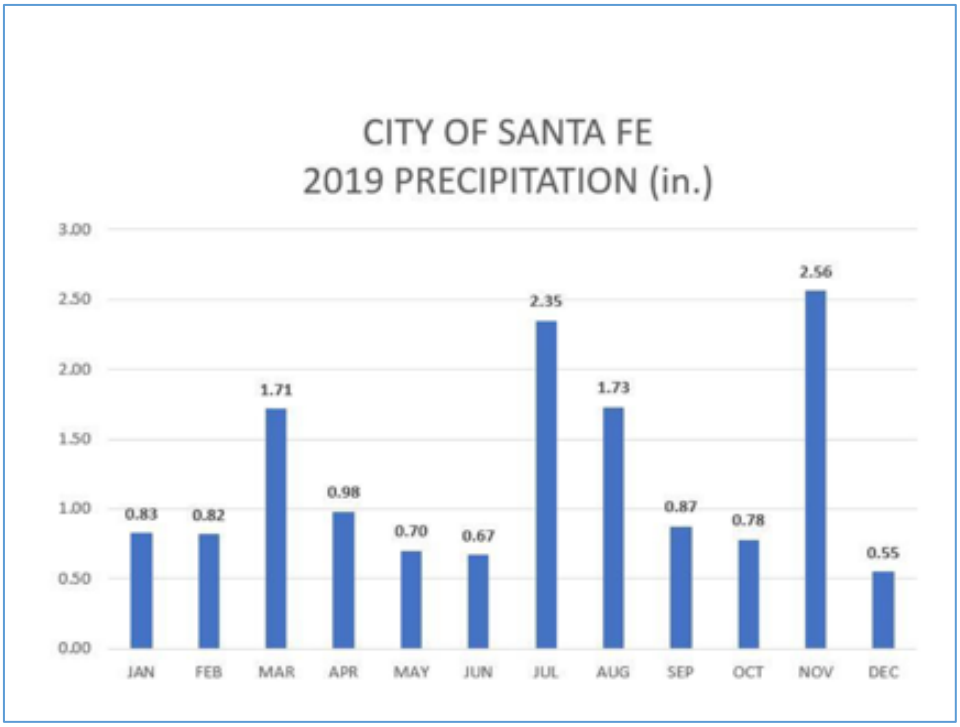
VFD – Variable Flow Drive

WCO – Water Conservation Office

1. Introduction

Submitted pursuant to City Code, the purpose of this report is to summarize information about City of Santa Fe Water (CSFW) including summaries of: water supply, water demand, efficiency and conservation, non-potable water deliveries, precipitation, capital projects, and water quality.

2019 was a good year for water in Santa Fe with a deep snowpack and cold spring that filled the reservoirs and reduced the amount of water used for outdoor irrigation. Outdoor irrigation accounts for nearly half of Santa Fe's water use so the reduction in irrigation demand had a significant impact on the total water demand.



2 -2019 precipitation by month in Santa Fe based on CoCoRaHS reporting stations.

Water conservation in Santa Fe has reduced total demand significantly since the City purchased the Sangre de Cristo water utility from PNM in 1995 and 2019 continues a positive trend of serving more people while using less water. 2019 also marks a change in name, from Sangre de Cristo Water or The Water Division, to City of Santa Fe Water (CSFW).

2. Drought & Precipitation

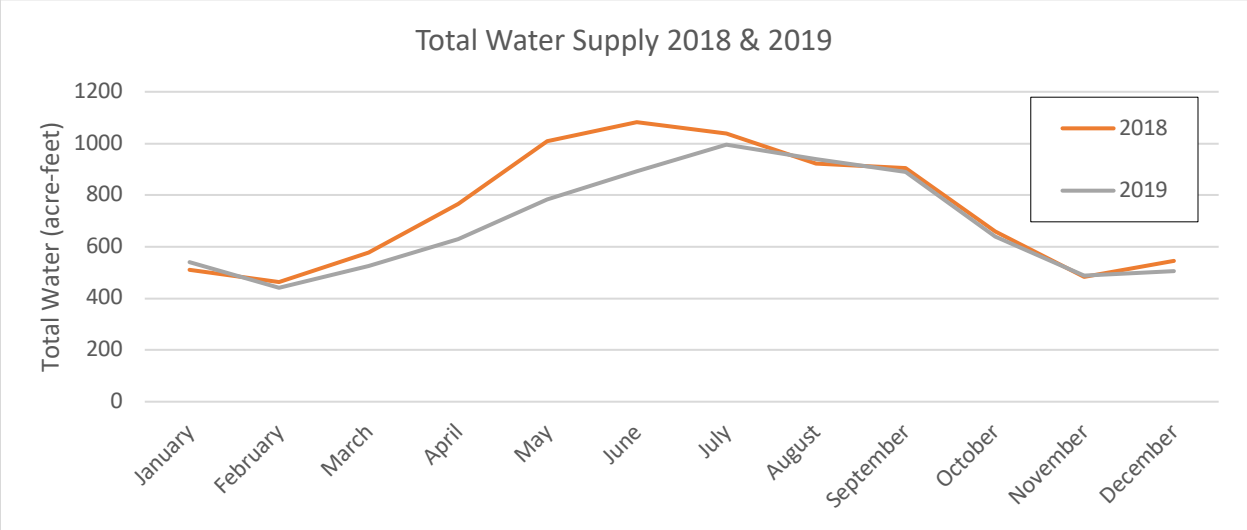
In late 2018 and early 2019, precipitation in northern New Mexico was well above the average. Spring 2019 snowmelt runoff began in March and April of 2019 and the subsequent streamflow yield in the Santa Fe River Basin was above average due to El Niño conditions during the winter throughout the Southwest. By August of 2019, the El Niño Conditions disappeared, and a period of below-average precipitation began. Precipitation is highly variable from one area of town to another, but one value from the Community Collaborative Rain Hail and Snow (CoCoRaHS) showed an average precipitation of 14.55" distributed as shown on the table above.

