

# Claret Springs West Homeowner Association Rosemount, MN

---

## Stage I Landscape Irrigation Assessment Report & Recommendations

**AUGUST 23, 2023**

---

Water in Motion, Inc.

Authored by: Timothy Malooly, CLIA,  
US EPA WaterSense Partner



---

## **GENERAL**

Date of Site Assessment: July 28, 2023    Approx. Irrigated acres/Ft<sup>2</sup>:    5.45/237,411

Approximate 2023 value of a well-designed system this location: \$220,000 to \$250,000

The Water in Motion, Inc. assessor met onsite with a longtime resident, Mr. James Ahlbrecht of 15164 Claret Circle. Mr. Ahlbrecht accompanied the assessor during the assessment.



## **IRRIGATION SYSTEM GENERAL OBSERVATIONS**

The irrigation system installation date is not known. The water supply and controller are both located centrally in an open space behind 15125 Crestone Circle. The water supply was found to be in generally good condition, in need of stabilization supports for the heavy plumbing elements and re-setting of the water supply cabinet on a replacement base to overcome a rotted base.

The water supply had a system master valve and flow sensor, not in service, evidence of a past SMART remote central control service. The irrigation controller had a not-in-service cellular cartridge and remnants in its database of a previous SMART remote-control service (see elsewhere in this report). Mr. Ahlbrecht did not have any knowledge of SMART remote-control service from a past or the current maintenance vendor.

The irrigation controller appeared to be in good operating condition and included an in-service advanced rain sensor. Scheduling was observed to essentially divide the 24 sprinkler stations serving the community into half, with the first 12 sprinkler stations and station 14 operating on even days of the

month and the stations 13 through 24 and station 14 operating odd days of the month. Mr. Ahlbrecht did not know why station 14 was programmed for daily operation.

The assessor operated all sprinkler stations and recorded per-station findings and suggestions (see elsewhere in this report). Selected photos with comments can be found elsewhere in this report.

The irrigation system design was below average to poor, appearing to favor construction schedules/priorities over water efficiency or best design practices.

The operating condition of the system was average, reflective of long intervals between maintenance visits and lack of adjustments or modifications to accommodate maturing of the landscape over time.

Scheduling was found to be imprecise and did not use built-in water-efficient features (such as cycle-and-soak or monthly adjustments based on historical weather). As mentioned, the controller appeared to previously have been enrolled in SMART features and remote-control operation.

#### GENERAL RECOMMENDATIONS:

- A. Budget for bi-weekly proactive system walk-through maintenance and attend to sprinkler placements and condition.
- B. Enact scheduling practices that employ water-efficient delivery of irrigation water. Adjust scheduling to water more precisely and include cycle-and-soak and monthly schedule adjustments based on historical weather. See Controller section.
- C. Consider re-enrollment into SMART and remote-control service from a qualified vendor. See controller section.
- D. Assemble a list of suitable replacement components for vendors to install to maintain system integrity. Include pressure-regulated sprinkler bodies to reduce overwatering and check valve sprinklers for low points to reduce waste from low point drainage.
- E. Require matched application rate nozzles on sprinklers to reduce overwatering.
- F. Add sprinklers where needed to improve coverage and improve distribution uniformity.
- G. Change sprinklers at stations 10 and 14 to accommodate inefficiencies from mature landscape.

#### GENERAL RECOMMENDATION ESTIMATED COST RANGES:

ITEM	COST RANGE	ESTIMATED PAYBACK
A	\$5,000 to \$6,000 annually, plus parts	
B	\$400 to \$600 (approx. 4 hours of professional time)	1 season
C	\$1,500 to \$2,000 annually; varies by provider. Most hardware and software is already in place.	1 to 3 seasons
D	No cost to standardize equipment. Pressure regulated, check valve sprinklers add approximately 20% over base sprinkler costs.	
E	Approximately 10 minutes of Tech time per sprinkler to properly nozzle	2 seasons
F	\$1,500 to \$2,500	
G	\$2,500 to \$3,500	

## **CONTROLLER AND SENSORS**

The system is operated from a Rain Bird ESP-LxMe SMART-ready controller. The controller is EPA WaterSense-ready and has an out-of-service cellular card. The assessor extracted remnants of past SMART scheduling. Engaging the cell card will enable daily weather data and corresponding schedule adjustments. Remote monitoring helps reduce the costs of operation including system shutdown for alarm conditions (like “geysers”) and enunciation of alarm conditions to precisely dispatch a service technician. Adding the weather service and updating scheduling practices will qualify the controller as an EPA WaterSense controller.

