

## Nelson, Dan

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**From:** Terry Scanlan <TScanlan@spfwater.com>  
**Sent:** Tuesday, September 14, 2021 12:11 PM  
**To:** Nelson, Dan  
**Cc:** Patrick Kelly  
**Subject:** Re: Field Exam Permit 63-33470

Dan,

Close enough for me. Thanks.

Terry

Sent from my iPhone

On Sep 14, 2021, at 8:25 AM, Nelson, Dan <[Dan.Nelson@idwr.idaho.gov](mailto:Dan.Nelson@idwr.idaho.gov)> wrote:

Terry and Pat:

Thank you for this information. I appreciate the pumping water level calculations and I feel they are reasonable. Using this water level I calculated the overall flow rate at 0.084 cfs at 40 psi.  $[8.8 \times 0.70 \times 5] / [272.5 + (40 \times 2.31)] = 0.084 \text{ cfs or } 38 \text{ gpm.}$

It appears from Pat's email, that they did run a zone with full circle sprinklers, so we can go with the information provided that supports 0.05 cfs for the irrigation use.

Using the information you supplied, I determined that the diversion rates should be 0.05 cfs for the irrigation use, 0.04 cfs for domestic use, and a total diversion rate of 0.08 cfs. Unless there is other information that you would like to supply, I will recommend these diversion rates. I agree with the volumes you supplied in the field report, so there are no issues there. Please let me know if you disagree with this recommendation. I will probably have this one ready for supervisor review by the end of this week.

Thank you for your efforts, and I really appreciate the quick reply.

Daniel Nelson  
Water Right Analyst 3  
Idaho Department of Water Resources  
Telephone (208) 287-4856  
Fax (208) 287-6700 (attn: Dan Nelson)

**From:** Patrick Kelly <[PKelly@spfwater.com](mailto:PKelly@spfwater.com)>  
**Sent:** Thursday, September 09, 2021 3:53 PM

**To:** Terry Scanlan <[TScanlan@spfwater.com](mailto:TScanlan@spfwater.com)>; Nelson, Dan <[Dan.Nelson@idwr.idaho.gov](mailto:Dan.Nelson@idwr.idaho.gov)>  
**Subject:** RE: Field Exam Permit 63-33470

Hello Dan,  
Station 7 (the NW lawn) and Station 1 (dog/side yard) have a combination of corner and 180 degree sprinklers. Station 4, the back lawn runs a strip of 360 degree heads across the back fence. They are used to irrigate the back yard, but also spray out into the field for what the Kaczmarek's called good for fire protection. This made the place of use slightly more difficult to distinguish, but I used the maximum rating instead of average based on what could theoretically be diverted instantaneously given the expected pressure of the system. The other zones do divert less. Thank you for your notes, they will be useful in future field exams.

Best,  
Patrick

**From:** Terry Scanlan <[TScanlan@spfwater.com](mailto:TScanlan@spfwater.com)>  
**Sent:** Thursday, September 9, 2021 3:35 PM  
**To:** Nelson, Dan <[Dan.Nelson@idwr.idaho.gov](mailto:Dan.Nelson@idwr.idaho.gov)>; Patrick Kelly <[PKelly@spfwater.com](mailto:PKelly@spfwater.com)>  
**Subject:** RE: Field Exam Permit 63-33470

Dan,

1. Regarding pumping water level, the static water level on drillers report was 205 feet. Pumping level with air lift was 330 feet, suggesting a maximum of 125 feet of drawdown. Pumping rate was 75+ gpm, for an airlift pumping specific capacity of 75 gpm/125 feet = 0.6 gpm/ft. If the pumping rate was 0.09 cfs (40.5 gpm), the drawdown would have been 36 gpm / 0.6 gpm/ft = 67.5 feet. 205 feet static plus 67.5 feet drawdown = 272.5 feet pumping water level. I think we used 268 feet because it was halfway between 205 and 330 and because airlift is inefficient compared to pumping, but the 272.5 is probably more defensible for 0.09 cfs.
2. The invoice provided with the exam photos indicates that the pump is controlled by an SD300N4 Sub Drive, meaning it is a variable speed pump.
3. I'll let Patrick respond to item 3.

Thanks for your quick review.

Terry

**From:** Nelson, Dan <[Dan.Nelson@idwr.idaho.gov](mailto:Dan.Nelson@idwr.idaho.gov)>  
**Sent:** Thursday, September 9, 2021 2:38 PM  
**To:** Terry Scanlan <[TScanlan@spfwater.com](mailto:TScanlan@spfwater.com)>; Patrick Kelly <[PKelly@spfwater.com](mailto:PKelly@spfwater.com)>  
**Subject:** Field Exam Permit 63-33470

Hello Terry and Pat,

I have reviewed the field report for permit and I have a couple of questions. This isn't a big difference, but I have to look at smaller permits with the same perspective as a larger permit. All I really need is for the information you gave to match up with your recommendations. The questions are:

- 1.) You used a pumping water level of 268 feet for a lift in the theoretical calculation based on the Well Driller's Report. The Well Driller's Report shows a drawdown of 330 feet at 75 gpm over 60 minutes of pumping. Your narrative refers to the Well Driller's Report,

but the Well Driller's Report doesn't provide anything that says the pumping water level is at 268 feet for any diversion rate. If you don't use the 330 feet drawdown number on the Well Driller's Report, you do have to give us a calculation or information that justifies a different pumping water level.

- 2.) If you use the 330 feet lift and the 40 psi be justified, then the pump curve and the theoretical calculation comes out at about 30 to 33 gpm or 0.07 cfs. This actually makes sense, since most domestic well systems are designed to have approximately a 6 to 35 gpm pump, so this pump actually seems to be a bit on the high side for a domestic well's recommended diversion rate. Most actual in-house use requirements are between 6 gpm to 12 gpm, and the additional flow handles the yard use. If there is a higher diversion rate, then I would assume that they would be very close to needing a variable speed pump. See website [https://inspectapedia.com/water/Well\\_Pump\\_Capacity.php](https://inspectapedia.com/water/Well_Pump_Capacity.php) for my information.
- 3.) You state in the narrative that the sprinklers in the backyard zone divert between 1.26 to 1.78 gpm, and then you multiply the 12 sprinklers by the maximum of 1.78 gpm instead of the average of 1.52 gpm average for 12 sprinklers for a total of 18.24 gpm or 0.04 cfs instead of the 0.05 cfs you recommended. If each sprinkler has a range of 1.26 to 1.78 gpm for each sprinkler then I agree with your estimation. However, if some of the sprinklers are 1.26 gpm and some are 1.78 gpm, then you would use the average and not the maximum. Your narrative says they use the 1800 series Rainbird sprinklers with a range of 1.26 to 1.78 gpm. It looks like the 10 Series HE-Van chart is the only chart that has a range of 1.26 to 1.78 gpm, and that is for a full circle. If this the nozzle used, then I would use the 1.78 gpm flow rate if they are full circles, since domestic uses usually have a 40-60 pressure switch. You observed them, so you should know how many are full circles and how many are partial circles. If there are partial circles, then you would use the maximum for that representation on the chart.

Generally, I try to be pretty lenient on smaller uses that can't be measured, but you gave me a bunch of information that seemed to disagree with the recommendations you made. I would really appreciate it if you could clarify some of the background information, so it matches the recommended amounts.

As always, if you have any questions, please don't hesitate to give me a call.

Respectfully,

Daniel Nelson  
Water Right Analyst 3  
Idaho Department of Water Resources  
Telephone (208) 287-4856  
Fax (208) 287-6700 (attn: Dan Nelson)

STATE OF IDAHO  
DEPARTMENT OF WATER RESOURCES  
**BENEFICIAL USE FIELD REPORT**

A Beneficial Use Field Report is prepared by a water right examiner as the result of an examination to clearly confirm and establish the extent of the beneficial use of water established in connection with a permit during the development period authorized by the permit and any extensions of time previously approved.

**A. GENERAL INFORMATION**Permit No. 63-33470

1. Owner Harry P Kaczmarek and Lorraine E Kaczmarek Phone No. 208-369-6119  
 Current address 7801 Sonara Road Caldwell Idaho 83607
2. Examiner's name Terry Scanlan CWRE 129 EXAM DATE 8/30/2021
3. Accompanied by Owners and Patrick Kelly (SPF) Email lkaczm@gmail.com  
 Address \_\_\_\_\_  
 Relationship to permit holder \_\_\_\_\_ Phone No. \_\_\_\_\_
4. Source Ground Water tributary to \_\_\_\_\_

**B. OVERLAP REVIEW**

1. Other water rights with the same place of use none
2. Other water rights with the same source and point of diversion 63-33566

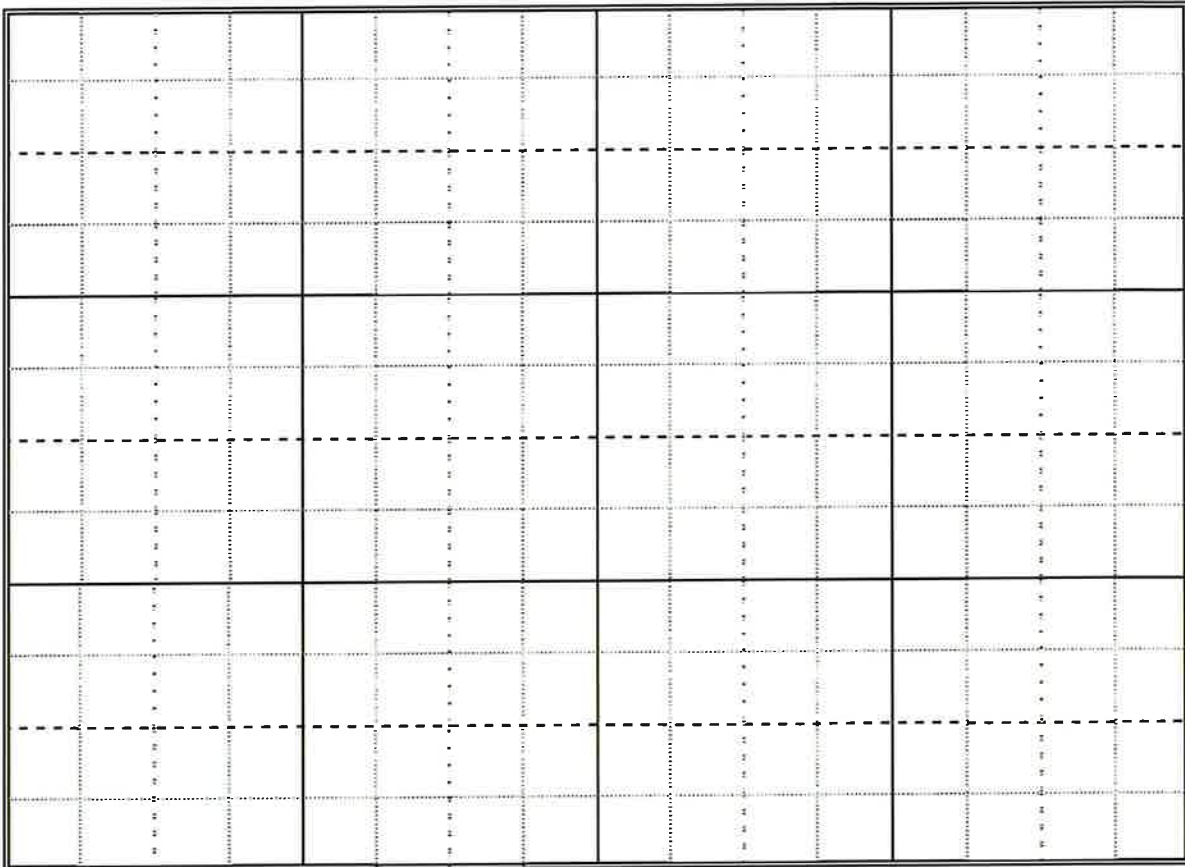
**C. DIVERSION AND DELIVERY SYSTEM****1. Point(s) of Diversion:**