According to the Western Regional Climate Center, the Santa Fe Watershed weather station, at an elevation of 7,674', receives an annual average of 13.84" of precipitation. In 2019, the Santa Fe Watershed station, located between Nichols and McClure reservoirs, recorded 17.41" of precipitation. Higher in elevation within the municipal watershed are two National Resource Conservation Service (NRCS) 'SNOTEL' weather stations that measure accumulated precipitation. The Santa Fe SNOTEL

station, located at 11,445', recorded 32.2" of precipitation and the Elk Cabin station, at 8,210', recorded 25.6"

3. Treated Water Demand

2019 began with heavy snowfall and remained cool into early June. The late, wet spring resulted in a slow start to irrigation season and a reduction in total demand from 2.9 to 2.67 billion gallons – from 8,955 acre-feet (af) to 8,268 af. Demand remained low through May and June and peaked in July at a level below the July water demands in 2018.



3 - Total water supplied for 2018 & 2019 showing substantially lower water demand in spring of 2019.

4. Per Capita Consumption

One measure of conservation effectiveness used by the Water Conservation Office (WCO) is gallons per capita per day (gpcd) which is an estimate of how much water is used on average per resident per day. This measurement is used internally to track program effectiveness over time and it is reported to the New Mexico Office of the State Engineer (OSE) who require submittal of the calculation annually for the City's water right permit compliance.

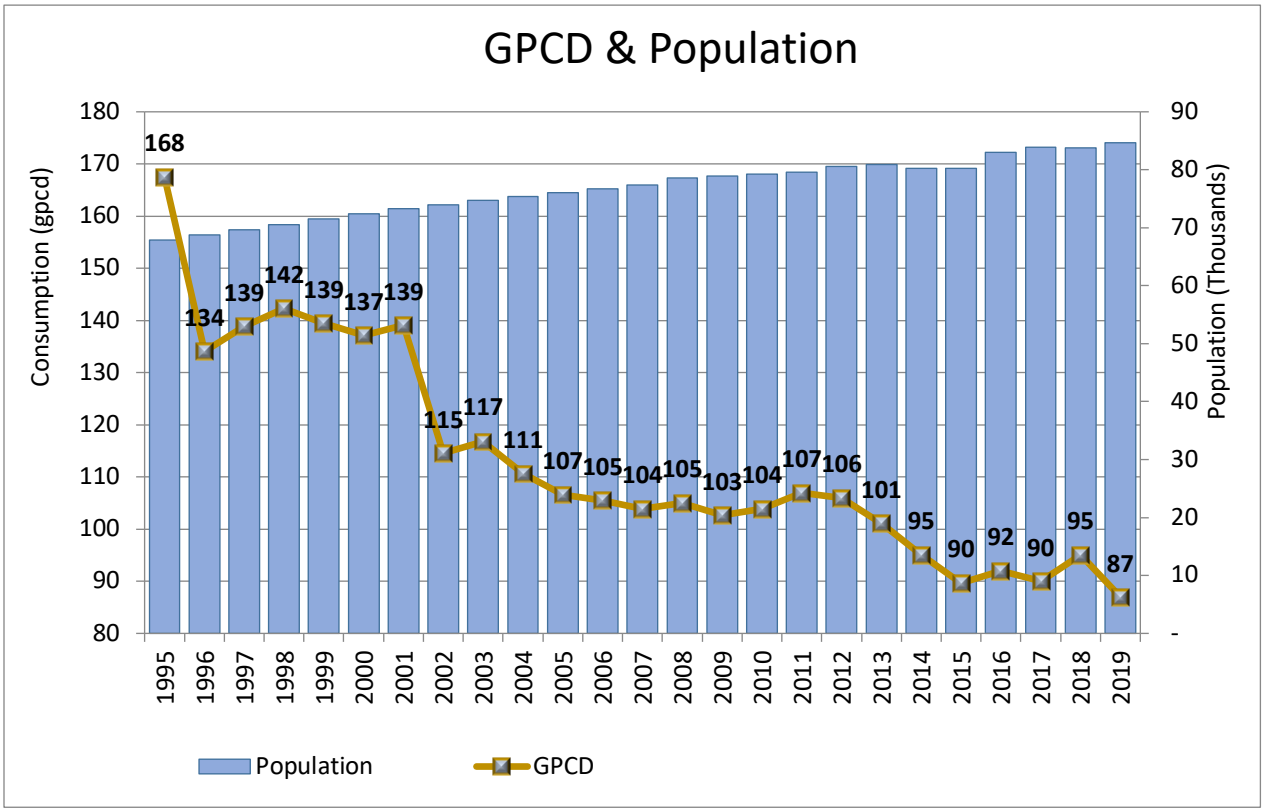
Santa Fe has been a regional leader in gpcd for many years and has reduced gpcd by over 30% on average since purchasing Sangre de Cristo Water in 1995. The gpcd for 2019 was 87, the lowest ever.

Comparison of the water consumption trends between 2018 – which was very dry – and 2019 reveals substantially lower total water use during the beginning and middle of the irrigation season.

a. GPCD Calculator Methodology

The gpcd calculator is designed to determine gpcd by using a combination of US Census/American Community Survey data and Water Utility Billing Data. There are two primary components to the gpcd calculation: total water supplied and total population.

US Census data is used to establish an average number of residents per household and to determine the total population for the City. Billing data is used to determine the quantities of water delivered by sector, and to determine the number of single-family connections in order to separate the population into single family- and multi-family-residential units.



4 - GPCD & population since the purchase of Sangre de Cristo water from PNM showing both reductions in gpcd and increased population. The savings from water conservation have more than kept pace with population growth.

5. Water Supply Sources

City of Santa Fe Water strives to use surface water to meet as much of the total supply as possible and balance the preservation of groundwater resources with enough utilization to keep wells ready in the event that they are needed. In 2019, surface water made up 93% of the total water supplied to Santa Fe Water customers as a result of highly efficient operation of the Canyon Road Water Treatment Plant (CRWTP), full reservoirs, and low overall demand.

a. Surface Water

Santa Fe Water has two sources for surface water: the Santa Fe River and the San Juan – Chama Project (SJCP). The Santa Fe River flows out of the Sangre de Cristo Mountains above Canyon Road. The SJCP is operated by the Bureau of Reclamation (BOR) to bring part of New Mexico's allocation of the Colorado River under the Continental Divide for use in the Rio Grande Basin.