There was observed to be an advanced Rain Bird rain sensor, in service.

System scheduling was basic. The observed schedule operates ½ stations on odd days and ½ stations on even days beginning at 10PM daily. Station 14 was observed to be operating on both schedules.

All stations were set to 30 minutes without consideration for the hydrozone or landscape characteristics. Both schedules were set to 110% of programmed time. We did not observe water-efficient scheduling practices such as:

- station-by-station calculations based on plant/soil/water and system application rates
- cycle-and-soak scheduling to reduce runoff and waste
- monthly schedule adjustments based on historical weather

### **CONTROLLER AND SENSOR RECOMMENDATIONS:**

- A. Remove station 14 from operating daily
- B. Calculate, document and input station runtimes based on soil, sun, plant type
- C. Employ and document cycle-and-soak operation to reduce runoff and waste
- D. Add monthly schedule adjustments based on historical weather
- E. Upgrade/re-engage the controller to US EPA WaterSense ability, utilize water-efficient scheduling including daily weather-based adjustments

### **CONTROLLER AND SENSOR IMPROVEMENT ESTIMATED COST RANGES:**

ITEM	COST RANGE	PAYBACK
A	Zero cost	1 season
B	\$400 to \$600 (Approx. 4 hours of professional time)	1 to 2 seasons
C	\$150 to \$200 (Approx. 1 hour of professional time)	1 to 2 seasons
D	Zero cost	1 to 2 seasons
E	\$1,500 to \$2,000 annually (See item C, Table 1)	1 to 3 seasons

## **WATER SUPPLY AND BACKFLOW PREVENTION**

One municipal irrigation water supply is sized adequately to serve the property. One reduced pressure zone backflow prevention assembly (RPZ) appeared to be tagged as tested per local code. The RPZ and meter were “free-standing” without support, placing stress on piping.

### **WATER SUPPLY AND BACKFLOW RECOMMENDATIONS:**

- A. Add support posts and brackets under the plumbing equipment to relieve stress on fittings.
- B. Replace failed gas struts on the supply cabinet lid.
- C. Replace rotting cabinet base, re-level.
- D. Use the installed flow sensing equipment.

### **WATER SUPPLY IMPROVEMENT ESTIMATED COST RANGES:**

ITEM	COST RANGE	PAYBACK
A	\$250 to \$300	
B	\$100 to \$150	
C	\$400 to \$600	
D	See chart item E page 4	

## **IRRIGATION STATIONS/ZONES RECCOMENDATIONS:**

A “station” or “zone” is a group of sprinklers that operate together. The irrigation system was operated station-by-station with photos taken and basic observations noted.

- A. Implement a plan to replace rotor-sprinklers randomly nozzled with matched application rate nozzles to improve distribution uniformity and water efficiency\*
- B. Move sprinklers to overcome changes or growth of landscape over time
- C. Add sprinklers in areas of inadequate coverage
- D. Add check valve sprinklers at low points to reduce drainage water waste
- E. Use pressure regulated sprinkler bodies on replacement sprinklers

*\* A nozzle is the orifice that emits water from a sprinkler. Nozzles come in assorted sizes resulting in different amounts of water applied to the landscape. Best design and maintenance practices include matching application rates to the area being covered by a sprinkler – smaller nozzles on ¼ circle sprinklers, larger nozzles on sprinklers with greater coverage. “Distribution uniformity” is the evenness that sprinklers deliver water onto the landscape.*



**IRRIGATION STATION IMPROVEMENT ESTIMATED COST RANGES:**

ITEM	COST RANGE	PAYBACK
A	\$5,000 +/- one time then maintain as part of M&O	2-3 seasons
B	\$1,500 +/- one time then maintain as part of M&O	2-3 seasons
C	\$2,500 +/- one time then maintain as part of M&O	3-4 seasons
D	\$1,500 +/- one time then maintain as part of M&O	4-5 seasons
F	Approximately 20% more cost than basic sprinkler bodies	