| Ident. No. | Gov't Lot | ¼ | ¼  | ¼  | Sec | Twp | Rge | County | Method of Determination/Remarks |
|------------|-----------|---|----|----|-----|-----|-----|--------|---------------------------------|
|            |           |   | SW | SE | 36  | 06N | 03W | Gem    | D0052472                        |
|            |           |   |    |    |     |     |     |        |                                 |
|            |           |   |    |    |     |     |     |        |                                 |
|            |           |   |    |    |     |     |     |        |                                 |

**2. Place(s) of Use:** Method of determination Well located at -116.640 43.809

| Twp | Rge | Sec | NE |    |    |    | NW |    |    |    | SW |    |    |    | SE |    |     |    | Totals |
|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|--------|
|     |     |     | NE | NW | SW | SE | NE | NW | SW | SE | NE | NW | SW | SE | NE | NW | SW  | SE |        |
| 06N | 03W | 36  |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 2.3 |    | 2.3    |
|     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |    |        |
|     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |    |        |
|     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |    |        |
|     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |    |        |
|     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |    |        |
|     |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |    |        |

3. **Delivery System Diagram:** Indicate all major components and distances between components. Indicate weir size/ditch size/pipe diameter (inside), as applicable. Use the space provided or ☒ see attached.



Scale: 1" = \_\_\_\_\_

- ☒ Copy of USGS Quadrangle attached showing location(s) of point(s) of diversion and place(s) of use (required)  
☒ Aerial photo attached (required for irrigation of 10+ acres)  
☒ Photo of diversion and system attached

4.

| Well or Diversion Identification No.* | Motor Make | Hp | Motor Serial No. | Pump Make | Pump Serial No. or Discharge Size |
|---------------------------------------|------------|----|------------------|-----------|-----------------------------------|
| D0052472                              | Franklin   | 5  |                  |           |                                   |
|                                       |            |    |                  |           |                                   |
|                                       |            |    |                  |           |                                   |

\*Code to correspond with no. on map and aerial photo

#### D. FLOW MEASUREMENTS

1.

| Measurement Equipment | Type | Make | Model No. | Serial No. | Size | Calib. Date |
|-----------------------|------|------|-----------|------------|------|-------------|
|                       |      |      |           |            |      |             |
|                       |      |      |           |            |      |             |

2. **Measurements:** \_\_\_\_\_

Measurements were not collected during the field exam. Average theoretical flow rate equals 0.09 cfs. See attached theoretical flow rate sheet for details.

Has the permit holder met all conditions of permit approval, including any mitigation requirements and/or measuring device installation requirements? ☒ Yes ☐ No If no, what must be done to meet the permit requirements?

**F. FLOW CALCULATIONS**☒ Additional computation sheets attached

Measured Method:

Permit 63-33470 = 0.15 cfs

Theoretical Equation =  $Q = 8.8 * (\text{Efficiency}) * \text{hp} / \text{depth to water} + 2.31 * (\text{psi}) + \text{friction} = 0.09 \text{ cfs}$ 

Standard allowance flow rate = # acres \* 0.03 cfs/ac = 2.3 acres \* 0.03 cfs/acre = 0.07 cfs

Sprinkler flow rate (largest zone) = 12 sprinklers \* 1.78 gpm/sprinkler = 0.05 cfs

Recommendation for irrigation flow rate = 0.05 cfs

Recommendation for domestic flow rate = 0.04 cfs per Administrative Memo #22

**G. VOLUME CALCULATIONS**

## 1. Volume Calculations for Irrigation:

$$V_{I,R} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = 2.3 \text{ acres} \times 4.5 \text{ af/acre} = 10.4 \text{ af}$$

$$V_{D,R} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation Season}) \times 1.9835 = 0.05 \text{ cfs} \times 260 \text{ days} \times 1.9835 = 25.8 \text{ af}$$

$$V = \text{Smaller of } V_{I,R} \text{ and } V_{D,R} = 10.4 \text{ af}$$

## 2. Volume Calculations for Other Uses:

0.6 af per Administrative Memo #22 for in-home domestic use.

**H. RECOMMENDATIONS**

## 1. Recommended Amounts

| Beneficial Use | Period of Use |       | Rate of Diversion<br>Q (cfs) | Annual Volume<br>V (afa) |
|----------------|---------------|-------|------------------------------|--------------------------|
|                | From          | To    |                              |                          |
| Irrigation     | 3/1           | 11/15 | 0.05                         | 10.4                     |
| Domestic       | 1/1           | 12/31 | 0.04                         | 0.6                      |
|                |               |       |                              |                          |
|                |               |       |                              |                          |
|                |               |       |                              |                          |
| <b>Totals:</b> |               |       | 0.09                         | 11.0                     |

## 2. Recommended Amendments

- ☐ Change P.D. as reflected on page 1    ☐ Add P.D. as reflected on page 1    ☒ None  
☐ Change P.U. as reflected on page 1    ☐ Add P.U. as reflected on page 1    ☐ Other

**I. AUTHENTICATION**

Field Examiner's Signature

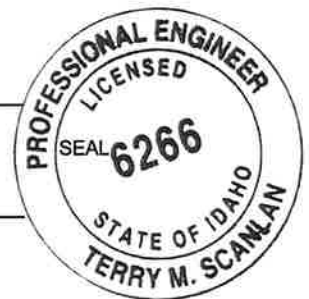
*Terry M. Scanlan*

Date 8/31/2021

Reviewer

*TH*

Date 9/27/21



## **Water Right Permit 63-33470 Field Exam Narrative**

The field exam for this permit was conducted on August 30, 2021. The field exam was conducted by Patrick Kelly, accompanied by Harry and Lorraine Kaczmarek, and reviewed by Terry Scanlan, P.E., P.G. (CWRE 129). Mr. and Mrs. Kaczmarek are the current owners of the permit and property. Changes to ownership are not required.

No licensed or decreed water rights exist on the property. Permit 63-33566 for 4.5 acres (known as Lot 5) has historically shared the well. Lot 5 is immediately east of the Kaczmarek property and has been irrigated to keep noxious weeds down. The buyers of Lot 5 will lose access to the Kaczmarek well later this fall and will drill another domestic well for the property. The Kaczmarek's do not receive water from an irrigation district or municipality. No other water rights should be considered.

The source of water comes from a domestic well drilled in 2007 (D0052472). A well drillers report is attached to this field exam. The well was drilled within the SWSE Sec 36, Twn 6 North, Rge 3 West of Gem County. Only one well serves the domestic and irrigation needs. The second POD description should be dropped for licensing. An amendment to the POD is not required.

In 2016, Valley Pump and Equipment installed a 5-hp submersible pump and motor. A phone call to the company provided very little information regarding pump curves, model, pumping level etc. Irrigation use is achieved through a buried sprinkler and drip system. Turf around the home and natural landscape along the perimeter of the property is irrigated by Rainbird sprinklers. Spec sheets of these sprinklers show that the sprinklers divert 1.26 to 2.30 gpm depending on system pressures. The back yard zone uses approximately 12 Rainbird 1800 series sprinklers that divert 1.26 to 1.78 gpm. The maximum diversion rate of this zone totals 21.4 gpm (0.05 cfs). Spec sheets for these sprinklers are attached to this report.

Drip irrigation systems are generally designed to operate in the pressure range of 10 to 30 pounds per square inch (psi), but domestic water is usually delivered to households at pressures above 30 psi. A pressure valve had to be installed on the south end of the property due to changes in head was blowing out the drip lines. Drip systems commonly divert at one half to four gallons per hour. The fruit trees shown in the attached photographs use three 5 gallons per hour emitters per tree. Even with the larger drip emitters, the sprinkler systems divert the most water at one time.

