

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 37-21742
Exam Date: 7/11/2017

1. Current Owner:
BLAINE COUNTY SCHOOL DISTRICT #61 118 W BULLION ST HAILEY ID 83333 (208) 578-5000
2. Accompanied by: Howard Royal
Phone No: (208) 578-5402 Cell Phone # (208) 481-2376
Address: 1630 Aviation Drive, Hailey, Idaho, 83333
Email Address: hroyal@blaineschools.org
Relationship to Permit Holder: Director of Buildings and Grounds Blaine County School District #61

3. SOURCE:
GROUND WATER

B. OVERLAP REVIEW

1. Other water rights with the same place of use: 37-22542, City of Carey, and Little Wood Irrigation District
2. Other water rights with the same point-of-diversion: No Direct Overlapping Water Rights.

PLEASE NOTE: There numerous other domestic water rights in this area, but only the water rights described above are direct overlaps to the place of use and point of diversion. Also please see narrative for discussion of mitigation water rights and their overlaps.

C. DIVERSION AND DELIVERY SYSTEM1. **LOCATION OF POINT(S) OF DIVERSION:**

GROUND WATER NW¼NE¼ Sec. 27, Twp 01S, Rge 21E, B.M. BLAINE County

Method of Determination: Visual Inspection, WMIS, and GPS.

2.

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
01S	21E	27	1.6	5.1	2.0														8.7

Total Acres: 8.7

Method of Determination: Visual Inspection, and ArcGIS

3.
 - ☒ Delivery System Diagram Attached (required). Indicate all major components and distances between components.
 - ☒ Indicate weir size/pipe as applicable.
 - ☒ Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.
 - ☒ Aerial Photo Attached (required for irrigation of 10+ acres).
 - ☒ Photo of Diversion and System Attached

4.

Well or Diversion ID No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
A0017841	Franklin Electric	75**	239603011	Franklin Electric	8 Inch Discharge

*Code to correspond with No. on map and aerial photo

** Please Note: The pump panel describes the pump as being a 75 Hp pump. However, the permit holder stated that the pump was a 60 Hp pump. The permit holder had a multimeter current tester, and the amps measured were similar to a 60 Hp pump. Although it cannot be confirmed with the multimeter, it does appear as though the 75 Hp pump was replaced with a 60 Hp pump at one time, and the pump tags were not replaced.

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
State Office Thyme Flyte #1	Polysonic	Thyme Flyte	TFP	N8J46378 ST. ID # 150232	N/A	March 2017

2. Measurements: Flow measurements were taken with the Thyme Flyte flow meter, and they appeared to reasonably accurate. The permit holder agreed that the measurements seemed reasonable. The permit holder's flow meter had recently been destroyed by a lightning strike, so it was not operational at the time of the field exam. The permit holder was replacing the unit while we were on sight, but hadn't completed the installation.

E. FLOW

 X Additional Computation Sheets Attached

CALCULATIONS

Measured Method:

Without knowing the exact Horsepower of the pump, I could not do a theoretical analysis of this pumping system. The system operates at 70 psi, so it appears as though the pump bowls have been trimmed and that the pump being used is not designed to divert under pressure. This explains why a theoretical analysis for this well doesn't make sense. The football field runs 16 - 8005 Rainbird Sprinklers at 16 gpm flow rate, which comes to 256 gpm (16 sprinkler X 16 gpm = 256 gpm), and when you add in a mid- rate zone and lower rate zone onto that set, 300+ gpm seems reasonable. The flow rate matches the 14 or 16 size nozzle depending on the pressure at the sprinkler. The entire system runs at 70 psi, so the nozzle pressure would be closer to 60 psi with friction loss. Please see the narrative for a discussion on the operation of the system. We measured the well with several zones in operation, which provided the absolute maximum amount of water the pump could supply to the system and maintain pressure.

Flow meter measurement = 379.5 gpm or 0.89 cfs

Permit allowed = 0.80 cfs

Adjusted flow per Application Processing Administrative Memo # 60 = 0.70 cfs (see attached memo)

Their largest single zone requires approximately 0.73 cfs, which is very close to the 0.70 cfs that can be allowed according to Application Processing Administrative Memo #60. I am recommending a diversion rate of 0.70 cfs, which is within 10% of the amount measured at their largest zone.