**EXAMPLES OF REPLACEMENT PRODUCTS FOR FUTURE MAINTENANCE**

ORIGINAL ITEM	REPLACE WITH	OPTIONAL
Hunter PgP rotor style sprinkler	EPA WS-labeled sprinkler body like Hunter I20-Ultra or Rain Bird 5004-Plus w/matched application rate nozzles	Hunter MP rotator® nozzle on a WS-labeled sprinkler body like Hunter ProSpray40 or Rain Bird 1804-PRS-SAM
Hunter PgJ small rotor style sprinkler	Same or Rain Bird 3500 series w/matched application rate nozzles	Hunter MP rotator® nozzle on a WS-labeled sprinkler body like Hunter ProSpray40 or Rain Bird 1804-PRS-SAM

**EXAMPLES TO ADD MATCHED APPLICATION RATE NOZZLES TO ROTOR-STYLE SPRINKLERS**

Where rotor sprinklers water same/similar areas	Where rotor sprinklers simultaneously water fronts/sides/back	OPTIONAL
Small nozzles on 1/4 to 1/3 arc, medium nozzles on 1/2 to 2/3, large nozzles on 3/4 to full circle	Small nozzles in shady areas, larger nozzles in sunny areas	Convert rotors to MSMT nozzles on WS-labeled sprinkler bodies

**SAMPLE IRRIGATION MAINTENANCE REQUEST FOR PROPOSAL GUIDANCE CAN BE FOUND AT:**

[https://www.vermillionriverwatershed.org/wp-content/uploads/2020/03/HOA-Irrigation-System-Services-RFP-Template-Final-3\\_6\\_2020.docx](https://www.vermillionriverwatershed.org/wp-content/uploads/2020/03/HOA-Irrigation-System-Services-RFP-Template-Final-3_6_2020.docx)

## **WATER USE INFORMATION**

### **Estimated water need based on ET data and effective rainfall:**

TURF (full sun to mostly sunny): 1,312,000 gallons Cost: \$5,498

### **Water Use History: Rosemount, MN 2023 water unit price is \$4.19 (per 1,000 gallons)**

YEAR	ANNUAL USAGE (GALS)	APPROX. ANNUAL COST
2022	1,934,000	\$8,103
2021	2,123,000	\$8,895
2020	1,274,000	\$5,338 *
2019	2,472,000	\$10,357
AVERAGE (4 YRS)	1,950,750	\$8,170

\*Water use records indicate that SMART, remote-control service may have been in place in 2020.

### **Application Efficiency and System Observations:**

Efficient irrigation system designs include consideration for plant types, soil, slope, sun, water requirement, water supply, watering timeframes and sprinkler performance -known as distribution uniformity (how evenly a sprinkler applies water). Rainfall is considered 100% uniform.

An exceptionally well-designed and maintained sprinkler irrigation system may achieve **70%** efficiency.

Estimating the efficiency of this system depicts annual water use as follows:

"A Level" effectiveness and water use based on 70% efficiency = 1,875,000-gals Water Cost: \$ 7,856

"B Level" effectiveness and water use based on 60% efficiency = 2,188,000-gals Water Cost: \$ 9,167

"C Level" effectiveness and water use based on 50% efficiency = 2,625,000-gals Water Cost: \$11,000

Based only on a calculation of irrigation system efficiency (avg. water use/water need) at this location, the efficiency of the system appears to approach **67%**.


Omitting the 2020 record from the equation results in adjusted annual water use average of 2,176,000 gallons and an efficiency calculation of **61%**.

Observations from this assessment indicate "B-level" effectiveness **approaching 40% water waste**.

It should be the desire of Claret Springs HOA to operate the irrigation system in a manner to achieve "A level" effectiveness that includes both efficient water application and best practice-based scheduling.

Watering with a system without leaks, employing water-saving components, using nozzles that are sized for their respective application areas, a SMART irrigation controller with working rain sensor and automatic, SMART-based scheduling practices will help to achieve greater effectiveness and efficiency.