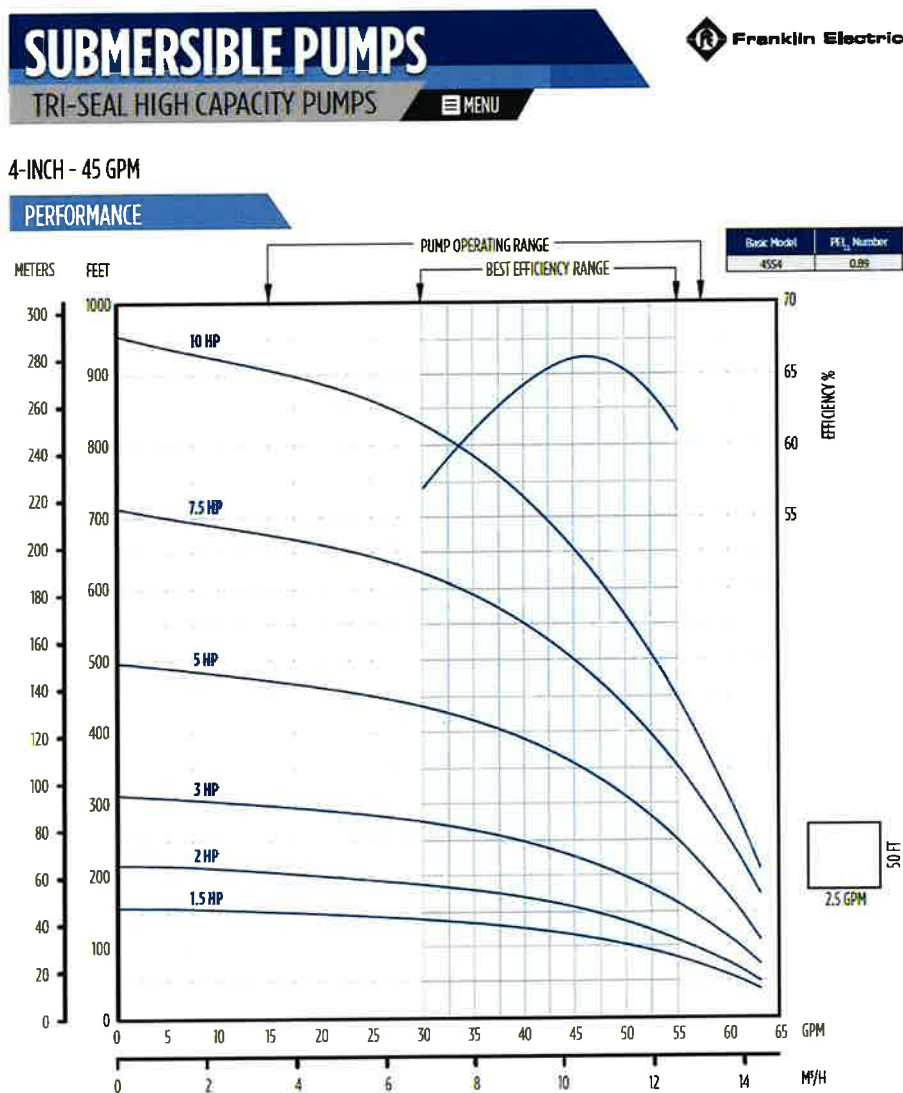
The irrigation place of use is a mix of turf grass, native shrub and flowering plants, junipers, fruit trees and vegetables. Much of the drip system on the south half of the property was installed in the summer of 2021, and is not yet visible on aerial imagery. The junipers along the east side of the property includes quail habitats that were developed under the supervision of Idaho Fish and Game. These habitats have created a large boost to the local wildlife as evidence of bird tracks across the property. Aerial imagery and digital tools were used to measure 2.3 acres of irrigation use.

Domestic water is used for in-home use for a single family. A hydropneumatic tank is used to decrease pump cycling. Standard domestic rate and volumes are recommended per Administrative Memo #22.

A theoretical calculation is used to demonstrate the estimated maximum diversion rate of the pump and is attached to the field report. The well drillers report recorded a static water level of 205 ft, the well was screened from 352 to 362 feet, and a pumping test yielded a flow of 75 gpm set at 330 feet. Pumping level inside the well is not known. 268 feet was used based on information recorded in the well

drillers report. A range of discharge pressures were used under what we would expect to see from domestic type irrigation systems (20 – 30 psi) as well as common domestic tanks (40 - 60 psi) Average theoretical flow rate is 0.09 cfs.

The pump curve below for a Franklin Electric 5 hp pump demonstrates that the system could easily divert 0.09 cfs (40.4 gpm) with the expected lift from the well.



The domestic system utilizes a hydropneumatic tank, however it is reasonable to assume that the domestic use could divert “live” water while irrigating the property. The license recommendation of 0.09 cfs represents running water for both beneficial uses, supported by the theoretical flow rate, pump curve, and sprinkler calculation.

## **ATTACHMENT A – SYSTEM DIAGRAM**



-  Point of Diversion
-  Sprinkler Mainline
-  Drip Mainline
-  Domestic Place of Use
-  Irrigation Place of Use

**SPF WATER**  
ENGINEERING

300 East Mallard Drive, Suite 350  
Boise, Idaho 83706  
Tel (208) 383-4140 Fax (208) 383-4156

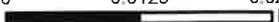
63-33470 Field Exam Report  
System Diagram

Harry and Lorraine Kaczmarek

|                   |                                                                                       |
|-------------------|---------------------------------------------------------------------------------------|
| DATE: 8/31/2021   |  |
| CREATOR: PKelly   |                                                                                       |
| PROJECT: 899.0100 |                                                                                       |

Absolute Scale: 1:1,101

0 0.0125 0.025 Miles



**ATTACHMENT B – THEORETICAL  
DIVERSION RATE**

**THEORETICAL HORSEPOWER EQUATION WORKSHEET (cjh 1/92)**

Water Right No.: 63-33470  
 Reviewer: SPF Water Engineering  
 Date of Review: 8/30/2021

| P/D No.:           | Scenario 1 | Scenario 2 | Scenario 3 |
|--------------------|------------|------------|------------|
| PUMP HORSEPOWER    | 5          | 5          | 5          |
| BOOSTER HORSEPOWER | 0          | 0          | 0          |
| PUMPING LEVEL      | 268        | 268        | 268        |
| DISCHARGE PRESSURE | 20         | 40         | 60         |
| RATE OF FLOW (cfs) | 0.10       | 0.09       | 0.08 0.09  |

The above calculates the formula =

$$Q = \frac{8.8 * (\text{Efficiency}) * \text{hp}}{\text{depth to water} + 2.31 * (\text{psi}) + \text{friction}}$$

Assumptions: %70 efficiency.  
 No Friction

**Examiners Notes:**

The pump was replaced by Valley Pump and Equipment in 2016. An invoice from the company shows a 5 hp submersible pump was installed. Pumping level is not known. 268 feet was used based on information recorded in the well drillers report. Static water level was recorded at 205 ft, the well was screened from 352 to 362 feet, a pumping test yielded a flow of 75 gpm set at 330 feet. A range of discharge pressures were used under what we would expect to see from domestic type irrigation systems (20 - 30) as well as common domestic tanks (40 - 60 psi). Average theoretical flow rate is 0.09 cfs.

## **ATTACHMENT C – SPRINKLER SPEC SHEETS**

| 8 Series HE-VAN                                                                            |                 |               |             |                  |                  |  |
|--------------------------------------------------------------------------------------------|-----------------|---------------|-------------|------------------|------------------|--|
| 24° Trajectory                                                                             |                 |               |             |                  |                  |  |
| Nozzle                                                                                     | Pressure<br>psi | Radius<br>ft. | Flow<br>gpm | ■ Precip<br>in/h | ▲ Precip<br>in/h |  |
|  360° Arc | 15              | 5             | 0.83        | 3.19             | 3.68             |  |
|                                                                                            | 20              | 6             | 0.96        | 2.56             | 2.95             |  |
|                                                                                            | 25              | 7             | 1.07        | 2.10             | 2.42             |  |
|                                                                                            | 30              | 8             | 1.17        | 1.76             | 2.03             |  |
|  270° Arc | 15              | 5             | 0.62        | 3.19             | 3.68             |  |
|                                                                                            | 20              | 6             | 0.72        | 2.56             | 2.95             |  |
|                                                                                            | 25              | 7             | 0.80        | 2.10             | 2.42             |  |
|                                                                                            | 30              | 8             | 0.88        | 1.76             | 2.03             |  |
|  180° Arc | 15              | 5             | 0.41        | 3.19             | 3.68             |  |
|                                                                                            | 20              | 6             | 0.48        | 2.56             | 2.95             |  |
|                                                                                            | 25              | 7             | 0.53        | 2.10             | 2.42             |  |
|                                                                                            | 30              | 8             | 0.59        | 1.76             | 2.03             |  |
|  90° Arc  | 15              | 5             | 0.21        | 3.19             | 3.68             |  |
|                                                                                            | 20              | 6             | 0.24        | 2.56             | 2.95             |  |
|                                                                                            | 25              | 7             | 0.27        | 2.10             | 2.42             |  |
|                                                                                            | 30              | 8             | 0.29        | 1.76             | 2.03             |  |

| 8 Series HE-VAN                                                                            |                 |             |              |             |                  |                  | METRIC |
|--------------------------------------------------------------------------------------------|-----------------|-------------|--------------|-------------|------------------|------------------|--------|
| 24° Trajectory                                                                             |                 |             |              |             |                  |                  |        |
| Nozzle                                                                                     | Pressure<br>bar | Radius<br>m | Flow<br>m³/h | Flow<br>l/m | ■ Precip<br>mm/h | ▲ Precip<br>mm/h |        |
|  360° Arc | 1.03            | 1.52        | 0.19         | 3.14        | 82               | 95               |        |
|                                                                                            | 1.38            | 1.83        | 0.22         | 3.62        | 66               | 76               |        |
|                                                                                            | 1.72            | 2.13        | 0.25         | 4.05        | 54               | 62               |        |
|                                                                                            | 2.07            | 2.44        | 0.27         | 4.43        | 45               | 52               |        |
|  270° Arc | 1.03            | 1.52        | 0.14         | 2.35        | 82               | 95               |        |
|                                                                                            | 1.38            | 1.83        | 0.16         | 2.72        | 66               | 76               |        |
|                                                                                            | 1.72            | 2.13        | 0.18         | 3.04        | 54               | 62               |        |
|                                                                                            | 2.07            | 2.44        | 0.20         | 3.33        | 45               | 52               |        |
|  180° Arc | 1.03            | 1.52        | 0.10         | 1.57        | 82               | 95               |        |
|                                                                                            | 1.38            | 1.83        | 0.11         | 1.81        | 66               | 76               |        |
|                                                                                            | 1.72            | 2.13        | 0.12         | 2.02        | 54               | 62               |        |
|                                                                                            | 2.07            | 2.44        | 0.13         | 2.22        | 45               | 52               |        |
|  90° Arc  | 1.03            | 1.52        | 0.05         | 0.78        | 82               | 95               |        |
|                                                                                            | 1.38            | 1.83        | 0.05         | 0.91        | 66               | 76               |        |
|                                                                                            | 1.72            | 2.13        | 0.06         | 1.01        | 54               | 62               |        |
|                                                                                            | 2.07            | 2.44        | 0.07         | 1.11        | 45               | 52               |        |

