



TOWN OF FIRESTONE

**2016 WATER EFFICIENCY
IMPLEMENTATION GRANT REPORT
FOR
*Installation of Water Efficient Irrigation
Controls on Town Park Irrigation
Systems and Residential Irrigation
System Clock Retrofits***

July 2019

Prepared by:



TOWN OF FIRESTONE 2016 WATER EFFICIENCY IMPLEMENTATION GRANTS

Clear Water Solutions, Inc. is assisting the Town of Firestone (Town) with two implementation program grants that the Town received from the Colorado Water Conservation Board (CWCB). The programs consist of the Installation of Water Efficient Irrigation Controls on Town Park Irrigation Systems and Residential Irrigation System Clock Retrofits. The Town began these programs in August 2016 and completed a 50% progress report on October 2017, and a 75% progress report in September 2018. This report summarizes the water savings and benefits of the two irrigation efficiency programs implemented in Firestone.

Climate

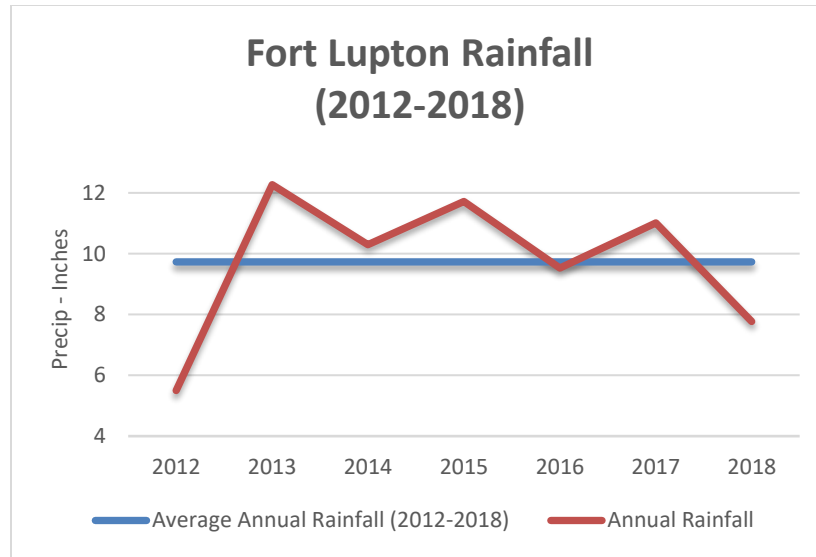
Because water use for irrigation is influenced by the seasonal precipitation and temperature, we took a brief look at the climate for 2018, the year following post-installation for a majority of the irrigation controls and retrofits.

According to the National Weather Service's 2018 climate review for Denver, for the weather parameters of temperature and precipitation, 2018 ended sixth driest along with a tie for 20th warmest on record. Additionally, the Weather Service reported that for the third year in a row, Denver came in with below average annual precipitation while ending 2018 with a scant 8.53 inches.

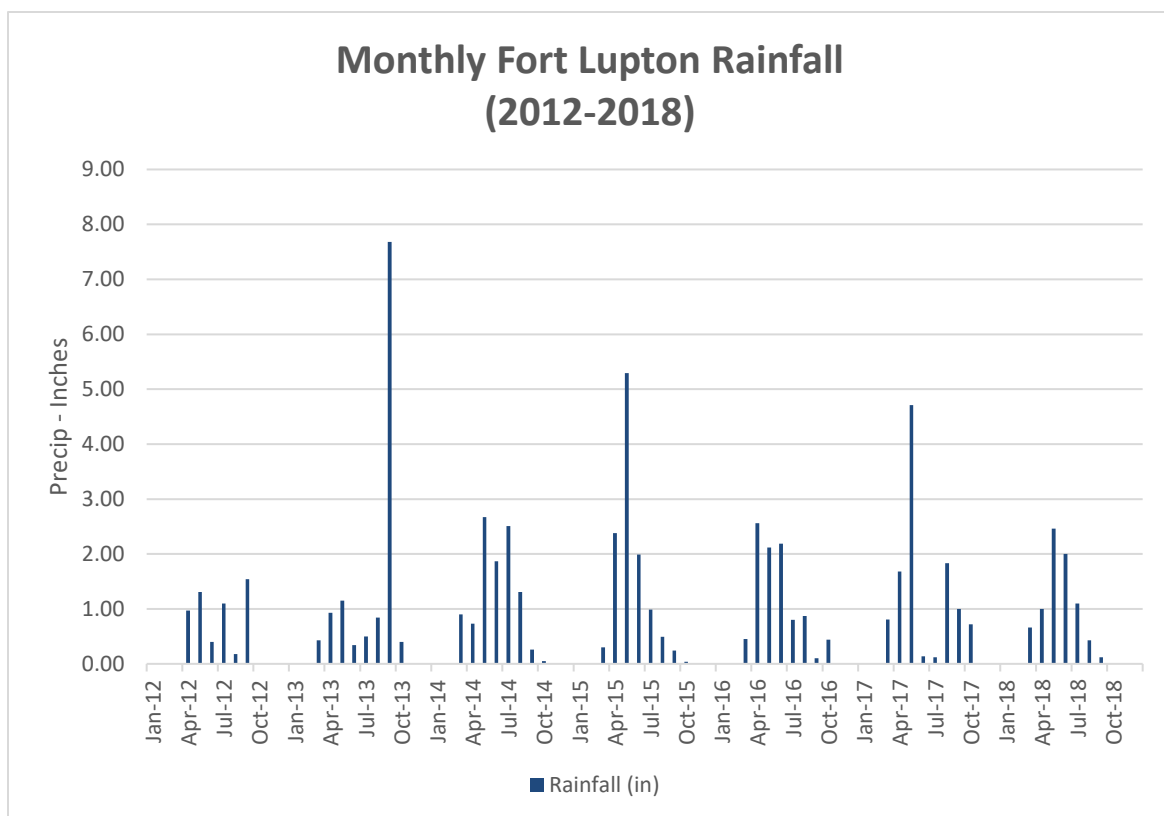
Specifically for the irrigation season, the National Weather Service states that although a 1.86 inches of precipitation was received in Denver for the month of May, it was below the average of 2.12 inches and was the wettest month for the year. Additionally, a strong streak of well below normal months extended from June through September which kept the annual accumulation very low.