## STATION FINDINGS

CLARET SPRINGS W HOA		STATION																							
CONTROLLER		AVAILABLE FEATURES																							
Make and Model Number	Rain Bird ESP-LxMe	Number of Stations	24																						
Year	SMART-ready controller	Percent Adjust Options	110																						
POINT OF CONNECTION		Number of Programs	using 2 of 4 available																						
Static Pressure	60	Cycles per Program	1																						
Backflow Preventor	2" Febco 860 reduced pressure (RP2)	Days Cycles Available	Pgm A-even days Pgm B-odd days																						
BOOSTER PUMP		Sensors Installed	Rain Bird advanced sensor - in service																						
Make	none	Miscellaneous Items	has an exp. cell card, master valve & flow sensor																						
SCHEDULE																									
Program	A	B	C	D	E																				
Start Time(s)	10:00PM	10:00PM																							
Days	even (sta 1-12, 14)	odd (sta 13-24 incl sta 14)																							
SITE		CONTROLS		TYPE				OBSERVED PROBLEMS																	
Location	Program	A	B	C	D	E	Plant Material	Sprinkler Type	Sprinkler Brand	Sprinkler Model	Number of Sprinklers	Valve Malfunctions	Low Pressure	High Pressure	Tilted Sprinklers	Spray Deflection	Sunken Sprinklers	Plugged Equipment	Arc Misalignment	Low Sprinkler Drainage	Leaky Seals or Fittings	Lateral or Drip Line Leaks	Missing or Broken Heads	Slow Drainage or Ponding	Uneven application/ unmatched n
Crestview Cir - front, side, back of 15124, Back of 15130, 15140	30						CS Turf	rotor	mixed	Pgr 3504, 3504	10							x		x					x
Crestview Cir - along pond mow line behind 15130, 15140, 15142, 15148, 15147, 15141	30						CS Turf	rotor	mixed	Pgr 3504, 3504	22														x
Crestview Cir - front of 15140, all around 15142, 15148, 15147, 15141	30						CS Turf	rotor	mixed	Pgr 3504, 3504	28							x							x
Crestview Cir - all around 15135, 15129. Behind 15123	30						CS Turf	rotor	mixed	Pgr 3504, 3504	27							x							x
Crestview Cir - behind 15123, 15117(?). Front and between 15117, 15111	30						CS Turf	rotor	mixed	Pgr 3504, 3504	26									x					x
Crestview Cir - behind 15111, 15105. Side and front of 15105. Entire center island	30						CS Turf	rotor	mixed	Pgr 3504, 3504	22									x					x
Notes		change to low angle nozzles center island sprinklers and add as needed to overcome lack of coverage																							