| 10 Series HE-VAN                                                                             |                 |               |             |                  |                  |  |
|----------------------------------------------------------------------------------------------|-----------------|---------------|-------------|------------------|------------------|--|
| 27° Trajectory                                                                               |                 |               |             |                  |                  |  |
| Nozzle                                                                                       | Pressure<br>psi | Radius<br>ft. | Flow<br>gpm | ■ Precip<br>in/h | ▲ Precip<br>in/h |  |
|  360° Arc | 15              | 7             | 1.26        | 2.48             | 2.86             |  |
|                                                                                              | 20              | 8             | 1.46        | 2.19             | 2.53             |  |
|                                                                                              | 25              | 9             | 1.63        | 1.94             | 2.24             |  |
|                                                                                              | 30              | 10            | 1.78        | 1.72             | 1.98             |  |
|  270° Arc | 15              | 7             | 0.95        | 2.48             | 2.86             |  |
|                                                                                              | 20              | 8             | 1.09        | 2.19             | 2.53             |  |
|                                                                                              | 25              | 9             | 1.22        | 1.94             | 2.24             |  |
|                                                                                              | 30              | 10            | 1.34        | 1.72             | 1.98             |  |
|  180° Arc | 15              | 7             | 0.63        | 2.48             | 2.86             |  |
|                                                                                              | 20              | 8             | 0.73        | 2.19             | 2.53             |  |
|                                                                                              | 25              | 9             | 0.81        | 1.94             | 2.24             |  |
|                                                                                              | 30              | 10            | 0.89        | 1.72             | 1.98             |  |
|  90° Arc  | 15              | 7             | 0.32        | 2.48             | 2.86             |  |
|                                                                                              | 20              | 8             | 0.36        | 2.19             | 2.53             |  |
|                                                                                              | 25              | 9             | 0.41        | 1.94             | 2.24             |  |
|                                                                                              | 30              | 10            | 0.45        | 1.72             | 1.98             |  |

| 10 Series HE-VAN                                                                             |                 |             |              |             |                  |                  | METRIC |
|----------------------------------------------------------------------------------------------|-----------------|-------------|--------------|-------------|------------------|------------------|--------|
| 27° Trajectory                                                                               |                 |             |              |             |                  |                  |        |
| Nozzle                                                                                       | Pressure<br>bar | Radius<br>m | Flow<br>m³/h | Flow<br>l/m | ■ Precip<br>mm/h | ▲ Precip<br>mm/h |        |
|  360° Arc | 1.03            | 2.13        | 0.29         | 4.78        | 64               | 74               |        |
|                                                                                              | 1.38            | 2.44        | 0.34         | 5.52        | 56               | 65               |        |
|                                                                                              | 1.72            | 2.74        | 0.37         | 6.17        | 50               | 57               |        |
|                                                                                              | 2.07            | 3.05        | 0.41         | 6.76        | 44               | 51               |        |
|  270° Arc | 1.03            | 2.13        | 0.22         | 3.59        | 64               | 74               |        |
|                                                                                              | 1.38            | 2.44        | 0.25         | 4.14        | 56               | 65               |        |
|                                                                                              | 1.72            | 2.74        | 0.28         | 4.63        | 50               | 57               |        |
|                                                                                              | 2.07            | 3.05        | 0.31         | 5.07        | 44               | 51               |        |
|  180° Arc | 1.03            | 2.13        | 0.15         | 2.39        | 64               | 74               |        |
|                                                                                              | 1.38            | 2.44        | 0.17         | 2.76        | 56               | 65               |        |
|                                                                                              | 1.72            | 2.74        | 0.19         | 3.09        | 50               | 57               |        |
|                                                                                              | 2.07            | 3.05        | 0.21         | 3.38        | 44               | 51               |        |
|  90° Arc  | 1.03            | 2.13        | 0.07         | 1.20        | 64               | 74               |        |
|                                                                                              | 1.38            | 2.44        | 0.08         | 1.38        | 56               | 65               |        |
|                                                                                              | 1.72            | 2.74        | 0.09         | 1.54        | 50               | 57               |        |
|                                                                                              | 2.07            | 3.05        | 0.10         | 1.69        | 44               | 51               |        |

**Note:** Turning the radius reduction screw may be required to achieve catalog radius and flow when the arc is set at less than maximum arc

■ Square spacing based on 50% diameter of throw

▲ Triangular spacing based on 50% diameter of throw

Performance data taken in zero wind conditions

| 12 Series HE-VAN                                                                  |                 |               |             |                  |                  |
|-----------------------------------------------------------------------------------|-----------------|---------------|-------------|------------------|------------------|
| 23° Trajectory                                                                    |                 |               |             |                  |                  |
| Nozzle                                                                            | Pressure<br>psi | Radius<br>ft. | Flow<br>gpm | ■ Precip<br>In/h | ▲ Precip<br>In/h |
|  | 15              | 9             | 1.67        | 1.99             | 2.30             |
|                                                                                   | 20              | 10            | 1.93        | 1.86             | 2.15             |
|                                                                                   | 25              | 11            | 2.16        | 1.72             | 1.99             |
|                                                                                   | 30              | 12            | 2.37        | 1.58             | 1.83             |
|  | 15              | 9             | 1.25        | 1.99             | 2.30             |
|                                                                                   | 20              | 10            | 1.45        | 1.86             | 2.15             |
|                                                                                   | 25              | 11            | 1.62        | 1.72             | 1.99             |
|                                                                                   | 30              | 12            | 1.77        | 1.58             | 1.83             |
|  | 15              | 9             | 0.84        | 1.99             | 2.30             |
|                                                                                   | 20              | 10            | 0.97        | 1.86             | 2.15             |
|                                                                                   | 25              | 11            | 1.08        | 1.72             | 1.99             |
|                                                                                   | 30              | 12            | 1.18        | 1.58             | 1.83             |
|  | 15              | 9             | 0.42        | 1.99             | 2.30             |
|                                                                                   | 20              | 10            | 0.48        | 1.86             | 2.15             |
|                                                                                   | 25              | 11            | 0.54        | 1.72             | 1.99             |
|                                                                                   | 30              | 12            | 0.59        | 1.58             | 1.83             |

| 12 Series HE-VAN                                                                  |                 |             |              |             |                  | METRIC           |
|-----------------------------------------------------------------------------------|-----------------|-------------|--------------|-------------|------------------|------------------|
| 23° Trajectory                                                                    |                 |             |              |             |                  |                  |
| Nozzle                                                                            | Pressure<br>bar | Radius<br>m | Flow<br>m³/h | Flow<br>l/m | ■ Precip<br>mm/h | ▲ Precip<br>mm/h |
|  | 1.0             | 2.7         | 0.38         | 6.33        | 50.5             | 58.3             |
|                                                                                   | 1.4             | 3.0         | 0.44         | 7.31        | 47.3             | 54.6             |
|                                                                                   | 1.7             | 3.4         | 0.49         | 8.18        | 43.7             | 50.4             |
|                                                                                   | 2.1             | 3.7         | 0.54         | 8.96        | 40.2             | 46.4             |
|  | 1.0             | 2.7         | 0.28         | 4.75        | 50.5             | 58.3             |
|                                                                                   | 1.4             | 3.0         | 0.33         | 5.48        | 47.3             | 54.6             |
|                                                                                   | 1.7             | 3.4         | 0.37         | 6.16        | 43.7             | 50.4             |
|                                                                                   | 2.1             | 3.7         | 0.40         | 6.72        | 40.2             | 46.4             |
|  | 1.0             | 2.7         | 0.19         | 3.17        | 50.5             | 58.3             |
|                                                                                   | 1.4             | 3.0         | 0.22         | 3.66        | 47.3             | 54.6             |
|                                                                                   | 1.7             | 3.4         | 0.25         | 4.09        | 43.7             | 50.4             |
|                                                                                   | 2.1             | 3.7         | 0.27         | 4.48        | 40.2             | 46.4             |
|  | 1.0             | 2.7         | 0.09         | 1.58        | 50.5             | 58.3             |
|                                                                                   | 1.4             | 3.0         | 0.11         | 1.83        | 47.3             | 54.6             |
|                                                                                   | 1.7             | 3.4         | 0.12         | 2.04        | 43.7             | 50.4             |
|                                                                                   | 2.1             | 3.7         | 0.13         | 2.24        | 40.2             | 46.4             |

**Note:** Turning the radius reduction screw may be required to achieve catalog radius and flow when the arc is set at less than maximum arc

■ Square spacing based on 50% diameter of throw

▲ Triangular spacing based on 50% diameter of throw

Performance data taken in zero wind conditions

**2011 IRRIGATION SHOW AWARD WINNER**

"Best New Product for  
Turf / Landscape"



| 15 Series HE-VAN                                                                              |                 |               |             |                  |                  |
|-----------------------------------------------------------------------------------------------|-----------------|---------------|-------------|------------------|------------------|
| 25° Trajectory                                                                                |                 |               |             |                  |                  |
| Nozzle                                                                                        | Pressure<br>psi | Radius<br>ft. | Flow<br>gpm | ■ Precip<br>in/h | ▲ Precip<br>in/h |
| 360° Arc<br> | 15              | 11            | 2.62        | 2.08             | 2.40             |
|                                                                                               | 20              | 12            | 3.02        | 2.02             | 2.33             |
|                                                                                               | 25              | 14            | 3.38        | 1.66             | 1.92             |
|                                                                                               | 30              | 15            | 3.70        | 1.58             | 1.83             |
| 270° Arc<br> | 15              | 11            | 1.96        | 2.08             | 2.40             |
|                                                                                               | 20              | 12            | 2.27        | 2.02             | 2.33             |
|                                                                                               | 25              | 14            | 2.53        | 1.66             | 1.92             |
|                                                                                               | 30              | 15            | 2.78        | 1.58             | 1.83             |
| 180° Arc<br> | 15              | 11            | 1.31        | 2.08             | 2.40             |
|                                                                                               | 20              | 12            | 1.51        | 2.02             | 2.33             |
|                                                                                               | 25              | 14            | 1.69        | 1.66             | 1.92             |
|                                                                                               | 30              | 15            | 1.85        | 1.58             | 1.83             |
| 90° Arc<br>  | 15              | 11            | 0.65        | 2.08             | 2.40             |
|                                                                                               | 20              | 12            | 0.76        | 2.02             | 2.33             |
|                                                                                               | 25              | 14            | 0.84        | 1.66             | 1.92             |
|                                                                                               | 30              | 15            | 0.93        | 1.58             | 1.83             |