The Weather Service goes on to say that as for temperatures, 2018 marked the fourth year with annual temperature above average. They concluded that dry conditions often coincide with above average temperatures as was the case in 2018 for the high plains region including Metro Denver.

We compiled the rainfall data from Fort Lupton's Northern Colorado Water Conservancy District Weather Station, which is a station near Firestone with consistent data available. Overall, 2018 total rainfall (7.77 inches) was below the 2012 thru 2018 average (9.73 inches) for the Fort Lupton Station. The following figure shows the annual rainfall for the Fort Lupton Station from 2012 through 2018.



The following figure shows the monthly variations in rainfall at the Fort Lupton Station from 2012 through 2018.



INSTALLATION OF WATER EFFICIENT IRRIGATION CONTROLS ON PARK AND IRRIGATION SYSTEMS

Background

In 2011 Firestone conducted irrigation site assessments and audits for Settler's Park and Prairie Ridge Park. The recommendation was made in the irrigation audit to replace existing controllers with centrally controlled, weather-based controllers. By the end of 2013 the Town had replaced ten irrigation controllers with Rain Master iCentral Controlled Irrigation Systems (iCentral Controllers). Firestone staff estimated that the 2013 usage for the Parks with the new controllers decreased by 37% when compared to 2012.

With the potential water savings evident from installation of the controllers, Firestone pursued this program to install more iCentral Controllers at Town Parks. The Town purchased four iCentral Controllers and installed the controllers at the following parks:

- Firestone Trail near Adams Bank
- Town Hall
- Onorato Park
- 4th & Buchanan Pocket Park

Some of the features included with the iCentral System include:

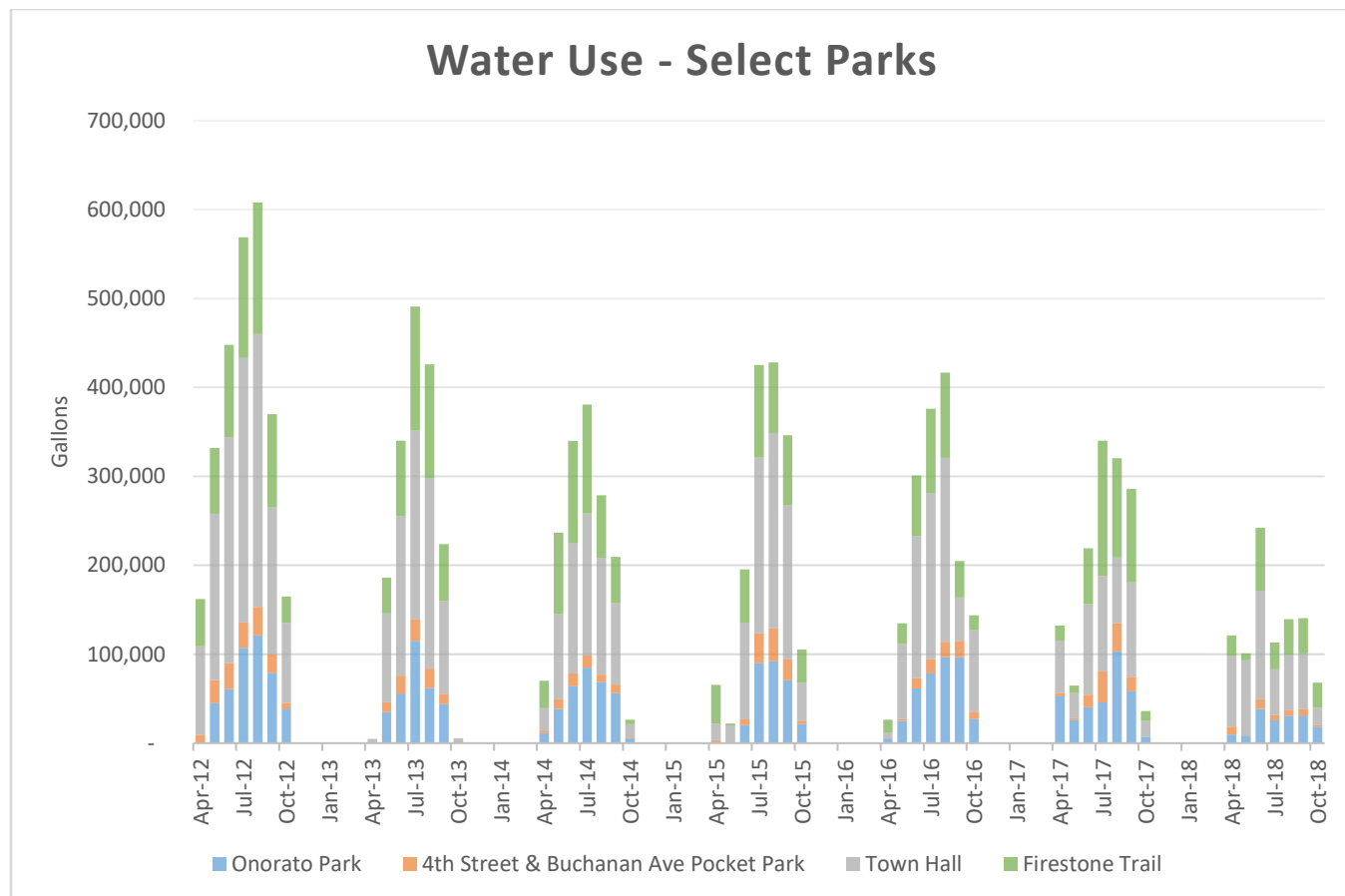
- Local weather information is automatically sent to each controller every day
- Smart Alerts™ are sent by iCentral for all field alarms generated when a "fault" occurs; text messages are sent to cell phone(s) and email address(es)
- Automatic initiation of "rain shutdown" to each controller if iCentral determines that precipitation in a designated area necessitates a shutdown
- Automatically modifies irrigation schedules based upon daily evapotranspiration (ET), as well as plant watering requirements
- Manually turn on/off any station or program

All of the iCentral Controllers were installed at the beginning of March 2017. The iCentral Controllers were verified to be working correctly and then linked to the

existing network of the Town's other iCentral Controllers. The new controllers were completely installed and functional by early April of 2017.

iCentral Controller Program Analysis

The previous five years of data for these parks has been collected and analyzed. Additionally, the water use for 2017 and 2018 was analyzed. We focused on water usage between April through October, which is typical of an irrigation season. The following figure shows the four parks and the data collected.