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$$V_{IR} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = 8.7 \text{ acres} \times 3.5 = 30.45 \text{ af}$$

$$V_{DR} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 = 0.70 \text{ cfs} \times 200 \text{ days} \times 1.9835 = 277.7 \text{ af}$$

$$V = \text{Smaller of } V_{IR} \text{ and } V_{DR} = 30.45 \text{ af}$$

PLEASE NOTE: This is a supplemental ground water right, so no volume is required. The highest volume recorded in the WMIS database was 10.02 af in 2014. A recording of 31.24 af was recorded in 2009, but a disclaimer was placed on the reading, because the meter was not read the previous year.

2. Volume Calculations for Other Uses: N/A

G. NARRATIVE/REMARKS/COMMENTS**History:**

The well for this permit was originally drilled for a fire protection well. There is no water right associated with the well for fire protection, but a well drilling permit was issued. The well was converted over to an irrigation well for this permit. The well is no longer connected to the fire suppression system, but it could be used if needed to connect to a fire truck.

Supplemental Water Analysis:

The main source of water for this system is Little Wood Irrigation District water. The low volumes of water in the WMIS database confirm that the Little Wood Irrigation District water is the main source of water supply for this system. There is no way they could maintain the lush growth of the playground and football areas on the volume being diverted through the well. The Little Wood Irrigation District water is diverted out of a ditch into a pumping system due north of the school. The water from the ditch pump is delivered to the irrigation system through an underground mainline.

Diversion Rate and System Description:

The water from the well is diverted into a system that delivers water to a series of sprinklers around the school. Sprinklers of different sizes and types are required to properly irrigate the different areas which include small grassy areas irrigated by popup type sprinklers to the football field that is irrigated with large Rainbird 8005 Falcon sprinklers. In order to make the system work, they need to mix and match the different sprinkler settings, so the system needs to be able to provide a large range of flow rates. They generally operate three zones. Normally, they operate a high rate zone, mid- rate zone, and low rate zone during each set. They have to alternate the mid-rate zones and low rate zones to prevent a buildup of water in a particular area, because the high rate zones generally need to run a longer period of time to apply the needed precipitation rate.

The pump is not on a variable speed pump, so the flow rate is regulated by pressure only. This puts a great deal of stress on the pump, which we could hear when the sprinkler system changed zones during the measurement. We measured the system on the highest possible flow rate, which was 0.89 cfs, but I do not believe this is a normal operating condition. Mr. Royal told me that they average around the 300 gpm range between the sets, which seems more in line with what we saw and heard from the pump during the field examination.

They do have the ability to divert up to 380 gpm flow rate during the hottest part of the year if necessary to ensure that all of the areas receive adequate water. They do this by adding additional smaller zones to the larger zones to ensure adequate water coverage. When we first arrived, the pump was diverting to the set of zones supplying the football field, which is the highest water requirement for an individual set, and we were measuring 326 gpm or 0.73 cfs.

According to Application Processing Memorandum #60, the highest diversion rate we can allow for the 6 hours they have to operate the system is 0.70 cfs. I contacted the permit holder by email on July 24, 2017 and again on July 27, 2017, to inform them that we could not allow a diversion rate higher than the 0.70 cfs for their system without additional information showing why they needed the higher diversion rate. On July 28, 2017, I received a verbal confirmation from Howard Royal in a telephone conversation that the 0.70 cfs would be sufficient to operate their system. Mr. Royal informed me that the majority of their system sets operates around the 300 gpm, and they could maintain that amount if necessary. The 0.89 cfs or 397.5 gpm measured was rarely used, and they could work around it if needed. Although I have not received written confirmation from Mr. Royal, I feel this is adequate to move forward with licensing the water right.

Mitigation Analysis:

This permit was approved per a mitigation plan providing that 20 acres of supplemental irrigation would be used for mitigation by non-use from water right 37-2657B. The water right was then split by ownership and new numbers were assigned. Water right 37-2657B is now 37-22204, owned by Danny and Dustin Simpson, and water right 37-22205, owned by Blaine County School District # 61. The mitigation plan limited water right 37-22204, owned by Dany and Dustin Simpson, to not irrigate specific acres in the SWSW of Section 3 and the NWNW and SWNW of Section 10, Township 2 South Range 21 East by any water right if the Simpsons used their supplemental ground water under water right 37-22204 when Blaine School District was using their supplemental ground water under water right 37-20005.