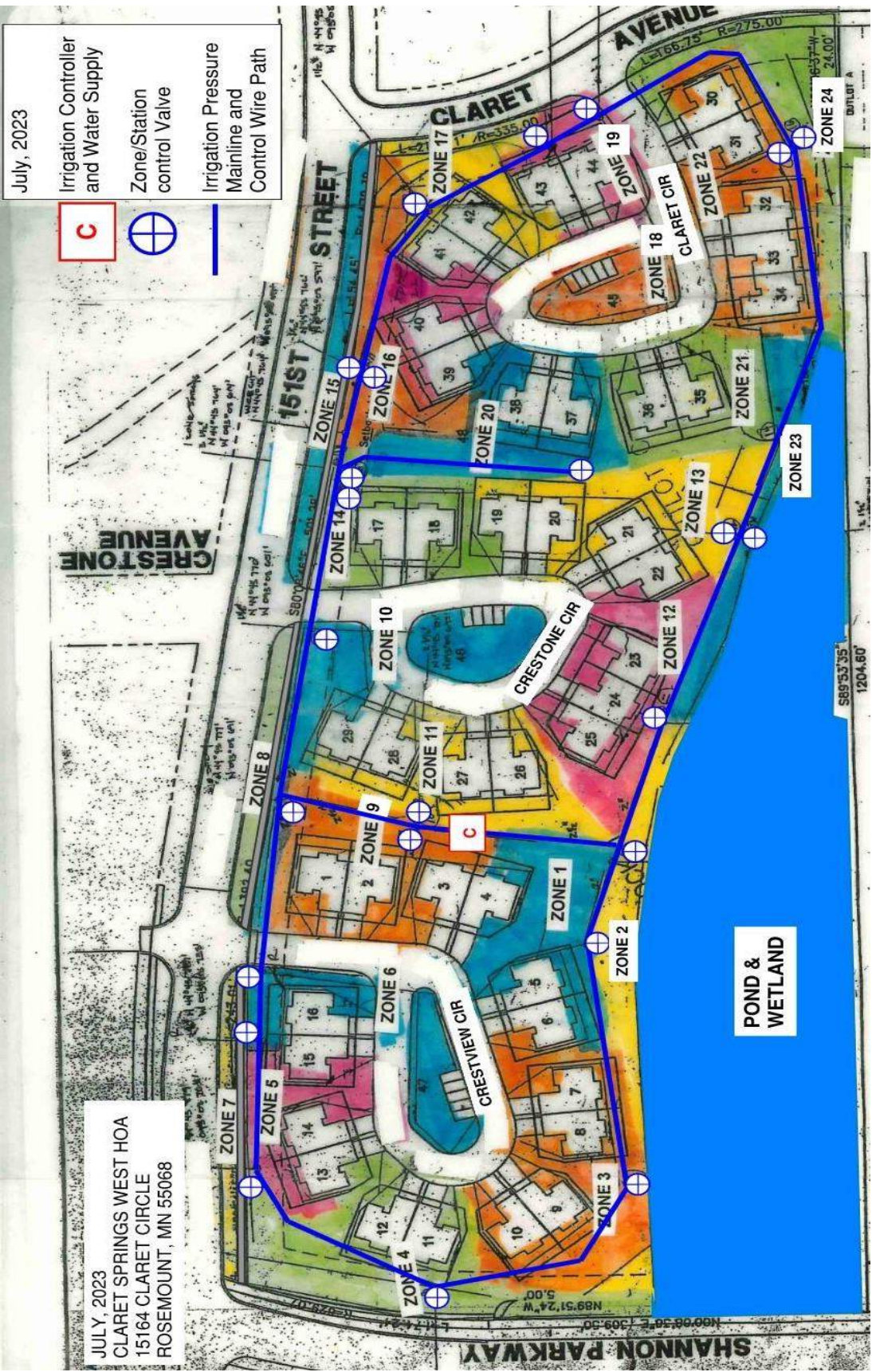
Claret Springs W HOA	SITE	CONTROLS					TYPE				OBSERVED PROBLEMS															
		Program					Plant Material	Sprinkler Type	Sprinkler Brand	Sprinkler Model	Number of Sprinklers	Valve Malfunctions	Low Pressure	High Pressure	Pitched Sprinklers	Spray Deflection	Sunken Sprinklers	Plugged Equipment	Arc Misalignment	Low Sprinkler Drainage	Leaky Seals or Fittings	Lateral or Drip Line Leaks	Missing or Broken Heads	Slow Drainage or Ponding	Uneven application/ unmatched noz	
7	151st Street - along boulevard corner of Shannon Pkwy & 151st St	A	B	C	D	E	CS Turf	spray	Rain Bird	1804	20							x								
8	151st Street - along boulevard between Crestview Cir & Creststone Cir	A	B	C	D	E	CS Turf	spray	Rain Bird	1804	18							x								
9	Crestview Cir - all around 15106, 15112, Front of 15118	A	B	C	D	E	CS Turf	rotor	mixed	PBP 5004, 3504	26															
10	Crestview Cir - along trail at 151st st. Front and side of 15109 Creststone Cir. Entire Crestone Cir parking lot island	A	B	C	D	E	CS Turf	rotor	mixed	PBP 5004, 3504	30						x									
11	Creststone Cir - behind 15109, 15117, 15125, 15133. Front & between 15117, 15125. Front & side of 15133	A	B	C	D	E	CS Turf	rotor	mixed	PBP 5004, 3504	21					x		x								
12	Creststone Cir - all around 15135, 15151, 15157. Front & between 15154, 15157	A	B	C	D	E	CS Turf	rotor	mixed	PBP 5004, 3504	20															
13	Creststone Cir- behind 15144, 15146, 15138, 15130. Front & between 15146 & 15138	A	B	C	D	E	CS Turf	rotor	mixed	PBP 5004, 3504	26						x									
14	Creststone Cir - behind 15117, 15109. Front & between 15125, 15117. Front & side of 15109	A	B	C	D	E	CS Turf	rotor	mixed	PBP 5004, 3504	22						x									
15	151st Street - along boulevard between Creststone Cir & corner of Claret Ave	A	B	C	D	E	CS Turf	rotor	mixed	PBP 5004, 3504	27							x								