A significant decrease in water usage is evident in most months for all parks analyzed. The following table shows the percent reduction of total water use from the 2012 through 2016 average water usage as compared to the 2018 water usage, after the controllers were installed. Figures showing the monthly water usage for each individual park and additional data is found in Appendix A.

Table 1 – Percent Reduction in Water Use for Select Parks

Year	Water Use - Gallons			
	Onorato Park	4th Street & Buchanan Ave Pocket Park	Town Hall	Firestone Trail
2012-2016 Avg	356,042	94,684	869,042	459,790
2018	162,389	42,032	481,187	239,809
Percent Reduction	46%	44%	55%	52%

RESIDENTIAL IRRIGATION SYSTEM CLOCK RETROFIT

Background

In 2003 the Town of Firestone began requiring that each new residential construction receive an irrigation system clock. The goal was to help Town residents be more efficient with their outdoor water use. Firestone realizes that the most efficient irrigation system is one where all parts are functioning properly to water at the right times and during the right conditions. The Residential Irrigation System Clock Retrofit program was developed in an effort to continue encouraging water utilities customers with original clocks that may be malfunctioning or defective to continue their water saving success and encouraged water users that might not have a clock to be able to obtain one.

As a sign of good faith to its water utilities customers, Firestone gave these clocks to customers, free of charge. Town Staff created an application process with several stipulations for water utilities customers to receive a new replacement clock. The stipulations include the following list:

- Applicant must be Town of Firestone water utilities customer.
- Program is not available for new construction.
- Only single-family residential properties can apply.
- Only one application can be submitted per property.
- At least one year of prior water usage at the property is required to qualify.
- Prior year's total water consumption must be 175,000 gallons or more to qualify for this program.
- Smart irrigation clock retrofit must be installed and applicant must schedule an onsite inspection of clock retrofit with the Town of Firestone within 30-day of receipt.
- All blanks (within application) must be completed for application to be processed.
- Provide proof of US citizenship or legal status in the United States by providing a photocopy of one of listed forms of identification on the Affidavit of Lawful Presence sheet. Complete the Affidavit of Lawful Presence form.
- Please allow up to 3 to 4 weeks for application to be processed.

The application process also includes some additional terms and conditions. These can be viewed in the actual application found in Appendix B.

Beginning in August of 2016, the Town publicized the program to their customers via Firestone's website and by mailing out flyers in customer bills in early January 2017. From the responses received, a list of applicants was generated. Those applicants were evaluated to verify they met the program requirements, and near the beginning of March 2017, a list of applicants was finalized.

From the list of potential applicants and other factors, 50 clocks were purchased for the Clock Retrofit. Once the clocks were ready, the qualified applicants were notified of their availability and the clocks were distributed to applicants for installation. Seven of the clocks were returned from customers that needed clocks with more zones than the Town was offering. All 43 installed clocks had been inspected by Town Staff near the end of April 2017.

Firestone advertised the remaining clocks' availability early in January 2018 and was able to give away the remaining seven clocks. Unfortunately, several of these clocks were not inspected by Town Staff until after June 2018 and therefore their water savings are not evaluated in the following analysis.

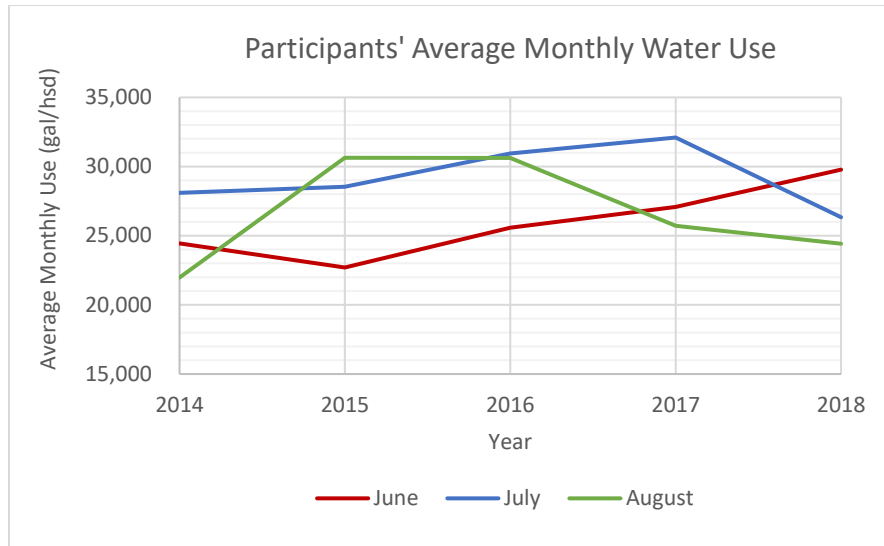
Clock Retrofit Comparative Analysis

The analysis consisted of comparing the participants' monthly water use before and after irrigation clock retrofits. The peak irrigation months of June, July and August of 2014 – 2016 were compared to those of 2018. For the seven properties with installations occurring in 2018, only data after the inspection date was considered. In addition, only participants with complete data through June, July and August of 2014 – 2018 were used in the comparative analysis. This amounted to 38 out of the 50 participants viable for the peak months considered.