According to watermaster records, the only year that the Simpson's used their supplemental ground water under water right 37-22204 was 2014. During that year, the Simpsons and Blaine School District filed a temporary transfer to change the location of the acres to be left fallow under water right 37-22205. It appears from my discussion with the watermaster, that the conditions of the permit and the mitigation plan have been followed. Apparently, the well supplying water to water right 37-22204 is owned by multiple individuals, so the WMIS database cannot be used to track compliance of the mitigation plan. The watermaster has monitored this water right to ensure it has been complied with in the past, and will continue to monitor the compliance with the mitigation plan. Therefore, there should be no issues with the mitigation of this permit.

Waiver of Data logger analysis:

The 2007 permit approval required a data logger be installed or included on the measurement device for this system. During the time that the permit was approved, the Department did require data loggers on measurement devices in the Eastern Snake Plain Aquifer area. Since 2009, the Department has determined that in most cases that the cost and lack expertise in setting up a data logger may not be needed to provide the information required by the water district. It has been determined that a flow meter with a totalizer is generally more than adequate for monitoring some of the diversions, without the expense of installing a data logger unit. The permit holder requested that the data logger requirement be waived in an email on July 18, 2017. The watermaster agreed that a data logger should not be required on this system, and recommended that the data logger requirement be removed at licensing.

Multiple applications for permit for heating and cooling purposes were filed by Blaine School District during the same time period as this permit. Requiring a data logger for a heating and cooling permits is needed to attain the volume and diversion rates needed to operate the system properly over seasonal changes. However, a supplemental irrigation right has a set period that it is normally used, and any non-authorized diversion can easily be determined by monitoring the totalizer of the flow meter. The only reason for a data logger on an irrigation system would be if there are conditions or local area issues that require time sensitive monitoring. There does not appear to be any reason where time sensitive data would be needed for this system. Therefore, I recommend that the data logger requirement be waived, and the condition for measurement changed to the current standard for irrigation water rights for water districts in the Eastern State Plain Aquifer area.

Conditions:

Conditions 1 (046) and 12 (26A) will be removed at licensing as is standard. Condition 2 (R59) should be changed to Condition WB7. Conditions 3 (R05), 5 (R02), 6 (065), 7 (104), and 11 should be carried over to licensing as they were on the permit. Condition 4 (115) should be changed to conditions 212 and 213 since the data logger requirement is being waived. The license will provide the order to waive the data logger requirement. Condition 7 (104) should be changed to condition 105 as is standard. Condition 9 should be removed, since the ownership change has been completed. Condition 10 (113) should be removed, since they have never exceeded the minimum limitation of 35 af, and the time frame for the last limitation of 2008 has been met. Condition 13 (051) should be changed to conditions 933 and 935 as is standard.

Condition 8 (170) should be corrected to meet existing conditions. It should now read as follows:

To mitigate for the depletion of water resulting from the use of water under this right and to prevent injury to senior water right holders, the right holder shall cease diverting and using water as authorized by the following water rights for the purposes and amounts specified below. Moreover, the official record for the following water right will be changed to show that diversion and use of water is not authorized because the rights, or portion thereof, are being dedicated to mitigation purposes.

Right No.	Use Changed to Mitigation	Mitigation Rate (cfs)	Mitigation Volume (AF)	Mitigation Acres
37-22205	Irrigation	0.13	30.5	8.7

The land that will no longer be irrigated under this right is located within the SWSW, Section 03, Township 02S, Range 21E (6 ac); NWNW, Sec. 10, Township 02S, Range 21E (2.7 ac), B.M.

If the specified mitigation right, or portion thereof, is sold, transferred, leased, used on any place of use, or is not deliverable due to a shortage of water or a priority call, then the amount of water authorized for diversion under this right shall be reduced by the same proportion as the reduction to the mitigation rights.

Several of the conditions will need to be re-worded to either make them match the license or make them more understandable.

PLEASE NOTE: The remaining portion of the water right 37-22205 will remain as a mitigation water right, since the permit holder already has plans to file another water right application using the remaining portion for mitigation of that permit. Please see Lori Graves Email dated 7/31/2017.

Have conditions of permit approval been met? ☒ Yes ☐ No

H. RECOMMENDATIONS

1. Recommended Amounts

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
IRRIGATION	04/15 to 10/31	0.70 CFS	
<u>Totals:</u>		0.700 CFS	

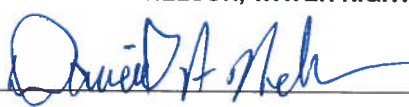
PLEASE NOTE: No volume is required on the water right, since it is a supplemental water right. A condition will be added to limit the annual volume when combined with other uses.