STATION

Claret Springs W HOA	SITE	CONTROLS					TYPE			OBSERVED PROBLEMS																	
		Program					Plant Material	Sprinkler Type	Sprinkler Brand	Sprinkler Model PP, 5004, 3504	Number of Sprinklers	Valve Malfunctions	Low Pressure	High Pressure	Pitched Sprinklers	Spray Deflection	Sunken Sprinklers	Plugged Equipment	Arc Misalignment	Low Sprinkler Drainage	Leaky Seals or Fittings	Lateral or Drip Line Leaks	Missing or Broken Heads	Slow Drainage or Ponding	Uneven application/ unmatched noz		
		A	B	C	D	E																				rotor	mixed
16	Claret Cir - along trail behind 15153, 15151, 15147, 15143			30			CS Turf	rotor	mixed	PP, 5004, 3504						x										x	
17	Claret Cir- front, between and behind 15143, 15139						CS Turf	rotor	mixed	PP, 5004, 3504						x										x	
18	Claret Cir - entire parking lot island						CS Turf	rotor	mixed	PP, 5004, 3504						x										x	
19	Claret Cir - front, side, behind 15135. Behind 15139						CS Turf	rotor	mixed	PP, 5004, 3504						x										x	
20	Claret Cir - all around 15159, 15163						CS Turf	rotor	mixed	PP, 5004, 3504						x										x	
21	Claret Cir - all around 15167, 15171, 15175						CS Turf	rotor	mixed	PP, 5004, 3504						x										x	
22	Claret Cir - all around 15166, 15164, 15158, 15156						CS Turf	rotor	mixed	PP, 5004, 3504						x										x	
23	Crestone Cir - along mow line behind						CS Turf	rotor	mixed	PP, 5004, 3504						x										x	
24	Claret Cir - open space behind 15166, 15164, 15158, 15156 & along Claret Ave						CS Turf	rotor	mixed	PP, 5004, 3504						x										x	
CONTROLLER 1 STATION																											



# STATION MAP





## STATION BY STATION SAMPLE OBSERVATIONS

(1)



Created: Fri 28 Jul 09:53  
2023

Claret Springs HOA

Controller and water supply behind 15118 Claret Circle. Top is held open with a wooden board due to failed gas struts. Recommend replacing gas struts for the hood, re-leveling the enclosure and placing on firm foundation.

(2)



Created: Fri 28 Jul 09:55  
2023

2" water supply 2" Febco 860 reduced pressure zone backflow prevention assembly (RPZ), 2" Rain Bird PgA as master valve, 2" Data Industrial paddle wheel flow sensor. System was formerly connected to full SMART remote central control. RPZ appears to have been tested and tagged May, 2023.

Recommend installing supports for the plumbing

---

**equipment (currently resting  
on the PVC pipeline, change  
PVC pipe to metallic pipe.**

**(3)**



**Created: Fri 28 Jul 10:00  
2023**

**Rain Bird ESP-Ix SMART ready  
controller w/24 stations of  
irrigation.**

**Rain Bird advanced rain  
sensor is connected and is in  
service.**



(4)



Created: Fri 28 Jul 10:01  
2023

Controller interior is orderly. Controller has an expired (not in service) remote central control cellular card and functional but not-in-use flow sensor and master valve. This system was formerly on SMART and remote control service.

Database download reflects some SMART features was previously in place. If the owner chooses not to re-subscribe to remote water management services, many water-efficient features are available as a stand-alone controller.