The following Table 2 and figure shows the average monthly water use during peak summer months from 2014 – 2018 of the 38 viable participants. Although it is limiting to have only one year post retrofit to assess changes in water use, we can observe a decrease in average use for the months of July and August.

Table 2 – Percent Reduction in Water Use for Retrofit Participants

Peak Months	Average of 2014-2016	2018	Average Savings	Average Savings (Gal/Household)
June	24,242	29,778	-23%	-5,536
July	29,198	26,335	10%	2,863
August	27,748	24,417	12%	3,331



The average use in July and August had a 10% and 12% decrease in water use after the retrofit. However, June showed an average increase in use of 23%. Due to the net increase in water use for June, the savings seen in July and August is essentially negated. Additional years of water use data need to be analyzed to properly assess the impact of the retrofits. Additional data is provided in Appendix B.

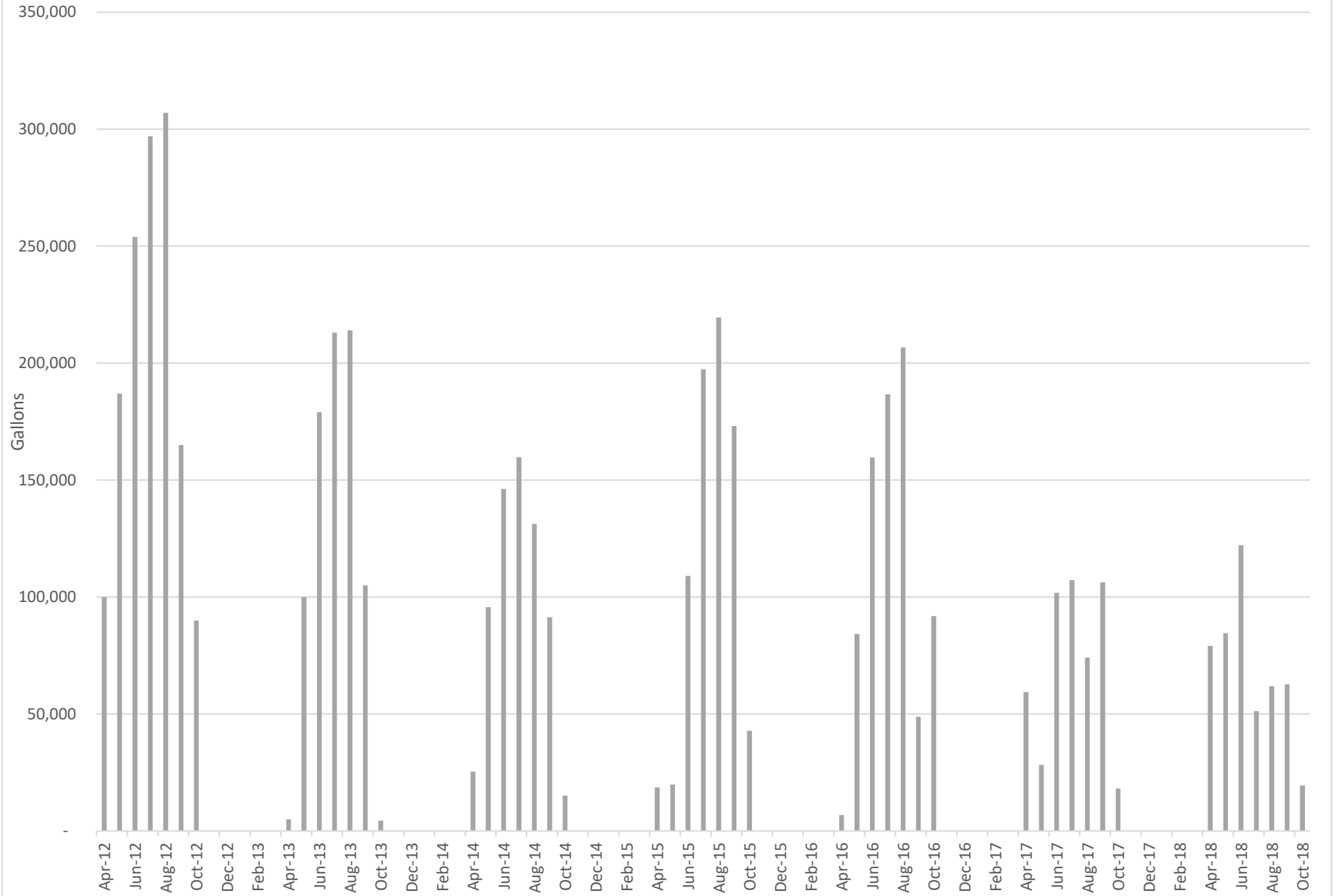
APPENDIX A

Installation of Water Efficient Irrigation Controls on Town Park Irrigation Systems