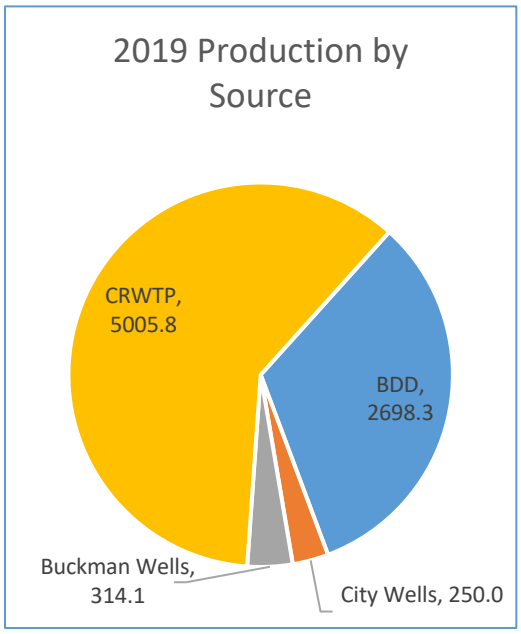
i. The Santa Fe River & the CRWTP

The Santa Fe River is the historic source of water in Santa Fe. Prior to the purchase of the water company from PNM in 1995, CSFW was known as the Sangre de Cristo Water Company because of the

original source of its water. The City is permitted to divert up to 5,040 acre-feet/year (afy) of water from the Santa Fe River. Santa Fe River water is stored in McClure and Nichols reservoirs before being treated at the CRWTP. With the hard work of Engineering and CRWTP staff, more than 5,000 af of water was diverted for the first time in many years. The CRWTP operated at a high daily capacity to realize that goal given the low overall system demand.

1. The Municipal Watershed

The management responsibility for the Santa Fe River includes source water protection and watershed management under the City of Santa Fe's Municipal Watershed Program. In mid-April 2019, with improving soil moisture and weather conditions, the Santa Fe National Forest conducted a prescribed burn of 442 acres, including 50 acres of piled vegetation, just north of Nichols Reservoir. Since 2015, City of Santa Fe Water customers, as the beneficiaries of a healthy watershed, have paid for over 5,800 acres of fuel treatments for vegetation management by the Santa Fe National Forest to protect the City's municipal reservoirs from wildfire and improve forest resiliency.



5 - 2019 Santa Fe Water production by source

In September 2019 in the run up to a planned prescribed burn of 350 acres near the drainage of Aztec Springs, the Forest Service received an order from the United States District Court for the District of Arizona stating that the agency's timber management actions must cease on five national forests in New Mexico and on the Tonto National Forest in Arizona pending formal consultation regarding potential effects to the Mexican Spotted Owl. The previously planned prescribed burn or any other vegetation management within the Santa Fe Municipal Watershed could not be initiated until the court order could be addressed. Within the municipal watershed there is a Mexican Spotted Owl protected activity center identified; however, previous fuels treatments within the lower, non-wilderness portion of the municipal watershed have not had a negative effect on any observed Mexican Spotted Owl.

2. Nichols and McClure Dam Downgrades

On August 19, 2019 the OSE's Dam Safety Bureau sent CSFW the results of the Annual Dam Inspection completed on May 31, 2019, resulting in a downgrade from a rating of Satisfactory to Poor. The Water Division has been working with OSE for the past couple years and continues to do so to plan, study and make improvements to both McClure Dam constructed in 1926 and Nichols Dam constructed in 1943 and the associated infrastructure. CSFW has major renovations to the outlet conduits (tunnels through the dam) slated for 2021 (Nichols) and 2023 (McClure) and expects to once again receive at least Satisfactory ratings at both dams once this work is complete.

Work that has been completed and is ongoing is as follows: Emergency repair of CRWTP Raw Water Supply Pipeline (completed in 2013); Nichols Reservoir Intake Structure Rehabilitation (completed in 2014); McClure Reservoir Intake Structure Rehabilitation (completed in 2015); OSE Dam Safety Bureau Inspection (completed 2016); Initiated contract with AECOM to be Water Division's Dam Engineer

(completed March 2018); Semi-Quantitative Risk Analysis for Nichols and McClure Dam completed by AECOM and presented to OSE Dam Safety Bureau (completed June 2018); Interim Risk Reduction Measures developed by AECOM with Outlet Inspection Checklists for Nichols and McClure Dam Outlet Conduits (completed December 2018); Nichols Dam Intake Structure Evaluation completed by AECOM with draft findings and recommendations report issued (completed January 2019); Emergency Action Plan (EAP) Tabletop Exercise (completed April 2019); Increased monitoring of Nichols and McClure toe drains and piezometers to measure dam seepage (initiated in early 2019 and scaled-back frequency June 2019); OSE Dam Safety Bureau Inspection (completed May 2019); 30% Nichols Outlet Conduit Design and Intake Structure Re-design by AECOM (completed July 2019); Nichols Dam to McClure Dam Fiber Optic, Electric and Security Improvements (completed in August 2019); Construction of CRWTP Raw Water Supply Pipeline CIP #3038C (initiated in Fall 2019 and currently on hold due to USFS Closure of Santa Fe National Forrest); Probable Maximum Precipitation/Flows (PMP/PMF) for Nichols and McClure Watershed analysis by AECOM (initiated in late 2019); 100% Nichols Outlet Conduit Design and Intake Structure Re-design and associated Geotechnical work by AECOM (scheduled to be completed summer 2021); Construction of Nichols Outlet Conduit Rehabilitation (scheduled for completion spring 2022); and McClure Outlet Conduit Rehabilitation (future project scheduled to be completed spring 2024).

ii. San Juan-Chama Water & the BDD

The SJCP is operated by the BOR and delivers water from the Upper Colorado River Basin into the Rio Grande Basin via tunnels. Santa Fe has 5,230 acre-feet of SJCP contract water which is diverted into the City via the BDD, a facility co-owned by the City and Santa Fe County Water Utility (SFWCU) and the Las Campanas association. The BDD diverts water from the Rio Grande at a point near the terminus of Diablo Canyon, which is also the former Buckman townsite along the historic Chili Line railroad.