(5)



**Created: Fri 28 Jul 11:09  
2023**

**Claret Springs Station 1 -  
illustration of sprinkler spray  
contributing to conifer  
damage over time.**

(6)



**Created: Fri 28 Jul 11:18  
2023**

**Claret Springs Station 2 -  
example of a sprinkler  
blocked behind grass line.  
Sprinklers also need arc and  
throw adjustment.**

(7)



Created: Fri 28 Jul 11:36  
2023

Claret Springs Station 3 -  
front of 15142 Crestview  
Circle - example of arc  
adjustment needed and need  
to add an opposing sprinkler  
(at the top of driveway edge).

(8)



Created: Fri 28 Jul 11:45  
2023

Claret Springs Station 4 -  
example of a tilted sprinkler  
in need of maintenance and  
perhaps moving away from  
stone and into the lawn area.



(9)



Created: Fri 28 Jul 11:56  
2023

Claret Springs Station 4 -  
front of 15123 Crestview  
Circle - example of a sprinkler  
tilted and stuck in the "up"  
position.

(10)



Created: Fri 28 Jul 12:00  
2023

Claret Springs Station 5 -  
between 15117&15111  
Crestview Circle - example of  
opportunity to install smaller  
nozzles between homes/in  
shade areas while leaving  
larger nozzles for sunny  
areas.

(11)



Created: Fri 28 Jul 12:29  
2023

**Claret Springs Station 10 -  
recommend changing rotor  
style sprinklers to short  
throw multi-stream, multi-  
trajectory (MSMT) sprinklers  
and add as needed between  
sprinklers.**

**Total average depth of throw  
to cover is only about 12 feet.  
Existing sprinklers throw up  
to 30 feet and are throwing  
directly into the trees and are  
largely ineffective and  
damaging the trees.**

**Changing sprinklers type will  
reduce waste and stress on  
mature conifers.**



(12)



**Created: Fri 28 Jul 12:18  
2023**

**Claret Springs Station 8 -  
sprays along 151<sup>st</sup> Street.**

**Several clogged, several  
sunken, 1 geyser.**

(13)



**Created: Fri 28 Jul 12:57  
2023**

**Claret Springs Station 10 -  
island area needs  
maintenance.**

**At least one sprinkler is  
overgrown or perhaps root  
pinched and not operating at  
all, contributing to dry areas.**

(14)



**Created: Fri 28 Jul 13:19  
2023**

**Claret Springs Station 14 -  
recommend the same  
remedy as station 10.  
Recommend changing rotor  
style sprinklers to short  
throw multi-stream, multi-  
trajectory (MSMT) sprinklers  
and add as needed between  
sprinklers.**

**Total average depth of throw  
to cover is only about 12 feet.  
Existing sprinklers throw up  
to 30 feet and are throwing  
directly into the trees and are  
largely ineffective and  
damaging the trees.**

**Changing sprinklers type will  
reduce waste and stress on  
mature conifers.**

(15)



**Created: Fri 28 Jul 13:26  
2023**

**Claret Springs Station 17 -  
several sprinklers blocked by  
conifers.**

**Recommend moving,  
adjusting and adding  
sprinklers as needed to avoid  
throwing water into conifers  
and maximizing coverage of  
lawn areas.**

**Shorter throw sprinklers such  
as MSMTs may be a better  
application for this area.**

(16)



**Created: Fri 28 Jul 13:38  
2023**

**Claret Springs Station 19 -  
pointing to a sprinkler  
directly under a conifer.**

**Recommend moving to  
another location or capping-  
off.**



(17)



**Created: Fri 28 Jul 14:09  
2023**

**Claret Springs Station 24 -  
Heavy shade area in this  
photo.**

**Matched application rate  
nozzles (MARN) can help  
overcome the overwatered  
area shown while addressing  
underwatered/sunny areas  
elsewhere on this station.**

(18)



**Created: Fri 28 Jul 14:14  
2023**

**Claret Springs Station 23 -  
several sprinklers blocked by  
vegetation. Recommend  
moving sprinklers into the  
managed lawn area, adjust as  
needed.**

---

## **GLOSSARY**

**Arc** – The area a part-circle sprinkler irrigates, expressed in degrees of a circle. For example, a 90-degree arc provides quarter-circle coverage, while a 180-degree arc provides half-circle coverage.