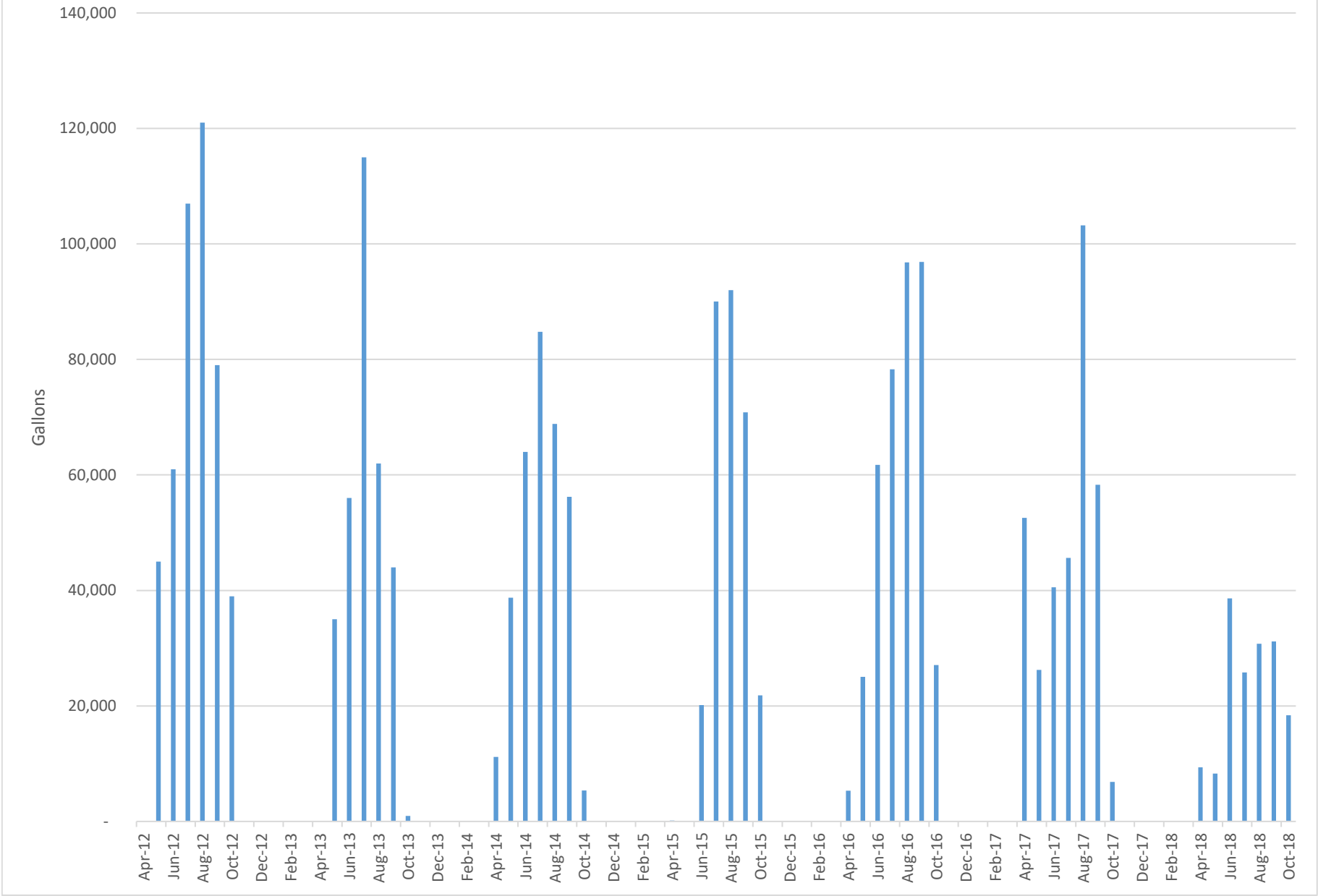
APPENDIX A***Annual Water Use for Select Firestone Parks***

Year	Annual Water Use - Gallons			
	Onorato Park	4th Street & Buchanan Ave Pocket Park	Town Hall	Firestone Trail
2012	452,000	143,000	1,300,000	597,000
2013	312,964	88,048	815,373	456,074
2014	329,085	60,753	664,756	487,579
2015	294,990	107,746	780,333	404,909
2016	391,172	73,875	784,746	353,390
2017	333,339	102,373	495,334	468,114
2018	162,389	42,032	481,187	239,809