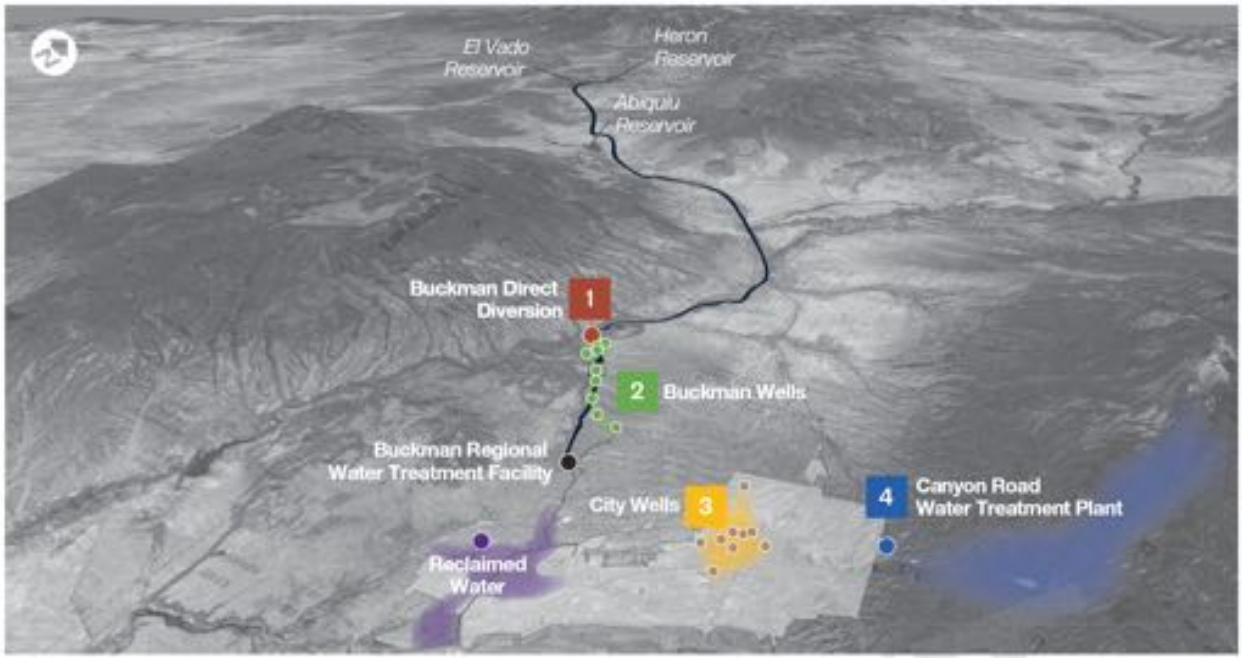
1. Santa Fe County Water Deliveries

The SFCWU is a ½ owner of the BDD facility which provides up to 5,230 afy to the city in addition to being the source of all of Santa Fe County's water. CSFW also provides up to 1,350 afy of backup water to SFWCU in the event that the BDD is shut down.

Las Campanas receives drinking water from SFCWU and also diverts untreated water via the BDD to be used for turf irrigation.

b. Groundwater

The City's groundwater comes from two wellfields: The City Wellfield, and the Buckman Wellfield. The City Wellfield is located within City limits, mostly along the Santa Fe River, and consists of seven active wells. The Buckman Wellfield consists of 12 active wells located near the Rio Grande approximately 15 miles northwest of Santa Fe and along the BDD water transmission line.



6 - Map showing sources of supply for CSFW

For many years the City relied heavily on groundwater to meet demand resulting in lowered groundwater tables. Since the BDD came online in 2011, the City has been able to reduce groundwater use and preserve groundwater. Some groundwater production is necessary because regular exercising of the wells maintains the motors and seals and sampling is required for environmental compliance and groundwater monitoring. In 2019 groundwater accounted for only 7% of total production.

c. Water Quality

Water quality information is reported in detail in the Annual Water Quality Report, sent – as required by law – to customers along with their bills annually. In 2019, the City's drinking water met all U.S. Environmental Protection Agency (EPA) and State drinking water quality limits. A copy of the full report is available online at https://savewatersantafe.com/2019-water-quality-report/.

The New Mexico Environment Department (NMED) completed a Source Water Assessment for the City of Santa Fe. This assessment included a determination of source water protection areas of concern. NMED concluded: "The Susceptibility Analysis of the City of Santa Fe water utility reveals that the utility is well maintained and operated, and the sources of drinking water are generally protected from potential sources of contamination based on an evaluation of the available information. The susceptibility rank of the entire water system is 'moderately low.'"

Sources of drinking water – both tap water and bottled water – include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances from the presence of animals or from human activity. Contaminants in drinking water may include microbial contaminants, inorganic contaminants, pesticides & herbicides, organic chemical contaminants, and radioactive contaminants. To ensure that tap water is safe to drink, the

Environmental Protection Agency (EPA) prescribes regulations that limit the number of certain contaminants in water provided by public systems.

A safe and dependable water supply is vital to our community. In 2019, Santa Fe's drinking water met all EPA and State Drinking Water Limits.

Contaminant	Units	Maximum Contaminant Load	Maximum Contaminant Level Goal	City Well Field	Buckman Tank	CRWTP	BDD	Violation?
Di(2-ethelhexyl) Phthalate	PPB	6	0	1 (ND-1)	ND	ND	ND	No
Arsenic	PPB	10	0	3.5 (ND-3.5)	ND	1.5	ND	No
Barium	PPM	2	2	0.7 (ND-0.7)	0.04	0.04	0.05	No
Fluoride	PPM	4	4	0.1 (ND-0.1)	0.37	0.19	0.26	No
Nitrate [as N]	PPM	10	10	5.7 (ND-5.7)	ND	ND	ND	No
Selenium	PPM	50	50	2 (ND-2)	ND	ND	ND	No
Gross Alpha Emitters	Pci/L	15	0	0.8 (0.2-0.8)	0.5	NA	5.9	No
Gross Beta/Proton Emitters	Pci/L	50[e]	NA	1.4 (ND-1.4)	3.5	NA	2.6	No
Radium 226/228	Pci/L	5	0	0.8 (0.4-0.8)	0.03	NA	0.03	No
Uranium	PPB	30	0	1	2	NA	8	No
Turbidity (highest single measurement)	NTU	TT = 1.0	0	NA	NA	0.25	0.02-0.21	No
Turbidity (lowest monthly % meeting limits)	NTU	TT = %<0.3 NTU	0	NA	NA	100%	100%	No
Total Organic Carbon (removal ratio)	NA	TT[f]	NA	NA	NA	1.1[g] (1.1-1.2)	NA	No

7 - Water quality table showing no violations in 2019.