**Backflow Preventer** – A mechanical assembly installed to protect the potable water supply from potentially contaminated irrigation water.

**Best Management Practices** – An irrigation BMP is a voluntary irrigation practice that is both economical and practical and is designed to reduce water consumption and protect water quality while maintaining plant health at the desired level.

**Certified Landscape Irrigation Auditor** – The Certified Landscape Irrigation Auditor is involved in the analysis of landscape irrigation water use. Auditors collect site data, make maintenance recommendations, and perform water audits. Through their analytical work at the site, these irrigation professionals develop monthly irrigation base schedules.

**Controller** – An automatic timing device that sends an electric signal for automatic valves to open or close according to a set irrigation schedule.

**Cycle-and-Soak** – Allows the user to divide a station’s run time into more usable, shorter duration cycles. Cycle-and-soak is particularly applicable for slopes and tight soil (such as clay) and helps prevent excessive runoff. The cycle time is entered into the controller as a fraction of the station’s watering time, and the soak time as the minimum soak required before the watering of the next portion. The total number of cycles is determined by taking the total programmed station run time and dividing it by the cycle time.

**Distribution Uniformity** – (Also referred as “Performance”) Measure of the uniformity of irrigation water over an area.

**EPA WaterSense Partner** – WaterSense is a voluntary, public-private partnership program sponsored by the U.S. Environmental Protection Agency. WaterSense works to protect the future of national water supplies by promoting water-efficient products, practices and professionals. EPA WaterSense Partners are committed to bringing water-efficient products and practices to the market.

**Fixed Arc Nozzles** – Rotor style sprinkler where the arc stays static and is non-adjustable.



---

**Hydrozone** – Grouping of plants with similar water requirements so that they can be irrigated with a common zone.

**Maintenance** – Work to keeping something in operating condition.

**Matched Application Rates** – Refers to sprinklers that apply water at the same rate per hour no matter the arc of coverage or part of a circle they cover.

**Microclimate** – Unique environmental conditions in a particular area of a landscape. Factors include amount of sunlight or shade, soil type, slope and wind.

**MSMT** – Multi-stream, multi-trajectory sprinkler with individual, rotating streams of water.

**Municipal Water** –Potable water that can be used as a source of irrigation water, but once water enters an irrigation system and passes through a backflow assembly, it is no longer considered potable.

**Nozzle** – The final opening through which water passes from the sprinkler or emitter. Nozzle shape, size, and placement has a direct effect on the distance, watering pattern, and distribution efficiency.

**Pitched Sprinkler Head** – A sprinkler that is slanted or tilted.

**Point of Connection** – Location where irrigation system is connected to a (potable) water supply.

**Rain Sensor** – A device that automatically interrupts irrigation events during periods of sufficient naturally occurring moisture.

**Rotor Sprinkler** – A type of sprinkler where a primary stream of water is distributed back and forth across the area being watered.

**Runoff** – Portion of precipitation, snow melt or irrigation, that flows over the soil, eventually making its way to surface water supplies.

**Spray Sprinkler** – A sprinkler with a fixed nozzle that does not rotate.

---

**Sprinkler to Sprinkler Coverage** – Single sprinklers generally do not furnish even distribution of water throughout their range of throw. When overlapping coverage is provided, the weak areas from one sprinkler are supplemented by the strong areas from another sprinkler. Overlapping coverage also reduces time necessary to complete an irrigation cycle from the perspective of total water required.

**Station/Zone/Circuit** – Section of an irrigation system served by a single point of control. Also known as a Hydrozone, optimally comprised of similar sprinkler types and plant material types and applying water onto a consistent topography or microclimate.

**Topography** – The arrangement of the natural and artificial physical features of an area.

**Valve Box** – A protective container installed around an underground valve to allow operation or maintenance access to underground pipeline valves.

**Variable Arc Nozzles** – Rotor style sprinkler where the arc can be adjusted to apply irrigation more accurately to nonconvention landscape areas.

**WiM** – Water in Motion, Inc.