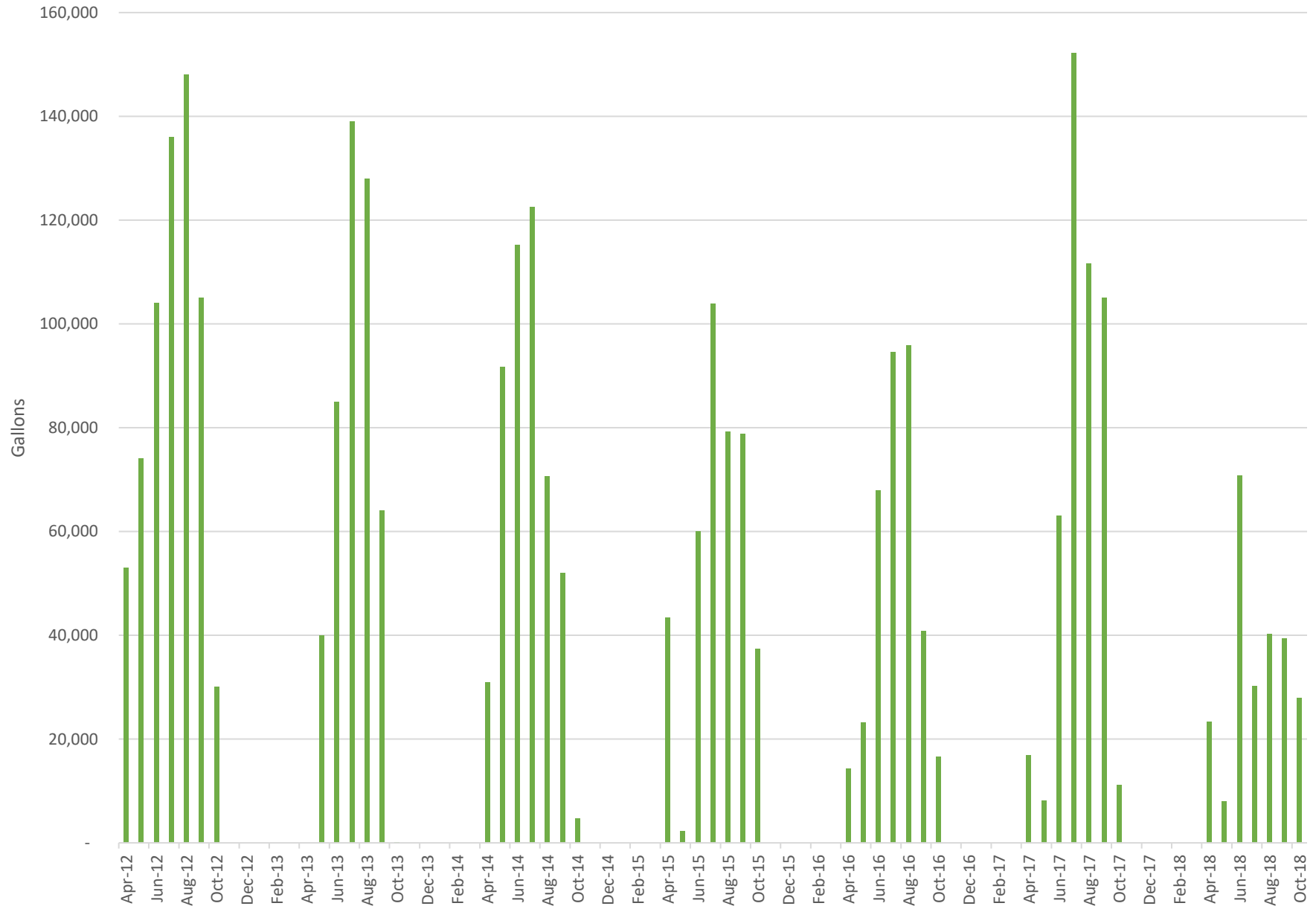
Water Usage - Town Hall



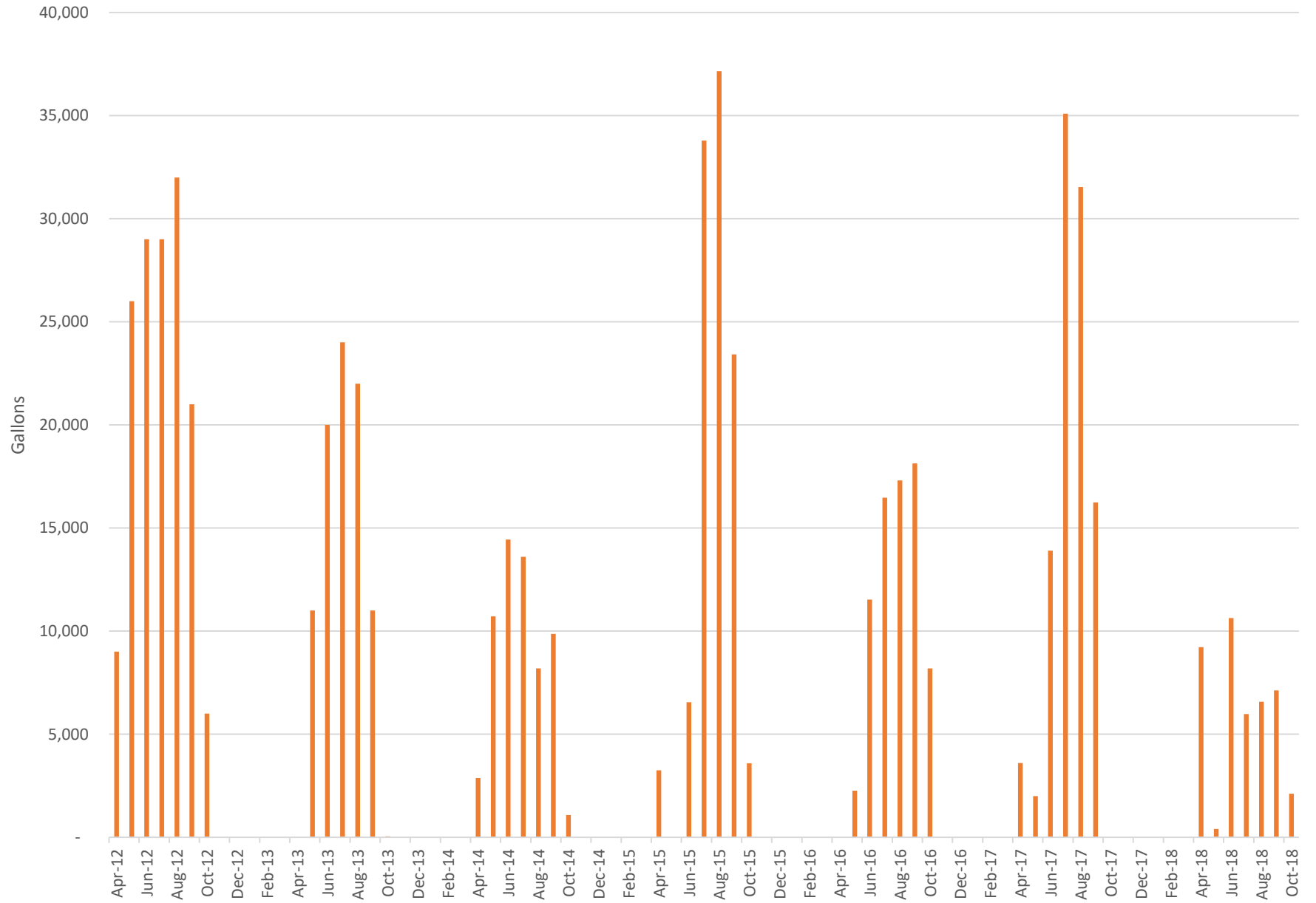
Water Usage - Onorato Park



Water Usage - Firestone Trail



Water Usage - 4th Street & Buchanan Ave Pocket Park



APPENDIX B

Residential Irrigation System Clock Retrofits



Smart Irrigation Clock Retrofit Pilot Program Application

Program Rules and Requirements

- Applicant must be Town of Firestone water utilities customer.
- Program is not available for new construction.
- Only single-family residential properties can apply.
- Only one application can be submitted per property.
- At least one year of prior water usage at the property is required to qualify.
- Prior year's total water consumption must be 175,000 gallon or more to qualify for this pilot program.
- Smart irrigation clock retrofit must be installed and applicant must schedule an onsite inspection of clock retrofit with the Town of Firestone within 30-day of receipt.
- All blanks below must be completed for application to be processed.
- Provide proof of US citizenship or legal status in the United States by providing a photocopy of one of listed forms of identification on the Affidavit of Lawful Presence sheet. Complete the Affidavit of Lawful Presence form.
- Please allow up to 3 to 4 weeks for application to be processed.