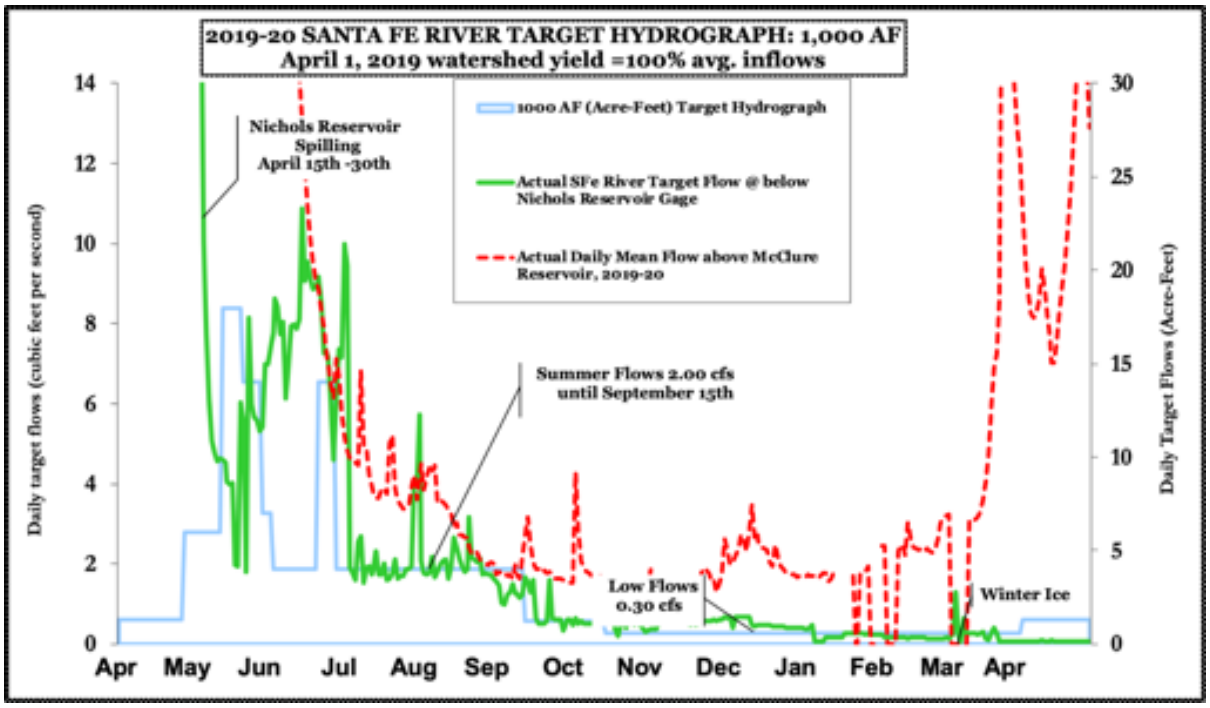
6. Other Water Demands

In addition to meeting potable water demands, CSFW also delivers untreated Santa Fe River water to acequias for irrigation and to the Santa Fe River channel through town to comply with the Living River Ordinance. CSFW also manages necessary water rights to assure delivery of water to the Rio Grande and tributaries, and La Cienega to offset groundwater pumping. Finally, working with the Wastewater Division of the Public Utilities Department – reclaimed wastewater is reused for non-potable turf irrigation.

a. Santa Fe's Living River

The purposes of Santa Fe's Living River Program are to help support the Santa Fe River's green corridor of trees, grasses, and other plants; to support healthy wildlife habitat; and to add to the beauty of free-flowing water to the parklands along the Santa Fe River. Benefits of maintaining a vegetated, green river corridor include shading and cooling of the urban environment; supporting plants that convert carbon dioxide into oxygen; helping to clean stormwater runoff; and controlling erosion. The target flow hydrograph establishes a schedule for the release of Living River water from April to April in proportion to anticipated water availability.

The Natural Resource Conservation Service (NRCS) forecast for April 1st of 2019 was for the upper Santa Fe River to be 100% of the thirty-year average streamflow yield. Therefore – according to the City's Living River Ordinance, the Santa Fe River Target flows were administered in accordance with the hydrograph of 1000 acre-feet for the 2019-2020 target year. The 1,000 af target was easily reached with bypass flows beginning in April 2019 combined with reservoir releases for flood management and continuing through early spring 2020.