| 15 Series HE-VAN                                                                              |                 |             |              |             |                  | METRIC           |
|-----------------------------------------------------------------------------------------------|-----------------|-------------|--------------|-------------|------------------|------------------|
| 25° Trajectory                                                                                |                 |             |              |             |                  |                  |
| Nozzle                                                                                        | Pressure<br>bar | Radius<br>m | Flow<br>m³/h | Flow<br>l/m | ■ Precip<br>mm/h | ▲ Precip<br>mm/h |
| 360° Arc<br> | 1.0             | 3.4         | 0.59         | 9.91        | 52.9             | 61.1             |
|                                                                                               | 1.4             | 3.7         | 0.69         | 11.44       | 51.3             | 59.3             |
|                                                                                               | 1.7             | 4.3         | 0.77         | 12.79       | 42.2             | 48.7             |
|                                                                                               | 2.1             | 4.6         | 0.84         | 14.01       | 40.2             | 46.5             |
| 270° Arc<br> | 1.0             | 3.4         | 0.45         | 7.43        | 52.9             | 61.1             |
|                                                                                               | 1.4             | 3.7         | 0.51         | 8.58        | 51.3             | 59.3             |
|                                                                                               | 1.7             | 4.3         | 0.58         | 9.59        | 42.2             | 48.7             |
|                                                                                               | 2.1             | 4.6         | 0.63         | 10.51       | 40.2             | 46.5             |
| 180° Arc<br> | 1.0             | 3.4         | 0.30         | 4.95        | 52.9             | 61.1             |
|                                                                                               | 1.4             | 3.7         | 0.34         | 5.72        | 51.3             | 59.3             |
|                                                                                               | 1.7             | 4.3         | 0.38         | 6.39        | 42.2             | 48.7             |
|                                                                                               | 2.1             | 4.6         | 0.42         | 7.00        | 40.2             | 46.5             |
| 90° Arc<br>  | 1.0             | 3.4         | 0.15         | 2.48        | 52.9             | 61.1             |
|                                                                                               | 1.4             | 3.7         | 0.17         | 2.86        | 51.3             | 59.3             |
|                                                                                               | 1.7             | 4.3         | 0.19         | 3.20        | 42.2             | 48.7             |
|                                                                                               | 2.1             | 4.6         | 0.21         | 3.50        | 40.2             | 46.5             |

**Note:** Turning the radius reduction screw may be required to achieve catalog radius and flow when the arc is set at less than maximum arc

■ Square spacing based on 50% diameter of throw

▲ Triangular spacing based on 50% diameter of throw

Performance data taken in zero wind conditions



## 5000 Series Std. Angle Rain Curtain™ Nozzle Performance

| Pressure<br>psi | Nozzle | Radius<br>ft. | Flow<br>gpm | Precip<br>in/h | Precip<br>in/h |
|-----------------|--------|---------------|-------------|----------------|----------------|
| 25              | 1.5    | 33            | 1.12        | 0.20           | 0.23           |
|                 | 2.0    | 35            | 1.50        | 0.24           | 0.27           |
|                 | 2.5    | 35            | 1.81        | 0.28           | 0.33           |
|                 | 3.0    | 36            | 2.26        | 0.34           | 0.39           |
|                 | 4.0    | 36            | 2.91        | 0.43           | 0.49           |
|                 | 5.0    | 37            | 3.72        | 0.52           | 0.60           |
|                 | 6.0    | 37            | 4.25        | 0.60           | 0.69           |
|                 | 8.0    | 33            | 5.90        | 1.26           | 1.50           |
| 35              | 1.5    | 34            | 1.35        | 0.22           | 0.26           |
|                 | 2.0    | 36            | 1.81        | 0.27           | 0.31           |
|                 | 2.5    | 37            | 2.17        | 0.31           | 0.35           |
|                 | 3.0    | 38            | 2.71        | 0.36           | 0.42           |
|                 | 4.0    | 40            | 3.50        | 0.42           | 0.49           |
|                 | 5.0    | 41            | 4.47        | 0.51           | 0.59           |
|                 | 6.0    | 43            | 5.23        | 0.54           | 0.63           |
|                 | 8.0    | 41            | 7.06        | 0.94           | 1.10           |
| 45              | 1.5    | 35            | 1.54        | 0.24           | 0.28           |
|                 | 2.0    | 37            | 2.07        | 0.29           | 0.34           |
|                 | 2.5    | 37            | 2.51        | 0.35           | 0.41           |
|                 | 3.0    | 39            | 3.09        | 0.37           | 0.43           |
|                 | 4.0    | 42            | 4.01        | 0.44           | 0.51           |
|                 | 5.0    | 43            | 5.09        | 0.48           | 0.56           |
|                 | 6.0    | 44            | 6.01        | 0.59           | 0.69           |
|                 | 8.0    | 44            | 8.03        | 0.92           | 1.06           |
| 55              | 1.5    | 35            | 1.71        | 0.27           | 0.31           |
|                 | 2.0    | 37            | 2.30        | 0.32           | 0.37           |
|                 | 2.5    | 37            | 2.76        | 0.39           | 0.45           |
|                 | 3.0    | 40            | 3.47        | 0.42           | 0.48           |
|                 | 4.0    | 42            | 4.44        | 0.48           | 0.56           |
|                 | 5.0    | 45            | 5.66        | 0.54           | 0.62           |
|                 | 6.0    | 50            | 6.63        | 0.51           | 0.59           |
|                 | 8.0    | 47            | 8.86        | 0.80           | 0.93           |
| 65              | 1.5    | 34            | 1.86        | 0.31           | 0.36           |
|                 | 2.0    | 35            | 2.52        | 0.40           | 0.46           |
|                 | 2.5    | 37            | 3.01        | 0.42           | 0.49           |
|                 | 3.0    | 40            | 3.78        | 0.45           | 0.53           |
|                 | 4.0    | 42            | 4.83        | 0.53           | 0.61           |
|                 | 5.0    | 45            | 6.16        | 0.59           | 0.68           |
|                 | 6.0    | 50            | 7.22        | 0.55           | 0.64           |
|                 | 8.0    | 48            | 9.63        | 0.84           | 0.97           |

Precipitation rates based on half-circle operation

■ Square spacing based on 50% diameter of throw

▲ Triangular spacing based on 50% diameter of throw

Performance data collected in zero wind conditions

Performance data derived from tests that conform with ASABE Standards; ASABE S398.1.  
See page 198 for complete ASABE Test Certification Statement.

## 5000 Series Std. Angle Rain Curtain™ Nozzle Performance METRIC

| Pressure<br>bar | Nozzle | Radius<br>m | Flow<br>m³/h | Flow<br>l/m | Precip<br>mm/h | Precip<br>mm/h |
|-----------------|--------|-------------|--------------|-------------|----------------|----------------|
| 2.0             | 1.5    | 10.2        | 0.28         | 4.8         | 5              | 6              |
|                 | 2.0    | 10.8        | 0.36         | 6.0         | 6              | 7              |
|                 | 2.5    | 10.9        | 0.44         | 7.2         | 7              | 9              |
|                 | 3.0    | 11.2        | 0.55         | 9.0         | 9              | 10             |
|                 | 4.0    | 11.6        | 0.71         | 12.0        | 11             | 12             |
|                 | 5.0    | 12.1        | 0.91         | 15.0        | 13             | 15             |
|                 | 6.0    | 12.4        | 1.05         | 17.4        | 15             | 17             |
|                 | 8.0    | 11.8        | 1.45         | 24.0        | 32             | 37             |
| 2.5             | 1.5    | 10.4        | 0.31         | 5.4         | 6              | 7              |
|                 | 2.0    | 11.0        | 0.41         | 6.6         | 7              | 8              |
|                 | 2.5    | 11.3        | 0.50         | 8.4         | 8              | 9              |
|                 | 3.0    | 11.2        | 0.62         | 10.2        | 9              | 11             |
|                 | 4.0    | 12.3        | 0.81         | 13.2        | 11             | 13             |
|                 | 5.0    | 12.7        | 1.03         | 17.4        | 13             | 15             |
|                 | 6.0    | 13.2        | 1.21         | 20.4        | 14             | 16             |
|                 | 8.0    | 13.3        | 1.63         | 27.0        | 24             | 28             |
| 3.0             | 1.5    | 10.6        | 0.34         | 6.0         | 6              | 7              |
|                 | 2.0    | 11.2        | 0.45         | 7.8         | 7              | 8              |
|                 | 2.5    | 11.3        | 0.56         | 9.6         | 9              | 10             |
|                 | 3.0    | 12.1        | 0.69         | 11.4        | 9              | 11             |
|                 | 4.0    | 12.7        | 0.89         | 15.0        | 11             | 13             |
|                 | 5.0    | 13.5        | 1.13         | 18.6        | 12             | 14             |
|                 | 6.0    | 13.4        | 1.34         | 22.2        | 13             | 17             |
|                 | 8.0    | 13.4        | 1.79         | 30.0        | 23             | 27             |
| 3.5             | 1.5    | 10.7        | 0.37         | 6.0         | 7              | 8              |
|                 | 2.0    | 11.3        | 0.49         | 8.4         | 8              | 9              |
|                 | 2.5    | 11.3        | 0.60         | 10.2        | 9              | 11             |
|                 | 3.0    | 12.2        | 0.74         | 12.6        | 10             | 12             |
|                 | 4.0    | 12.8        | 0.97         | 16.2        | 12             | 14             |
|                 | 5.0    | 13.7        | 1.23         | 20.4        | 13             | 15             |
|                 | 6.0    | 14.2        | 1.45         | 24.0        | 13             | 15             |
|                 | 8.0    | 14.9        | 1.93         | 32.4        | 20             | 24             |
| 4.0             | 1.5    | 10.6        | 0.40         | 6.6         | 7              | 8              |
|                 | 2.0    | 11.1        | 0.52         | 9.0         | 8              | 10             |
|                 | 2.5    | 11.3        | 0.64         | 10.8        | 10             | 12             |
|                 | 3.0    | 12.2        | 0.80         | 13.2        | 11             | 12             |
|                 | 4.0    | 12.8        | 1.04         | 17.4        | 13             | 15             |
|                 | 5.0    | 13.7        | 1.32         | 22.2        | 14             | 16             |
|                 | 6.0    | 14.9        | 1.55         | 25.8        | 14             | 16             |
|                 | 8.0    | 15.2        | 2.06         | 34.2        | 21             | 25             |
| 4.5             | 1.5    | 10.4        | 0.42         | 7.2         | 8              | 9              |
|                 | 2.0    | 10.7        | 0.55         | 9.0         | 10             | 11             |
|                 | 2.5    | 11.3        | 0.68         | 11.4        | 11             | 12             |
|                 | 3.0    | 12.2        | 0.84         | 13.8        | 11             | 13             |
|                 | 4.0    | 12.8        | 1.10         | 18.0        | 13             | 15             |
|                 | 5.0    | 13.7        | 1.40         | 23.4        | 15             | 17             |
|                 | 6.0    | 14.6        | 1.64         | 28.2        | 15             | 18             |
|                 | 8.0    | 15.2        | 2.19         | 36.6        | 19             | 22             |