Applicant Information

Town of Firestone Water Account Number: _____
(Located on your water bill)

Property Owners Name: _____

Property Address: _____
(Address where clock is being installed)

Mailing Address: _____
(If different from the property address)

City: _____ State: _____ Zip: _____

Telephone Number: _____ Email address: _____

Property / Installation Site Information

Does the property currently have a programmable irrigation system? ☐Yes ☐No

If yes, is the irrigation system installed in the front and back yard? ☐Both front and back ☐Front only ☐Back only

If no, do you have plans to install a programmable irrigation system in the front and back yard? ☐Yes ☐No

If yes, where? ☐Both front and back ☐Front only ☐Back only If yes, when? _____

Number of total zones in existing or planned irrigation system: _____

How many days per week is the property currently being irrigated: _____

Length of time irrigated per zone each time: _____

If no programmable irrigation system is currently installed, what is the length of time yard is irrigated each time: _____

Property / Installation Site Information Continued

Current programmable irrigation clock Brand: _____

Current programmable irrigation clock Model No.: _____

Date of installation of current programmable irrigation clock: _____

Terms and Conditions

In order to receive the Smart Irrigation Clock Retrofit, the property owner understands and agrees to the following conditions:

1. I understand that the clock retrofit program is subject to availability of funding and is provided on first-come, first-served basis.
2. I understand and I meet all specified program rules and requirements from the first page and I understand that the Town of Firestone Water Utilities Department can deny any application that does not meet program rules and requirements (which can change without notification).
3. I understand I will be responsible for picking up the clock retrofit from the Town of Firestone at 151 Grant Ave., Firestone, CO 80520 once I am notified that my application has been approved.
4. I understand the installation of clock and material are my responsibility.
5. I understand and agree that all work performed will comply with applicable state and local laws, ordinances, and regulations.
6. I understand and agree that the Town of Firestone Water Utilities Department staff will inspect my property to confirm that the clock was installed, done so properly, and is operating for its intended purpose. If the inspection, whenever performed, shows that the device is not installed or being used as represented in this application, I agree to reimburse the Town the full price of \$207.48 for a four-station clock or \$232.96 for an eight-station clock, whichever I received. I agree the reimbursement would be a charge placed on my water bill for the full amount of the clock I received.
7. I understand that property shall be available for future inspection and monitoring (up to five years) by Town of Firestone Water Utilities Department staff. Town of Firestone Water Utilities Department staff may take photos of the project. Properties addresses participating in the clock retrofit program will be available to the public. Customer names will not be made public or associated with the property address. The property owner will cooperate with any additional reporting needs that are required by the Town of Firestone or outside funding organization
8. I understand and agree that installation of irrigation equipment or landscape materials may not result in lower water bills.
9. If this application is approved by Town of Firestone Water Utilities Department and the work proceeds, I agree to defend, indemnify, and hold harmless Town of Firestone, its agents and employees against any and all loss, liability, expense, claims, suits and damages, including attorney's fees, arising out of or resulting from the installation of irrigation equipment and landscape equipment. I have read, understand, and agree to the terms and conditions of the program for which I am applying.

Property Owner Signature _____

Date _____

Print name _____

Send completed application to:

Town of Firestone

Retrofit Program

151 Grant Ave.

P.O. Box 100

Firestone, CO 80520

Office Use Only

Verification by: _____ Date: _____

Application: ☐ Approved ☐ Denied

Additional notes: _____



Dear Town of Firestone Water Customers,

We would like to inform you of a step in the application process with which you must comply before receiving your clock retrofit.

On July 31, 2006, Governor Bill Owens signed into law House Bill 06S-1023, which restricts who may receive public benefits in the State of Colorado. Under the new law, any individual person older than 18 years of age must prove lawful presence in the United States in order to receive non-emergency public benefits, such as the rebate for which you have applied. The new law went into effect August 1, 2006.

In order to prove lawful presence in the United States, you must produce one of the following forms of identification:

- a valid driver's license from one of the following states that the Colorado Department of Revenue has deemed eligible: Colorado, Alabama, Arizona, Arkansas, California, Connecticut, Delaware, District of Columbia, Florida, Georgia, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Minnesota, Mississippi, Missouri, Montana, Nevada, New Hampshire, New Jersey, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Virginia, West Virginia, or Wyoming;
- a valid Colorado identification card;
- a United States military card;
- a United States military dependent's identification card;
- a United States Coast Guard Merchant Mariner card;
- a Native American tribal document;
- a Naturalization or citizenship certificate;
- a Court-issued adoption order;
- an I-94 immigration form with refugee or asylum status;
- an unexpired resident alien card, permanent resident card, temporary resident card or employment authorization card.

You may mail or drop off a photocopy of your identification (in one of the forms listed above) to the Town of Firestone at 151 Grant Ave/P.O. Box 100 Firestone, CO 80520. We assure you that this information will remain highly confidential. You may remove/darken all sensitive information such as social security numbers from the copy of your identification that you submit to the Town of Firestone.

In addition, completion of the affidavit attached is also required.

We regret any inconvenience these requirements may cause you.

Sincerely,

Town of Firestone



AFFIDAVIT OF LAWFUL PRESENCE

I, _____ (print name legibly), swear or affirm under penalty of perjury under the laws of the State of Colorado that (check one):

- ☐ I am a United States citizen, or
- ☐ I am not a United States citizen, but I am a Permanent Resident of the United States, or
- ☐ I am not a United States citizen, but I am lawfully present in the United States pursuant to Federal law.

I understand that this sworn statement is required by law because I have applied for a public benefit. I understand that state law requires me to provide proof that I am lawfully present in the United States prior to receipt of this public benefit. I further acknowledge that making a false, fictitious, or fraudulent statement or representation in this sworn affidavit is punishable under the criminal laws of Colorado as perjury in the second degree under Colorado Revised Statute 18-8-503 and it shall constitute a separate criminal offence each time a public benefit is fraudulently received.