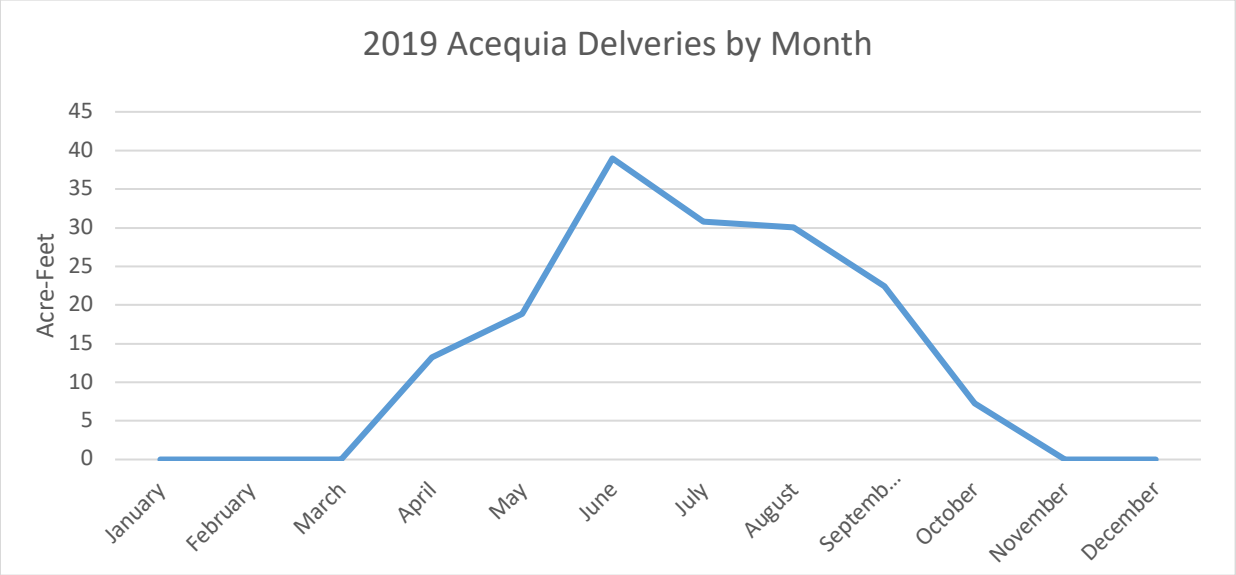


8 - Graph showing Santa Fe River Flows and projections for the Living River

b. Acequia Deliveries

2019 started with a strong runoff and acequia diversions were able to pull water from the Santa Fe River without coordinated releases from the City. Starting in June, coordination with the acequias allowed limited releases to be optimized for use. The graph of acequia deliveries undercounts total deliveries prior to June because high conditions in the river allowed diversion to the acequias without the City's assistance or knowledge.

Santa Fe River flows are allowed to "bypass" McClure and Nichols Reservoirs to meet irrigation water deliveries to three acequias near the top of Canyon Road: Acequia del Llano which serves lands south of Upper Canyon Road, Acequia Madre on the south side of the river which runs all the way to a farm located downstream of Siler Rd, and Acequia Cerro Gordo on the north side of the river. A fourth Acequia, Acequia Muralla on the north side of the river serves lands downstream of those watered by Acequia Cerro Gordo and pulls water from the Santa Fe River when available but it not factored into the City's bypass operations. When there is water in the river below the Municipal Watershed, diversions can be easily managed on a predetermined schedule, but when the channel is dry increased coordination is required to ensure adequate deliveries. In 2019, the river channel had water for the Living River and because of snowmelt but beginning in July reduced water in the channel required coordinated deliveries.



9 - 2019 Acequia deliveries by month. High river flows through May resulted in undercounting of acequia deliveries as the ditches were able to divert from the flowing river.

c. Santa Fe River Mass Balance

River management on the Santa Fe River is based on a 12-month cycle from mid-April to mid-April and in 2019 the volume of water released in that period was 2,730 acre-feet. An estimated water budget for the Santa Fe River releases from Nichols including the Living River and acequia diversions considered above is presented in the table below. The acequia diversions are estimated based on their requested irrigation schedule. In the past, acequia delivery estimates have been based on the increase in bypass flows; however, due to high bypass flows in 2019, no adjustments had to be made to the flow for most

of the irrigation season. Based on periodic field visits, the acequia diversions were greater than the estimates suggest.

Component	acre-feet	% of total
Evaporation	72	3
Estimated Acequia Diversions	87	3
2-Mile Pond Evaporation	21	1
Streamflow Past PRWRF	1,327	49
Infiltration	1,223	45
Total Volume of Bypassed Flows	2,730	100

10 - Table showing Santa Fe River releases

d. Surface Offsets for Groundwater Pumping

Santa Fe Water holds numerous surface water rights in surrounding basins which are used as offsets in compliance with OSE permitting. Each year the OSE determines the extent of the impact to surface water from groundwater pumping from city owned wells and these impacts are offset by the city's having purchased surrounding rights to reduce demand proportionately.

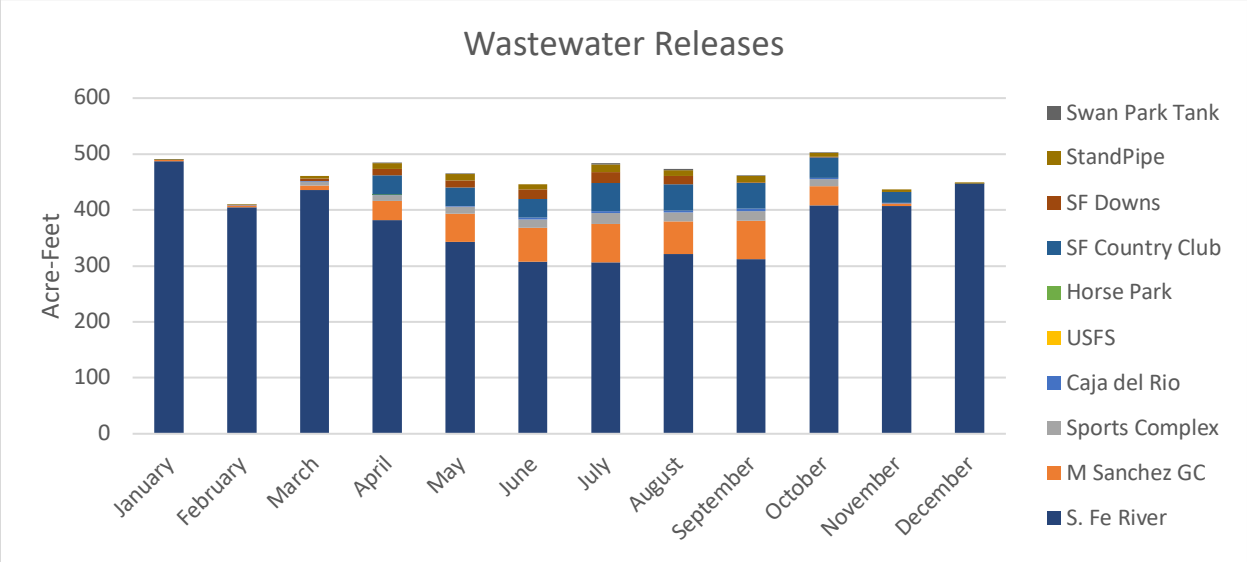
It can take many years to fully offset the impacts of a single year of groundwater pumping and as a result, even though 2019 had very low groundwater use and did not incur a significant number of offsets, offsets are still required to account for the impact of previous years.

Basin	Offsets (acre-feet)
Rio Pojoaque-Nambe	58.683
Rio Tesuque	33.716
Rio Grande above Otowi Gage	106.72
Rio Grande below Otowi Gage	714.5
La Cienega	2.9
TOTAL	916.519

11 - Table showing 2019 offsets as calculated by the OSE for each groundwater basin in which Santa Fe Water owes offsets.