### 5000 Series Low Angle Nozzle Performance

| Pressure<br>psi | Nozzle | Radius<br>ft. | Flow<br>gpm | Precip<br>in/h | Precip<br>in/h |
|-----------------|--------|---------------|-------------|----------------|----------------|
| 25              | 1.0 LA | 25            | 0.76        | 0.23           | 0.27           |
|                 | 1.5 LA | 27            | 1.15        | 0.30           | 0.35           |
|                 | 2.0 LA | 29            | 1.47        | 0.34           | 0.39           |
|                 | 3.0 LA | 29            | 2.23        | 0.51           | 0.59           |
| 35              | 1.0 LA | 28            | 0.92        | 0.23           | 0.26           |
|                 | 1.5 LA | 30            | 1.38        | 0.30           | 0.34           |
|                 | 2.0 LA | 31            | 1.77        | 0.35           | 0.41           |
|                 | 3.0 LA | 33            | 2.68        | 0.47           | 0.55           |
| 45              | 1.0 LA | 29            | 1.05        | 0.24           | 0.28           |
|                 | 1.5 LA | 31            | 1.58        | 0.32           | 0.37           |
|                 | 2.0 LA | 32            | 2.02        | 0.38           | 0.44           |
|                 | 3.0 LA | 35            | 3.07        | 0.48           | 0.56           |
| 55              | 1.0 LA | 29            | 1.17        | 0.27           | 0.31           |
|                 | 1.5 LA | 31            | 1.76        | 0.35           | 0.41           |
|                 | 2.0 LA | 33            | 2.24        | 0.40           | 0.46           |
|                 | 3.0 LA | 36            | 3.41        | 0.51           | 0.58           |
| 65              | 1.0 LA | 29            | 1.27        | 0.29           | 0.34           |
|                 | 1.5 LA | 31            | 1.92        | 0.38           | 0.44           |
|                 | 2.0 LA | 33            | 2.45        | 0.43           | 0.50           |
|                 | 3.0 LA | 36            | 3.72        | 0.55           | 0.64           |

Precipitation rates based on half-circle operation

■ Square spacing based on 50% diameter of throw

▲ Triangular spacing based on 50% diameter of throw

Performance data collected in zero wind conditions

Performance data derived from tests that conform with ASABE Standards; ASABE S398.1.

See page 198 for complete ASABE Test Certification Statement.

### 5000 Series Low Angle Nozzle Performance

### METRIC

| Pressure<br>bar | Nozzle | Radius<br>m | Flow<br>m³/h | Flow<br>l/m | Precip<br>mm/h | Precip<br>mm/h |
|-----------------|--------|-------------|--------------|-------------|----------------|----------------|
| 1.7             | 1.0 LA | 7.6         | 0.17         | 3.0         | 6              | 7              |
|                 | 1.5 LA | 8.2         | 0.26         | 4.2         | 8              | 9              |
|                 | 2.0 LA | 8.8         | 0.33         | 5.4         | 9              | 10             |
|                 | 3.0 LA | 8.8         | 0.51         | 8.4         | 13             | 15             |
| 2.0             | 1.0 LA | 8.0         | 0.18         | 3.0         | 6              | 6              |
|                 | 1.5 LA | 8.6         | 0.28         | 4.8         | 8              | 9              |
|                 | 2.0 LA | 9.1         | 0.36         | 6.0         | 9              | 10             |
|                 | 3.0 LA | 9.3         | 0.55         | 9.0         | 13             | 15             |
| 2.5             | 1.0 LA | 8.6         | 0.20         | 3.6         | 5              | 6              |
|                 | 1.5 LA | 9.2         | 0.32         | 5.4         | 8              | 9              |
|                 | 2.0 LA | 9.5         | 0.41         | 6.6         | 9              | 10             |
|                 | 3.0 LA | 10.1        | 0.62         | 10.2        | 12             | 14             |
| 3.0             | 1.0 LA | 8.8         | 0.22         | 3.6         | 6              | 7              |
|                 | 1.5 LA | 9.4         | 0.35         | 6.0         | 8              | 9              |
|                 | 2.0 LA | 9.7         | 0.45         | 7.8         | 10             | 11             |
|                 | 3.0 LA | 10.6        | 0.68         | 11.4        | 12             | 14             |
| 3.5             | 1.0 LA | 8.8         | 0.24         | 4.2         | 6              | 7              |
|                 | 1.5 LA | 9.4         | 0.38         | 6.6         | 9              | 10             |
|                 | 2.0 LA | 9.9         | 0.49         | 8.4         | 10             | 11             |
|                 | 3.0 LA | 10.8        | 0.74         | 12.6        | 13             | 15             |
| 4.0             | 1.0 LA | 8.8         | 0.26         | 4.2         | 7              | 8              |
|                 | 1.5 LA | 9.4         | 0.41         | 6.6         | 9              | 11             |
|                 | 2.0 LA | 10.1        | 0.52         | 9.0         | 10             | 12             |
|                 | 3.0 LA | 11.0        | 0.80         | 13.2        | 13             | 15             |
| 4.5             | 1.0 LA | 8.8         | 0.27         | 4.8         | 7              | 8              |
|                 | 1.5 LA | 9.4         | 0.44         | 7.2         | 10             | 11             |
|                 | 2.0 LA | 10.1        | 0.56         | 9.0         | 11             | 13             |
|                 | 3.0 LA | 11.0        | 0.84         | 13.8        | 14             | 16             |

### Tools

#### Holdup Tool with Bubble Level

##### Features

- Combination holdup tool/bubble level makes proper installation easier
- Works with 5000, Falcon® 6504, and 8005

##### Model

- HOLDUPTOOL



HOLDUPTOOL

#### Rotor Tool

##### Features

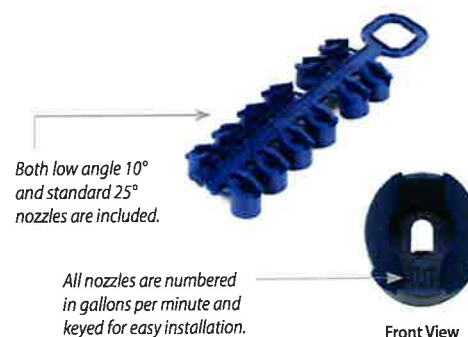
- Flat blade screwdriver and pull-up tool all in one
- Works with 3500, 5000, Falcon® 6504, and 8005

##### Model

- ROTORTOOL



ROTORTOOL



Front View

## 5000 PRS Std. Angle Rain Curtain™ Nozzle Performance

| Pressure<br>psi | Nozzle | Radius<br>ft. | Flow<br>gpm | Precip<br>In/h | Precip<br>In/h |
|-----------------|--------|---------------|-------------|----------------|----------------|
| 25              | 1.5    | 33            | 1.12        | 0.2            | 0.23           |
|                 | 2.0    | 35            | 1.5         | 0.24           | 0.27           |
|                 | 2.5    | 35            | 1.81        | 0.28           | 0.33           |
|                 | 3.0    | 36            | 2.26        | 0.34           | 0.39           |
|                 | 4.0    | 36            | 2.91        | 0.43           | 0.49           |
|                 | 5.0    | 37            | 3.72        | 0.52           | 0.66           |
|                 | 6.0    | 37            | 4.25        | 0.60           | 0.69           |
|                 | 8.0    | 33            | 5.9         | 1.26           | 1.5            |
| 35              | 1.5    | 34            | 1.35        | 0.22           | 0.26           |
|                 | 2.0    | 36            | 1.81        | 0.27           | 0.31           |
|                 | 2.5    | 37            | 2.17        | 0.31           | 0.35           |
|                 | 3.0    | 38            | 2.71        | 0.36           | 0.41           |
|                 | 4.0    | 40            | 3.5         | 0.42           | 0.49           |
|                 | 5.0    | 41            | 4.47        | 0.51           | 0.59           |
|                 | 6.0    | 43            | 5.23        | 0.54           | 0.63           |
|                 | 8.0    | 41            | 7.06        | 0.94           | 1.1            |
| 45              | 1.5    | 35            | 1.54        | 0.24           | 0.28           |
|                 | 2.0    | 37            | 2.07        | 0.29           | 0.34           |
|                 | 2.5    | 37            | 2.51        | 0.35           | 0.41           |
|                 | 3.0    | 39            | 3.09        | 0.37           | 0.43           |
|                 | 4.0    | 42            | 4.01        | 0.44           | 0.51           |
|                 | 5.0    | 43            | 5.09        | 0.48           | 0.56           |
|                 | 6.0    | 44            | 6.01        | 0.55           | 0.63           |
|                 | 8.0    | 44            | 8.03        | 0.92           | 1.06           |
| 55 – 75         | 1.5    | 35            | 1.59        | 0.25           | 0.29           |
|                 | 2.0    | 37            | 2.14        | 0.3            | 0.35           |
|                 | 2.5    | 37            | 2.6         | 0.37           | 0.42           |
|                 | 3.0    | 39            | 3.2         | 0.39           | 0.44           |
|                 | 4.0    | 42            | 4.15        | 0.45           | 0.52           |
|                 | 5.0    | 43            | 5.27        | 0.5            | 0.58           |
|                 | 6.0    | 44            | 6.22        | 0.57           | 0.65           |
|                 | 8.0    | 44            | 8.31        | 0.72           | 0.84           |

Precipitation rates based on half-circle operation

■ Square spacing based on 50% diameter of throw

▲ Triangular spacing based on 50% diameter of throw

Performance data collected in zero wind conditions

Performance data derived from tests that conform with ASABE Standards; ASABE S398.1.  
See page 198 for complete ASABE Test Certification Statement.