2. Recommended Amendments

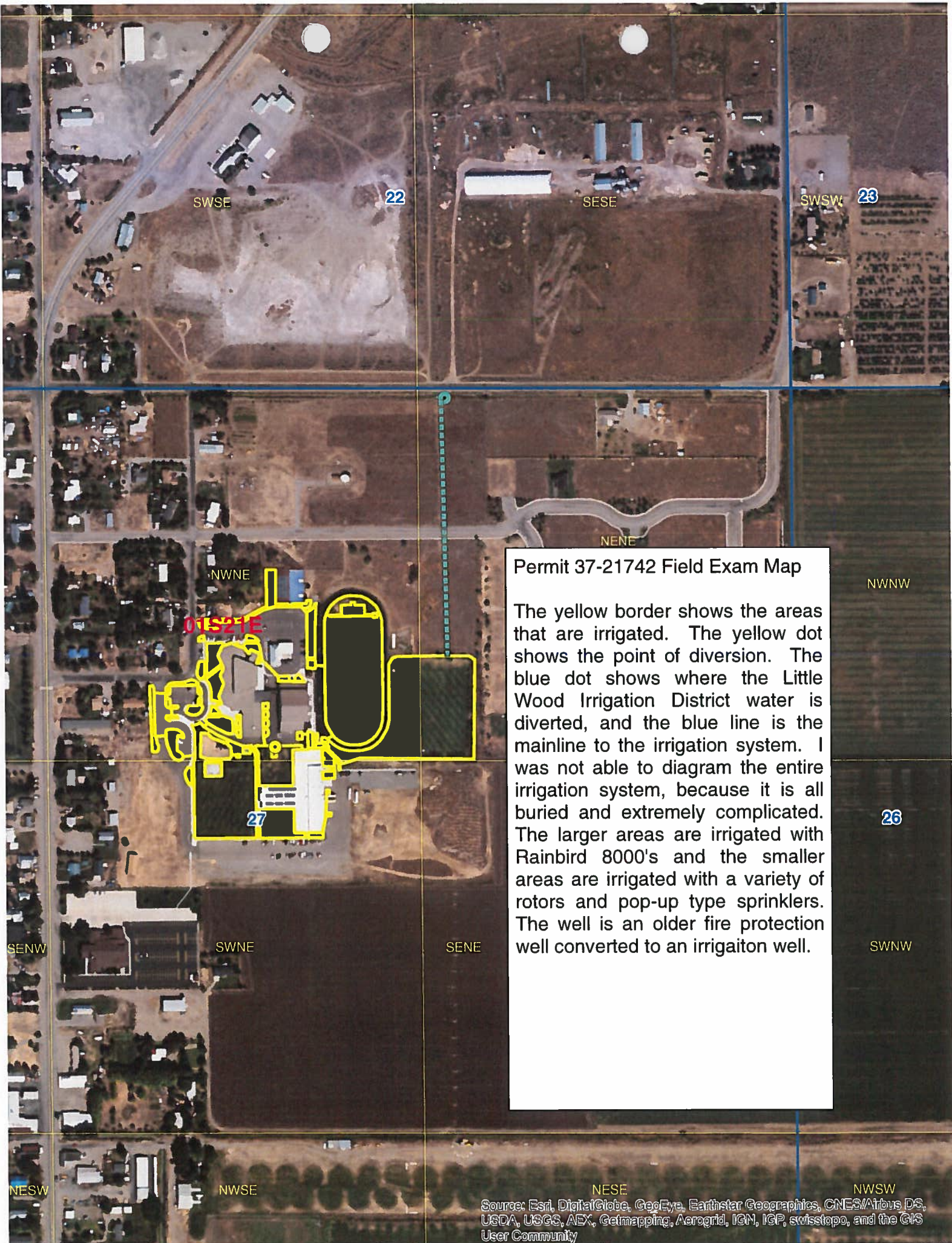
☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☐ None

☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☐ None

I. AUTHENTICATION – DANIEL A. NELSON, WATER RIGHT ANALYST 3

Field Examiner's Name  Date 7-31-17

Reviewer _____ Date _____



Permit 37-21742 Field Exam Map

The yellow border shows the areas that are irrigated. The yellow dot shows the point of diversion. The blue dot shows where the Little Wood Irrigation District water is diverted, and the blue line is the mainline to the irrigation system. I was not able to diagram the entire irrigation system, because it is all buried and extremely complicated. The larger areas are irrigated with Rainbird 8000's and the smaller areas are irrigated with a variety of rotors and pop-up type sprinklers. The well is an older fire protection well converted to an irrigaiton well.