CSFW has offset requirements in five Administrative Groundwater Basins: Rio Pojoaque – Nambe, Rio Tesuque, the Rio Grande above Otowi, the Rio Grande below Otowi, and in La Cienega. The offset requirements for the Rio Grande above Otowi are met through the release of SJCP surface water, the offset requirements in La Cienega have an application pending with the OSE to offset with a retired pre-basin groundwater right, and the offset requirements for all of the other basins are met with surface water rights purchased from irrigators in each basin. A secondary reason that CSFW tries to use as little groundwater as possible is that agricultural water rights are expensive, and no one wants to reduce the amount of water available for growing food along acequias in the region.

7. Treated Effluent Water Deliveries



12 - 2019 Wastewater releases by month

The City operates the Paseo Real Water Reclamation Facility (PRWRF) on Airport road which treats all of the city's wastewater. Most of the cleaned water that leaves the facility is returned to the Santa Fe River and some is used to meet non-potable irrigation demands for large facilities including the Marty Sanchez golf course, the soccer fields at the Municipal Recreation Complex, SWAN Park, and the Santa Fe Country Club.

In June of 2019, the PRWRF experienced an upset of clarification process. This upset caused turbid effluent to enter the tertiary treatment area. As a result, the effectiveness of ultra-violet disinfection was reduced and bacteria counts exceeded permit limits for both the NPDES permit and the NMED Discharge Permit 289 (DP289). Because the bacteria count exceeded the requirements for DP289, wastewater stopped all deliveries for treated effluent. Temporary measures were put in place to provide potable water to Marty Sanchez Golf Course, the Municipal Recreation Complex (MRC), SWAN Park, and the Santa Fe County Club. CSFW is actively developing options for turf irrigation with untreated Rio Grande water to provide resiliency for potential PRWRF exceedance events.

8. The Waterbank

New water demand on the Santa Fe Water system requires a water credit from the Water Bank in an equal amount, with the goal being to maintain sufficient rights to meet increasing water obligations. The City requires that any new construction project which will result in a net increase in demand on City water account for that increase either through purchasing water credits from the City's Water Bank, or by transferring water rights to CSFW. The determination of whether a project water budget is met with water rights or through purchased conservation credits is based on the size of the water budget – larger projects have to transfer in water rights while smaller ones can purchase conservation credits.

When water credits are purchased from the City, the source of these credits is conserved water realized through conservation rebate programs or water rights which have been purchased by the City. When

water rights are transferred to the City water bank, these water rights are used as offset rights (see Water Rights Used for Offsets).

		'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19
End of Year Balances	Public Banked Water Totals	10	82	91	99	105	165	241	282	297	305	311
	Dedicated Banked Water	0	6	16	33	49	63	77	91	119	144	179
	Undedicated Banked Water	10	76	75	66	56	103	164	191	178	161	132
	Private Banked Water Totals	485	513	547	527	518	597	667	648	618	671	687
	Privately Owned Water Rights	456	484	518	499	490	579	657	638	613	666	682
	Privately Owned Toilet Retrofit Credits	1184	1166	1153	1135	1123	739	420	388	210	201	193
	Affordable Housing	57	51	46	42	38	33	32	30	27	9	2
Xfer	Public Toilet Retrofit Credits Deposited (AFY)	0	0	0	0	0	0	54	33	8	5	0
Acquisitions	Public Water Rights Acquired	10	40	0	1	0	54	18	0	0	0	2
	Private Water Rights Acquired	63	33	42	0	31	95	115	7	0	52	14
	Affordable Housing Credits Acquired	59	0	0	0	0	0	0	0	0	0	0
	Conservation Credits Acquired	0	32	9	7	6	6	3	8	7	3	4
	Total Acquisitions	132	105	51	8	37	155	136	15	7	55	20
Dedications	Public Banked Water Dedicated	0	6	10	17	17	14	15	13	28	25	35
	Affordable Housing Dedications	2	6	5	4	4	5	2	2	3	17	8
	Privately Owned Toilet Retrofit Credits Dedicated (1 credit = 0.025 acre-feet)	39	18	13	18	12	384	318	33	178	9	316
	Private Water Rights Dedicated	10	6	7	19	40	6	37	25	25	6	21
	Total Dedications	12.975	18	22	40	61	25	54	40	56	48	64

13 - 2019 end of year waterbank balances

9. Engineering: 2019 CSFW CIP Project Information

The purpose of the Water Division's Capital improvement Plan (CIP) is to look at a 5-year window of water infrastructure needs involving planning, design and construction for infrastructure that has reached the end of its useful service life and to implement with efficiencies and technologies that

improve the overall system operation. The Water Division CIP is accomplished with internal professional staff including engineers, a geologist, an archaeologist, technicians, mapping and drafting specialists along with supporting contracted professional expertise.

a. Planning

The foundation of any good design and construction project is a good plan. In 2019, planning work included:

- Development of an Asset Management Plan (AMP) for the Water Division that inventories and tracks key water system components. Work included inventorying assets and developing a hierarchy of importance by utilizing performance measure evaluations including: consequence of failure, likelihood of failure and life cycle analysis.
- Development of a Preliminary Engineering Report (PER) and Opinion of Probable Construction Costs (OPCC) for upgrades to Buckman Booster Stations 3 and 4. These booster stations were constructed in the 1970s and are a critical component to meeting our water system demands, by running continuously year-round to move water produced by BDD and the Buckman Wellfield, but reached the end of their useful service life. Upon completion and review of 30% design drawings, PER and OPCC it was determined the scoped improvements were cost prohibitive and needed to be re-assessed.
- Planning work was initiated to develop a Comprehensive Performance Evaluation (CPE) at CRWTP to evaluate the effectiveness of treatment processes for current and future water quality regulations. Evaluations were conducted of the rapid mix, flocculation and sedimentation, filtration, chemical feed systems, and electrical and control systems. The data collected from the CPE was used to develop a Facility Optimization and Evaluation (FOE) plan which identified options to address water quality concerns and reduce O&M and energy costs. A PER was also developed including system upgrades and partial designs.
- Planning work continued for a return flow water pipeline from PRWRF to the Rio Grande in the vicinity of the Buckman Direct Diversion. Work included a feasibility study, evaluation of stakeholder concerns, permitting challenges, viability of integrating with the existing non-potable reuse pipelines, and potential routes for a new pipeline.