## 5000 PRS Std. Angle Rain Curtain™ Nozzle Performance METRIC

| Pressure<br>bar | Nozzle | Radius<br>m | Flow<br>m³/h | Flow<br>l/m | Precip<br>mm/h | Precip<br>mm/h |
|-----------------|--------|-------------|--------------|-------------|----------------|----------------|
| 1.7             | 1.5    | 10.1        | 0.25         | 4.2         | 5              | 6              |
|                 | 2.0    | 10.7        | 0.34         | 5.4         | 6              | 7              |
|                 | 2.5    | 10.7        | 0.41         | 6.6         | 7              | 8              |
|                 | 3.0    | 11.0        | 0.51         | 8.4         | 8              | 10             |
|                 | 4.0    | 11.3        | 0.66         | 10.8        | 10             | 12             |
|                 | 5.0    | 11.9        | 0.84         | 13.8        | 12             | 14             |
|                 | 6.0    | 11.9        | 0.97         | 16.2        | 14             | 16             |
|                 | 8.0    | 11.0        | 1.34         | 22.2        | 22             | 26             |
| 2.0             | 1.5    | 10.2        | 0.28         | 4.8         | 5              | 6              |
|                 | 2.0    | 10.8        | 0.36         | 6.0         | 6              | 7              |
|                 | 2.5    | 10.9        | 0.44         | 7.2         | 7              | 9              |
|                 | 3.0    | 11.2        | 0.55         | 9.0         | 9              | 10             |
|                 | 4.0    | 11.6        | 0.71         | 12.0        | 11             | 12.6           |
|                 | 5.0    | 12.1        | 0.91         | 15.0        | 13             | 15             |
|                 | 6.0    | 12.4        | 1.05         | 17.4        | 15             | 17             |
|                 | 8.0    | 11.8        | 1.45         | 24.0        | 32             | 37             |
| 2.5             | 1.5    | 10.4        | 0.31         | 5.4         | 6              | 7              |
|                 | 2.0    | 11.0        | 0.41         | 6.6         | 7              | 8              |
|                 | 2.5    | 11.3        | 0.50         | 8.4         | 8              | 9              |
|                 | 3.0    | 11.2        | 0.62         | 10.2        | 9              | 11             |
|                 | 4.0    | 12.3        | 0.81         | 13.2        | 11             | 13             |
|                 | 5.0    | 12.7        | 1.03         | 17.4        | 13             | 15             |
|                 | 6.0    | 13.2        | 1.21         | 20.4        | 14             | 16             |
|                 | 8.0    | 13.3        | 1.63         | 27.0        | 24             | 18             |
| 3.0             | 1.5    | 10.6        | 0.34         | 6.0         | 6              | 7              |
|                 | 2.0    | 11.2        | 0.45         | 7.8         | 7              | 8              |
|                 | 2.5    | 11.3        | 0.56         | 9.6         | 9              | 10             |
|                 | 3.0    | 12.1        | 0.69         | 11.4        | 9              | 11             |
|                 | 4.0    | 12.7        | 0.89         | 16.8        | 11             | 13             |
|                 | 5.0    | 13.5        | 1.13         | 18.6        | 12             | 14             |
|                 | 6.0    | 13.9        | 1.34         | 22.2        | 14             | 16             |
|                 | 8.0    | 14.1        | 1.79         | 30.0        | 23             | 27             |
| 3.5 – 5.2       | 1.5    | 10.6        | 0.35         | 6.0         | 6              | 7              |
|                 | 2.0    | 11.2        | 0.47         | 7.8         | 8              | 9              |
|                 | 2.5    | 11.3        | 0.58         | 10.2        | 9              | 11             |
|                 | 3.0    | 12.1        | 0.71         | 12.0        | 10             | 11             |
|                 | 4.0    | 12.7        | 0.92         | 15.6        | 12             | 13             |
|                 | 5.0    | 13.5        | 1.17         | 19.2        | 13             | 15             |
|                 | 6.0    | 13.9        | 1.39         | 22.8        | 14             | 17             |
|                 | 8.0    | 14.1        | 1.85         | 31.2        | 18             | 21             |



### 5000 PRS Low Angle Nozzle Performance

| Pressure<br>psi | Nozzle | Radius<br>ft. | Flow<br>gpm | Precip<br>in/h | Precip<br>in/h |
|-----------------|--------|---------------|-------------|----------------|----------------|
| 25              | 1.0 LA | 25            | 0.76        | 0.22           | 0.26           |
|                 | 1.5 LA | 27            | 1.15        | 0.3            | 0.35           |
|                 | 2.0 LA | 29            | 1.47        | 0.34           | 0.39           |
|                 | 3.0 LA | 29            | 2.23        | 0.51           | 0.59           |
| 35              | 1.0 LA | 28            | 0.92        | 0.21           | 0.25           |
|                 | 1.5 LA | 30            | 1.38        | 0.3            | 0.34           |
|                 | 2.0 LA | 31            | 1.77        | 0.35           | 0.41           |
|                 | 3.0 LA | 33            | 2.68        | 0.47           | 0.55           |
| 45              | 1.0 LA | 29            | 1.05        | 0.23           | 0.26           |
|                 | 1.5 LA | 31            | 1.58        | 0.32           | 0.37           |
|                 | 2.0 LA | 32            | 2.02        | 0.38           | 0.44           |
|                 | 3.0 LA | 35            | 3.07        | 0.48           | 0.56           |
| 55 – 75         | 1.0 LA | 29            | 1.09        | 0.25           | 0.29           |
|                 | 1.5 LA | 31            | 1.64        | 0.33           | 0.38           |
|                 | 2.0 LA | 32            | 2.09        | 0.39           | 0.45           |
|                 | 3.0 LA | 35            | 3.18        | 0.5            | 0.58           |

Precipitation rates based on half-circle operation

■ Square spacing based on 50% diameter of throw

▲ Triangular spacing based on 50% diameter of throw

Performance data collected in zero wind conditions

Performance data derived from tests that conform with ASABE Standards; ASABE S398.1.

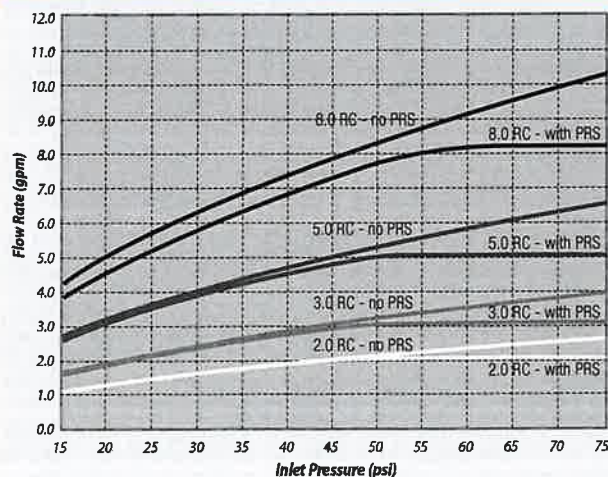
See page 198 for complete ASABE Test Certification Statement.

### 5000 PRS Low Angle Nozzle Performance

### METRIC

| Pressure<br>bar | Nozzle | Radius<br>m | Flow<br>m <sup>3</sup> /h | Flow<br>l/m | Precip<br>mm/h | Precip<br>mm/h |
|-----------------|--------|-------------|---------------------------|-------------|----------------|----------------|
| 1.7             | 1.0 LA | 7.6         | 0.17                      | 3.0         | 6              | 7              |
|                 | 1.5 LA | 8.2         | 0.26                      | 4.2         | 8              | 9              |
|                 | 2.0 LA | 8.8         | 0.33                      | 5.4         | 9              | 10             |
|                 | 3.0 LA | 8.8         | 0.51                      | 8.4         | 13             | 15             |
| 2.0             | 1.0 LA | 8.0         | 0.18                      | 3.0         | 6              | 6              |
|                 | 1.5 LA | 8.6         | 0.28                      | 4.8         | 8              | 9              |
|                 | 2.0 LA | 9.1         | 0.36                      | 6.0         | 9              | 10             |
|                 | 3.0 LA | 9.3         | 0.55                      | 9.0         | 13             | 15             |
| 2.5             | 1.0 LA | 8.6         | 0.20                      | 3.6         | 5              | 6              |
|                 | 1.5 LA | 9.2         | 0.32                      | 5.4         | 8              | 9              |
|                 | 2.0 LA | 9.5         | 0.41                      | 6.6         | 9              | 10             |
|                 | 3.0 LA | 10.1        | 0.62                      | 10.2        | 12             | 14             |
| 3.0             | 1.0 LA | 8.8         | 0.22                      | 3.6         | 6              | 7              |
|                 | 1.5 LA | 9.4         | 0.35                      | 6.0         | 8              | 9              |
|                 | 2.0 LA | 9.7         | 0.45                      | 7.8         | 10             | 11             |
|                 | 3.0 LA | 10.6        | 0.68                      | 11.4        | 12             | 14             |
| 3.5 – 5.2       | 1.0 LA | 8.8         | 0.23                      | 3.6         | 6              | 7              |
|                 | 1.5 LA | 9.4         | 0.36                      | 6.0         | 8              | 10             |
|                 | 2.0 LA | 9.7         | 0.47                      | 7.8         | 10             | 12             |
|                 | 3.0 LA | 10.6        | 0.70                      | 12.0        | 13             | 15             |

### Flow Rate vs. Inlet Pressure – Rain Curtain™ Nozzles



### How much water can you save each minute using Rain Bird® 5000 PRS Rotors with Flow Optimizer Technology?

| Flow<br>GPM | 45 | 50   | 55   | 60   | 65   | 70   | 75   | 80    |
|-------------|----|------|------|------|------|------|------|-------|
| 6           | 0  | 0.33 | 0.66 | 0.96 | 1.25 | 1.54 | 1.81 | 2.06  |
| 8           | 0  | 0.43 | 0.85 | 1.24 | 1.62 | 1.98 | 2.33 | 2.67  |
| 10          | 0  | 0.55 | 1.07 | 1.57 | 2.05 | 2.52 | 2.96 | 3.39  |
| 12          | 0  | 0.66 | 1.27 | 1.86 | 2.43 | 2.97 | 3.50 | 4.01  |
| 14          | 0  | 0.77 | 1.49 | 2.18 | 2.84 | 3.48 | 4.10 | 4.70  |
| 16          | 0  | 0.87 | 1.69 | 2.48 | 3.24 | 3.97 | 4.67 | 5.35  |
| 18          | 0  | 0.98 | 1.90 | 2.79 | 3.64 | 4.46 | 5.25 | 6.01  |
| 20          | 0  | 1.10 | 2.12 | 3.10 | 4.05 | 4.96 | 5.83 | 6.68  |
| 22          | 0  | 1.21 | 2.33 | 3.42 | 4.46 | 5.47 | 6.44 | 7.37  |
| 24          | 0  | 1.30 | 2.54 | 3.72 | 4.85 | 5.94 | 7.00 | 8.01  |
| 26          | 0  | 1.41 | 2.76 | 4.04 | 5.27 | 6.45 | 7.60 | 8.70  |
| 28          | 0  | 1.53 | 2.96 | 4.34 | 5.66 | 6.93 | 8.16 | 9.35  |
| 30          | 0  | 1.63 | 3.17 | 4.65 | 6.07 | 7.43 | 8.74 | 10.02 |