Adjusted Diversion Rate Calculation for Permit 37-21742

By Dan Nelson

7/11/2017

This irrigation system irrigates approximately 8.7 acres of the grounds around the Carey School. The school needs to irrigate the system at night during a short period of time to allow proper water application, and still provide a relatively dry playground area. The school typically irrigates 6 hours during the early nighttime hours to allow the wet fields and playground areas time to dry before the day begins. I used the following calculations to determine what the maximum flow rate that could be allocated to the permit holder. I used the following equation provided in Application Processing Administrative Memorandum # 60.

$$[(0.02 \text{ cfs/ acre standard rate}) / (6/24 \text{ reduced irrigation time})] \times (8.7 \text{ acres}) = 0.696 \text{ cfs}$$

This permit was originally approved with an enhanced diversion rate as directed by Application Processing Administrative Memorandum # 60 for the irrigation of turf grass in public areas. This permit was approved for 0.80 cfs for 20 acres or 0.04 cfs per acre, instead of the standard 0.02 cfs per acre. However, only 8.7 of the 20 acres were actually developed. The system was measured at a maximum capacity of 397.5 gpm or 0.89 cfs, which is reasonably close to the diversion rate approved by the permit. The system was developed for the diversion rate permitted, but the acres approved by the permit were not fully developed. Limiting the diversion rate to the 0.04 cfs per acre or 0.35 cfs as approved in the permit would greatly restrict their current irrigation practices, and would probably require them to install a new well or a variable speed drive to the pump motor to safely reduce the amount of water being pumped. This well was originally developed for fire protection, so they were not required to install a new pumping system when they irrigation system was attached to the well.

According to Application Processing Memorandum # 60, the permit holders can have up to 0.70 cfs for the 8.7 acres developed. At this diversion rate, the permit holder would not need to replace the pump or install a variable speed pump. The pump could safely be operated at a diversion rate of 0.70 cfs without causing damage to the pump. The permit was advertised at an enhanced diversion rate of 0.80 cfs without protest, and the Department has received no complaints about the use of the pump in the last 10 to 15 years the well has been used for irrigation. I feel it is reasonable to recommend a diversion rate of 0.70 cfs for this system, since it was designed to pump these increased flow rates.

POLYSONIC READINGS

PERMIT #: 37-22542

POINT OF DIVERSION

Irrigation Pump A0017841

FIRST SET OF INFORMATION:

SET-UP IMPUTE DATA USED DURING
PREPARATION FOR FLOW MEASUREMENTS.

SECOND SET OF INFORMATION:

THESE ARE THE READINGS TAKEN FOR
THIS PUMP. THE TOTAL FLOW WAS
AVERAGED OVER 4 MINUTES DUE TO
TIME RESTRAINTS OF FLOWS PER ZONE.

FLOWS IN GALLONS PER MINUTE (GPM)

397.5 GPM FLOW RATE

FLOWS IN CUBIC FEET PER SECOND (CFS)

397.5 GPM / 448.8 = 0.89 CFS FLOW RATE

Please Note: The sets only ran a
for approximately 15 to 30 minutes.
By the time that we could get a maximum
possible flow, the system shut down
4 minutes into the test. It is unlikely
that pump operates at this flow rate all
the time. It may operate at this flow rate
to irrigate the football field.

159 X 10 = 1590 gallons in 4 minutes
1590 / 4 = 397.5 gpm.

MODE SELECT
INPUT

OUTER DIAMETER
8.01000 IN

PIPE MATERIAL
? CS.SS

WALL THICKNESS
0.2600 IN

INNER LINING
? NO LING.