b. Design

Water system designs are completed with internal staff and/or with consultants. In 2019, design work included:

- Design was initiated on an additional 4MG finished water storage tank at BDD to increase total onsite water storage to increase ability of BDD to provide water when Rio Grande river quality is less than optimal.
- On Call Engineering Contracts were used to supplement professional staff. Analysis and designs were initiated at Nichols Dam and McClure Dam in response to the NM OSE Dam Safety Bureau Annual Inspection report including: updated Emergency Action Plans; performed an Emergency Preparedness Exercise; developed a Watershed Snowmelt Prediction Tool; initiated an update to the Watershed's Probable Maximum Precipitation/Flood analysis; and initiated the design of the Nichols Outlet Conduit replacement. Analysis and designs were also initiated throughout the water system including: trained staff on the functionality of our hydraulic model; initiated the design of Hospital Tank drainage improvements; completed the CRWTP filter surveillance

program; initiated reuse plan support and permit analysis; initiated Water Division website support; and initiated water system operations model.

c. Construction

Construction of water system improvement projects are completed based on internal designs and designs provided by engineering consultants. In 2019, construction work included:

- Construction of a replacement line for the CRWTP Raw Water Pipeline that provides raw water from Nichols Reservoir to the CRWTP for treatment. Construction was initiated to replace approximately 3,200 LF of 24-inch pipe that is located in the Santa Fe River channel. The goal of this project is to replace pipe that has reached the end of its useful service life along with temporary piping and relocate it out of the Santa Fe River channel, where it is endures harsh wet/dry and freeze/thaw conditions, to the Nichols Reservoir and Dam access road, where there are better pipe conditions.
- Construction of an Extension of Fiber Optic and Electric Lines between Nichols and McClure Reservoirs to expand power and connectivity at both sites and improve security with new cameras.
- Construction of Priority Line Replacements including water mains, valves, fire hydrants and services that had reached the end of their useful service life. Approximately 7,400 LF of 8-inch water main, 150 services, 11 fire hydrants and 28 valves were replaced on Lujan Street, Vitalia Street, Camino Rancheros, Caminos Ranchitos and Garcia Street.
- Construction of a replacement Pressure Reducing Valve (PRV) station that had inadequate working room, unsafe access for personnel and had reached the end of its useful service life. Three (3) PRV stations were consolidated into one (1) PRV station in the Camino Rancheros/Camino Ranchitos/Garcia Street area.
- On call Emergency Construction is used to supplement water staff and completed several emergency water repairs while water staff were busy on other repairs. Repairs included a service leak on Calle Lejano, discharge pipe at Buckman Well 8, a fire hydrant near Palace and E. Alameda.

d. CIP Budget Summary

Project Title	Contract Amount	Expended in 2019	% Complete
On Call Engineering - AECOM	$542,188.00	$125,311.62	23.11%
On Call Engineering – Hazen/Molzen Corbin/JSAI	$487,968.75	$86,321.67	17.69%
On Call Engineering - Carollo/JSAI	$261,863.13	$10,895.57	4.16%
Asset Management Plan	$299,286.75	$96,746.75	2.32%
24" CRWTP RWS Pipeline Replacement	$2,935,706.75	$31,681.34	1.07%
Comprehensive Performance Evaluation for CRWTP	$463,774.88	$119,376.00	25.74%
BS 3 & 4 Upgrades (incl. M-5 and M-6)	$1,312,533.00	$100,129.64	7.63%
PRV Station Replacement	$250,000.00	$169,160.31	67.66%
Priority Line Upgrade	$1,626,562.50	$1,254,248.45	77.11%
Citywide Emergency On-Call Contract - SOS	$271,094.00	$18,807.01	6.94%
Citywide Emergency On-Call Contract - T&D	$271,094.00	$45,165.44	16.66%
4 MG Tank at BDD	$110,930.13	$104,632.81	94.32%
Water Reuse Pipeline Implementation Plan	$192,696.75	$169,763.75	88.10%
Nichols & McClure Electric & Security Improvements	$727,138.50	$727,138.50	100%
Total	$9,752,837.14	$3,059,378.85	31.37%

14 2019 CIP Budget Table

10. Planning for the Future

Planning is an essential function of CSFW and work is being done to increase the role of public involvement in that process. In 2019, CSFW conducted public outreach and developed an addendum updating the 5-Year Water Conservation Plan and conducted two public meetings focused on a proposed pipeline redirecting wastewater from the PRWRF to the Rio Grande.

a. Long-Range CSFW Planning

2019 saw the first long range planning public meeting held by CSFW in several years. The event was focused on a proposed pipeline project and brought together stakeholders with wide ranging views along with technical experts able to answer questions. One of the primary takeaways for CSFW staff is that there is a desire for more public input and involvement in water planning. In response to this interest, developing a robust process and strategy for public input has become a central goal for 2020 with a multi-year process set to begin in 2020.

b. Water Conservation Planning

The City of Santa Fe WCO uses a five-year plan model to direct operations and for water right permit compliance. In 2019 the WCO developed an addendum to update the existing plan on file with the OSE. The goal of the addendum was to collect and use public input to guide the priorities and projects for the WCO over the next 5 years. A series of facilitated public discussions were held during the summer to

solicit input focused on specific themes including: Climate Change, Residential Conservation, and Commercial Conservation.

The data collected was wide ranging, insightful, and from a broad range of opinions. Numerous themes emerged from the data collected with many of the comments focused on the need for the City to lead by example and to utilize neighborhood insights to develop water conservation projects. The plan was designed to be flexible – a quality highly valued in 2020 – and to provide the small WCO with a framework that allowed for cooperation and partnerships to improve the scale of water conservation.

11. Closing

Thank you for taking the time to read through CSFW's 2019 Report. From a water perspective, 2019 was the sort of bountiful year we hope for in Santa Fe – snowy winters, full reservoirs, and healthy trees and gardens – and it's the sort of bountiful year that provides an opportunity to save for the future. Santa Feans rose to the occasion and, with more efficient water use than ever, kept demand low enough that more than 90% of it came from surface water, most of that with local Santa Fe River water thanks to the highly efficient operation of the CRWTP. This reliance on Santa Fe River water preserves SJCP water in Chama River reservoirs and keeps groundwater in the ground where it supports the local ecosystem and will be available in the future.