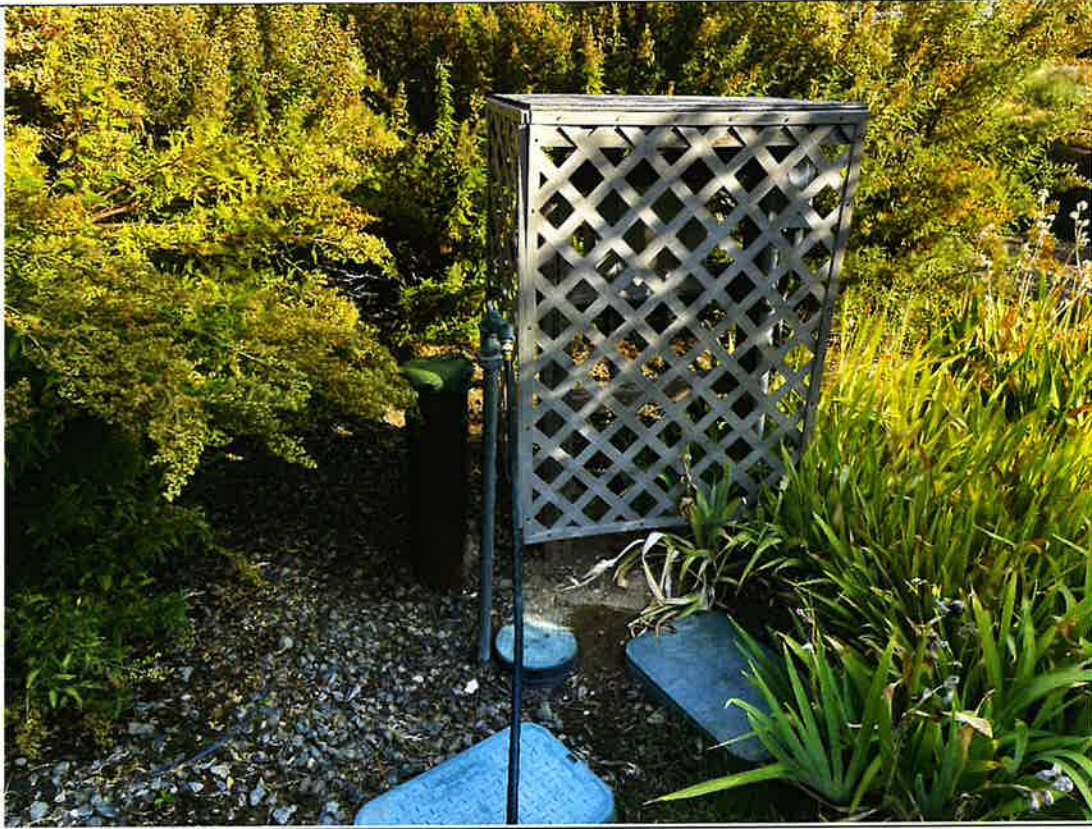
Total gallons of water saved per minute of run time

Ex: At 70 psi a zone with 20 gpm of flow would save  
4.96 gallons a minute with 5000 PRS

## **ATTACHMENT D – WELL DRILLERS REPORT**



**ATTACHMENT E – FIELD EXAM PHOTOGRAPHS**



Domestic Well

63-33470 Point of  
Diversion

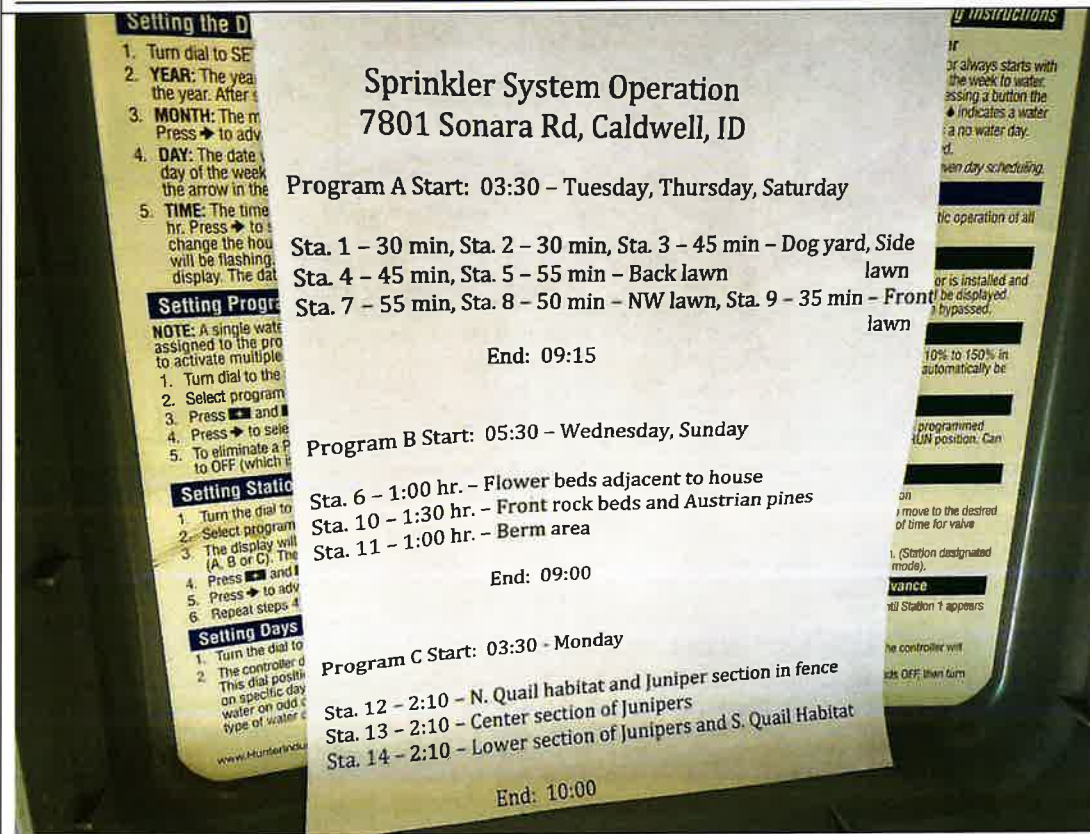
GPS: -116.640 43.809



Well Tag:  
D0052472



Sprinkler Control Box



Irrigation Zone Schedule

Valley Pump and Equipment Co. Inc.  
 Box 548  
 Emmett, ID 83617  
 208-365-2972

# Invoice

| Date      | Invoice # |
|-----------|-----------|
| 7/13/2016 | 134945    |

| Terms    |
|----------|
| Net 10th |

Bill To:

Harry Kaczmarek  
 7801 Senora Rd.  
 Caldwell, ID 83607

Job Site:

| P.O. No. | Rep |
|----------|-----|
|          | PLF |

| Qty | Description                                                                                                         | Rate            | Amount |
|-----|---------------------------------------------------------------------------------------------------------------------|-----------------|--------|
| 1   | SD300N4 Sub Drive (5HP) w/NEMA 4 Enclosure<br>12G451900002H 12G45 (3 year warranty)                                 |                 |        |
| 1   | Surge Arrestor 1ph 150814902 (SDSA1176)                                                                             |                 |        |
| 1   | Plastic replacement end for Baker frostfree<br>Hydrants (2-116 o ring)                                              |                 |        |
| 1   | (W/DGD-5005) Dual-Gradient Polypropylene Filter<br>Cartridge 50micron pre-filter & 5micron post-filter<br>155357-51 |                 |        |
|     | Labor and Travel BILL W., BUTCH, RANDY &<br>DENNY                                                                   |                 |        |
|     | NOTE: VENDER DENIED WARRANTY ON OLD<br>SD300 (3 YEAR WARRANTY)                                                      |                 |        |
|     | Sales Tax                                                                                                           |                 |        |
|     |                                                                                                                     | <b>Subtotal</b> |        |

Please pay amount due, in full, by the 10th of the

Valley Pump and  
 Equipment Invoice

5 hp pump

Franklin Pump & Motor  
 with NEMA 4 Enclosure



Drip emitter.



Rainbird 1800 Sprinkler  
used to irrigate yard  
around home.



Rainbird 5000 used to  
irrigate around natural  
vegetation.



Natural vegetation and flowers irrigated around drive.



Natural landscape around drive. Drip line shown within rocks.



Landscape around property, west of home.



View of properties western boundary. Irrigated area on property shown on left. Dry land shown on right.



Drip system on south west end of property. Drip lines run north-south to grow pumpkins and other vegetables.





Large junipers line east property boundary. Drip lines shown for two rows of shrub.



South-west corner of property looking east. Drip system shown irrigates a row of hybrid poplar trees and hackberries.



Cherry and Peach fruit trees. Trees have been added since latest imagery.



3, 5-gallon drip emitters are used per tree. PVC pipe has been installed to help deliver water to root zone.

## MEMORANDUM

TO: Water Right File 63-33470

FROM: Daniel Nelson – Analyst 3

DATE: November 19, 2020

SUBJECT: Licensing Review of Water Right 63-33470

The field exam for this right was performed by Patrick Kelly and reviewed by Certified Water Right Examiner Terry Scanlan of SPF Water Engineering. Originally Mr. Kelly and Mr. Scanlan recommended 0.05 cfs and 10.4 af for irrigation and 0.04 cfs and 0.6 af for domestic use for a total of 0.09 cfs and 11 af. After my initial review, I contacted Mr. Kelley and Mr. Scanlan to clarify some of the information provided, and they agreed that total diversion rate should be reduced to 0.08 cfs. The irrigation and domestic rates and volumes should remain the same along with all of the volumes.

I was able to recreate the place of use provided by Mr. Kelley. The only area of concern was the strip of ground along the southwestern side of the property. However, the photos supplied by Mr. Kelley show that they are growing squash/garden types of plants using a drip system, this type of irrigation probably would not show up as well in the sentinel imagery. According to Mr. Kelley's September 9, 2021, email, they may have been irrigating additional acres around the home in the past, so changing the acres around should not be an issue. Since there isn't any quality imagery to dispute Mr. Kelley's place of use, I will defer to his place of use, since he has been on site.

There are no overlapping water rights for this permit. Conditions R69, 132, 01M, and X60 should be carried forward to licensing. Conditions 121 will be changed to 103 as is standard. All other conditions will be removed.