Signature

Date

Tape/Staple copy of identification here....

Appendix B

Firestone Residential Irrigation Clock Retrofit Program Data

Resident ID	Inspection Date	Avg. Monthly Use Before Retrofit 2012-2016 (gal)			Monthly Use After Retrofit 2018 (gal)			Percent Savings		
		June	July	Aug	June	July	Aug	June	July	Aug
1	7/26/2017	20,018	21,707	20,088	24,270	21,970	20,960	-21%	-1%	-4%
2	9/22/2017	21,859	30,753	25,564	29,050	27,807	22,893	-33%	10%	10%
3	4/21/2017	41,796	53,262	47,063	49,521	47,363	40,857	-18%	11%	13%
4	5/2/2017	33,617	33,221	30,404	28,713	29,422	27,057	15%	11%	11%
5	4/28/2017	33,442	36,141	33,645	31,582	33,151	29,658	6%	8%	12%
6	6/1/2017	34,182	41,319	41,021	35,482	32,686	29,148	-4%	21%	29%
7	4/19/2017	36,921	41,824	42,752	28,210	28,190	18,138	24%	33%	58%
8	4/25/2017	34,745	48,987	45,780	76,770	42,143	37,567	-121%	14%	18%
9	4/12/2017	22,325	21,854	18,924	19,357	16,093	15,305	13%	26%	19%
10	7/7/2017	15,910	17,570	14,316	12,148	10,712	10,847	24%	39%	24%
11	7/7/2017	14,914	17,949	17,271	30,153	26,429	21,605	-102%	-47%	-25%
12	5/5/2017	24,373	30,609	26,428	18,612	15,773	12,825	24%	48%	51%
13	5/16/2017	35,231	34,661	29,259	43,287	28,478	14,131	-23%	18%	52%
14	5/30/2017	34,714	37,463	35,130	32,395	36,145	32,700	7%	4%	7%
15	7/3/2017	20,843	28,529	31,695	30,086	27,762	24,104	-44%	3%	24%
16	5/3/2017	24,738	37,698	32,266	42,550	35,510	32,770	-72%	6%	-2%
17	4/27/2017	55,295	58,271	46,289	95,740	79,680	68,380	-73%	-37%	-48%
18	5/31/2017	41,333	41,442	36,434	18,803	20,744	29,853	55%	50%	18%
19	6/9/2017	24,598	27,964	30,179	31,961	31,432	32,751	-30%	-12%	-9%
20	7/25/2017	18,519	21,736	23,166	31,280	25,622	21,803	-69%	-18%	6%
21	5/23/2017	28,943	30,669	31,362	31,257	23,073	26,520	-8%	25%	15%
22	6/28/2017	25,899	28,695	27,273	17,208	26,610	20,860	34%	7%	24%
23	6/27/2017	15,015	16,103	15,931	17,147	12,693	9,549	-14%	21%	40%
24	5/18/2018	39,383	47,045	38,922	47,484	40,790	36,545	-21%	13%	6%
25	6/9/2017	28,911	28,358	27,236	19,449	18,430	8,865	33%	35%	67%
26	6/14/2017	18,099	23,607	22,016	18,411	19,332	21,084	-2%	18%	4%
27	5/8/2017	19,991	17,526	24,680	24,227	26,666	23,227	-21%	-52%	6%
28	6/5/2017	23,063	22,070	20,086	23,991	23,381	17,639	-4%	-6%	12%
29	6/14/2017	28,341	29,994	28,448	27,642	26,580	26,813	2%	11%	6%
30	6/20/2017	13,207	12,235	12,129	20,980	17,916	17,044	-59%	-46%	-41%
31	7/19/2017	20,739	22,180	20,534	34,950	35,680	48,450	-69%	-61%	-136%
32	5/15/2017	20,251	26,288	23,790	17,100	15,439	14,310	16%	41%	40%
33	5/2/2017	25,240	26,266	25,182	24,603	24,438	25,522	3%	7%	-1%
34	5/17/2017	26,329	25,873	26,797	30,621	20,595	17,847	-16%	20%	33%
35	5/31/2017	21,947	26,392	28,998	19,716	11,725	12,089	10%	56%	58%
36	5/31/2017	14,963	14,418	14,239	19,273	12,890	14,220	-29%	11%	0%
37	9/26/2017	33,500	21,500	19,277	13,940	18,390	23,730	58%	14%	-23%
38	5/17/2017	38,828	45,224	40,921	42,108	30,529	30,679	-8%	32%	25%
39	6/20/2017	13,704	13,786	14,853	22,625	16,090	16,686	-65%	-17%	-12%
40	6/2/2017	11,324	10,702	9,788	16,290	14,192	13,376	-44%	-33%	-37%
41	6/4/2018	37,345	41,012	40,262	31,811	33,834	36,202	15%	18%	10%
42	6/5/2017	13,207	16,977	16,113	9,691	14,474	24,569	27%	15%	-52%
43	6/2/2018	26,984	33,158	30,132	34,006	34,412	34,393	-26%	-4%	-14%
44	7/3/2018	22,777	12,328	12,370	31,137	19,982	14,688	-37%	-62%	-19%
45	6/20/2017	13,009	15,929	15,459	7,082		13,593	46%		12%
46	6/16/2017	12,133	14,151	14,035	8,187	8,238	9,542	33%	42%	32%
47	6/2/2017	9,279	10,047	11,028	13,943	10,748	9,327	-50%	-7%	15%
48	6/26/2018	15,427	30,104	26,415	25,212	26,110	19,570	-63%	13%	26%
49	8/14/2018	25,191	27,817	33,171	27,366	26,766	33,753	-9%	4%	-2%
50	9/9/2018	21,942	24,862	19,823	18,950	17,791	16,151	14%	28%	19%
Average		25,087	27,965	26,379	28,128	25,406	23,604	-14%	7%	8%