KIND OF FLUID
? WATER

SENSOR MOUNTING
? U

TYPE OF SENSOR
? SMALL

SPACING
6.049 IN U

MODE SELECT
TO CHECK

0287.3 MMSEC
102.66 % T0

07-11 14:2400 *R
+002.00 % A12

ZERO MODE
AUT ZERO

15:07+398.107E 00GPM 00R
+ 2.900E 0FFS 00R
+00000 *10 G 00R
-00000 *10 G 00R

15:08+402.334E 00GPM 00R
+ 2.929E 0FFS 00R
+00039 *10 G 00R
-00000 *10 G 00R

15:09+385.427E 00GPM 00R
+ 2.808E 0FFS 00R
+00079 *10 G 00R
-00000 *10 G 00R

15:10+401.805E 00GPM 00R
+ 2.926E 0FFS 00R
+00118 *10 G 00R
-00000 *10 G 00R

15:11+399.428E 00GPM 00R
+ 2.910E 0FFS 00R
+00159 *10 G 00R
-00000 *10 G 00R

297.5 gpm

8005 Nozzle Performance

Pressure psi	Nozzle	Radius ft.	Flow gpm	Precip In/h	Precip In/h
50	● 04	39	3.8	0.48	0.56
	● 06	45	5.6	0.53	0.62
	● 08	49	6.6	0.53	0.61
	● 10	53	9.3	0.64	0.74
	● 12	57	11.1	0.66	0.76
	● 14	59	12.6	0.70	0.81
	● 16	61	14.3	0.74	0.85
	● 18	63	16.1	0.78	0.90
	● 20	65	18.6	0.85	0.98
	● 22	65	20.7	0.94	1.09
	● 24	63	22.3	1.08	1.25
	○ 26	65	24.3	1.11	1.28
60	● 04	39	3.8	0.48	0.56
	● 06	45	6.1	0.58	0.67
	● 08	49	8.4	0.67	0.78
	● 10	53	10.1	0.69	0.80
	● 12	59	12.0	0.66	0.77
	● 14	61	14.3	0.74	0.85
	● 16	65	15.9	0.72	0.84
	● 18	65	17.8	0.81	0.94
	● 20	67	20.1	0.86	1.00
	● 22	71	23.2	0.89	1.02
	● 24	69	24.7	1.00	1.15
	○ 26	73	26.7	0.96	1.11
70	● 04	39	4.7	0.60	0.69
	● 06	45	6.7	0.64	0.74
	● 08	49	9.0	0.72	0.83
	● 10	55	11.1	0.71	0.82
	● 12	59	13.2	0.73	0.84
	● 14	63	15.3	0.74	0.86
	● 16	67	17.2	0.74	0.85
	● 18	67	19.3	0.83	0.96
	● 20	71	22.0	0.84	0.97
	● 22	73	25.2	0.91	1.05
	● 24	75	27.0	0.92	1.07
	○ 26	75	29.4	1.01	1.16
80	● 04	39	5.0	0.63	0.73
	● 06	45	7.1	0.68	0.78
	● 08	49	9.8	0.79	0.91
	● 10	55	11.8	0.75	0.87
	● 12	61	14.2	0.73	0.85
	● 14	63	16.4	0.80	0.92
	● 16	67	18.6	0.80	0.92
	● 18	69	20.9	0.85	0.98
	● 20	71	23.9	0.91	1.05
	● 22	75	27.3	0.93	1.08
	● 24	77	29.2	0.95	1.10
	○ 26	79	31.5	0.97	1.12

Pressure psi	Nozzle	Radius ft.	Flow gpm	Precip In/h	Precip In/h
90	● 12	61	14.7	0.76	0.88
	● 14	65	17.9	0.82	0.94
	● 16	69	20.0	0.81	0.93
	● 18	71	22.2	0.85	0.98
	● 20	73	25.3	0.91	1.06
	● 22	75	29.1	1.00	1.15
	● 24	79	31.0	0.96	1.10
	○ 26	79	33.7	1.04	1.20
	○ 26	81	36.3	1.07	1.23
100	● 20	75	26.8	0.85	0.97
	● 22	77	30.7	1.00	1.15
	● 24	79	32.8	1.01	1.17
	○ 26	81	36.3	1.07	1.23

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 ASAE Standards; ASAE S398.1.
See page 224 for complete ASAE Test Certification Statement.



8005 Cutaway

PHOTOGRAPHER AND DATE OF PHOTOS Daniel A. Nelson, Manuel Rauhut, and Chelsey Serrano 7/11/2017

FILE NUMBER 37-21742



The photos above show the well and the well tag marking the well. The photos below show the pump panel and the location of the well within the gated area.



PHOTOGRAPHER AND DATE OF PHOTOS Daniel A. Nelson, Manuel Rauhut, and Chelsey Serrano 7/11/2017

FILE NUMBER 37-22542



The pictures above start at the back of the grade school and pans around to the well site and the front of the high school. The pictures below show the back of the high school and the football field.



PHOTOGRAPHER AND DATE OF PHOTOS Daniel A. Nelson, Manuel Rauhut, and Chelsey Serrano 7/11/2017

FILE NUMBER 37-22542



The above pictures start at the southeast corner of the grade school panning south to the grassy area in front of the high school. The photos below show the front of the grade school and the very bottom pictures show the parking lot area on the west side.

