

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 37-08157

Exam Date: 4/19/2016 & 3/30/2107

1. Current Owner:

THE COMMUNITY SCHOOL INC
PO BOX 2118
SUN VALLEY ID 83353 (208)622-3955

2. Accompanied by: Keith Keim, Corey Skinner, and Allen Merritt

Phone No: Keith Keim, 208-309-0530

Address: same as above

Relationship to Permit Holder: Keith Keim – Facilities Manager. Corey Skinner and Allen Merritt – IDWR employees.

3. SOURCE:

UNNAMED STREAM

TRIBUTARY:

Sinks

B. OVERLAP REVIEW

1. Other water rights with the same place of use: Ground water irrigation rights 37-20901 and 37-22681
2. Other water rights with the same point-of-diversion: None

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

UNNAMED STREAM NW¼SW¼ Sec. 16, Twp 04N, Rge 18E, B.M. BLAINE County

Method of Determination: ArcMap aerial imagery and site visit

2.

PLACE OF USE: IRRIGATION FROM STORAGE

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
04N	18E	16							1.0			30.0	10.0						41.0

Acre Limit: 14.8 acres within a 41.0 acre PPU

PLACE OF USE: IRRIGATION STORAGE

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
04N	18E	16										X							

Method of Determination: ArcMap aerial imagery and site visit

3.

Delivery System Diagram Attached (required). Indicate all major components and distances between components.

X 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

X 1:24,000 or greater.X Aerial Photo Attached (required for irrigation of 10+ acres).X 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
NA					

*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
NA						

2. Measurements:

1. Measured flow over the existing check structure at the reservoir. The head was measured at 0.07' and the weir width was 39.5" (3.292'). Using the formula for a standard contracted rectangular weir $Q = 3.33(L-0.2h)h^{1.5}$ or $3.33(3.29 - 0.2 \times 0.07) 0.07^{1.5}$, $Q = 0.2$ cfs. Performed a bucket and stopwatch test to assess leakage past weir by stopping flow over check. To fill 5 gallons in a bucket took 17.25 seconds, so $60/17.25 = 3.48$ fills/min. x 5 gallons = 17.39 gpm or 0.04 cfs for a total flow of 0.24 cfs.
2. We also did a bucket and stopwatch test to check the outflow below the check at a notch in the concrete. This took 4 seconds to fill 5 gallons in a bucket, so $60/4 = 15$ fills/min x 5 gallons = 75 gpm or 0.17 cfs.

E. FLOW CALCULATIONS

_____ Additional Computation Sheets Attached

Measured Method: The average of the two tests yielded a flow of 0.21 cfs, which was far above the permitted rate of 0.13 cfs. This rate will be used to calculate the volume below, as there will be not flow rate associated with the license.

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$$V_{IR} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = 14.8 \text{ acres} \times 3.5 \text{ AF} = 51.8 \text{ AFA}$$

$$V_{DR} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 = 0.13 \text{ cfs} \times 200 \text{ days} \times 1.9835 \text{ AF/day} = 51.6 \text{ AFA}$$

$$V = \text{Smaller of } V_{IR} \text{ and } V_{DR} = 51.6 \text{ AFA}$$

2. Volume Calculations for Other Uses: NA

G. NARRATIVE/REMARKS/COMMENTS

Two field visits were made to complete the field exam for permit 37-8157. The Community School Sagewillow Campus was visited on April 19, 2016, when Allen Merritt and Corey Skinner of our office accompanied me. We made depth measurements of the reservoir and took pictures of the facility and reservoir, but the flow was quite low, so another trip was made on March 30, 2017, when Corey Skinner and I returned to make a measurement of the flow out of the reservoir. We felt that a measurement on the outlet structure of the reservoir was more accurate than measuring inflow, because much of the stream was flowing underground as it neared the reservoir area and the remaining stream was very braided and difficult to measure. Additionally, the irrigation wells, which also pump into the reservoir, weren't operating yet. The day of the measurement was rainy and the snowmelt had been in progress for some time, so inflow into the reservoir was at a high level.

Permit 37-8157 was originally permitted with the source being springs upstream of the reservoir (T04N, R18E, Section 16, NWNW and SWNW). A pipe apparently carried water from the springs to the reservoir, but this system ceased being used at some point and the water ran directly into the reservoir which had been placed across the streambed. This change will necessitate an Amendment of Permit for the clarification of the name of the source. The water originates at the springs and it appears that the reservoir has existed at its location from the time of this permit, so, by pipe or by stream, the water ended up in the reservoir. Although the permit doesn't mention storage, storage was apparently intended, as the map accompanying the application showed pipelines feeding two reservoirs and the application states "Pipeline and ditch to two ponds".

The unnamed stream appears to originate about 0.45 miles north of the reservoir and runs in generally a southerly direction through willows until it is collected in a constructed reservoir which has a surface area of about 0.24 acres. Keith Keim, the Community School Facilities manager, thought the depth of the reservoir was in the 8-10 foot range and when our IDWR crew measured it, we estimated the depth at 7.7 feet. So, with a depth of 8 feet and a surface area of 0.24 acres, the reservoir has a volume of 1.92 acre-feet.

The reservoir is vegetated with grass and has a concrete outlet with a check that accommodates wooden 4" X 4" X 4' checkboards. It appears to be constantly checked to a height of about 28". When irrigation occurs, the reservoir is drawn down to a point where a float causes the ground water source (up to 3 wells) to begin pumping into the reservoir and then a mixture of surface and ground water is pumped onto the nearby soccer fields. One pump services the north soccer field and a second pump covers the south two fields. Mr. Keim was unsure of the horsepower of the pumps. The accompanying ground water rights are 37-22681 (0.11 cfs, 11.0 acres, 38.5 AFA) and 37-20901 (0.27 cfs, 30.0 acres, 105.0 AFA). It seems appropriate to license the permit limited to 14.8 acres within a 41.0 acre Permissible Place of Use, with the 41.0 acres being the combined place of use for the two ground water rights. An amendment of permit to create the PPU will also be sought. Because the ground and surface rights are co-mingled in the reservoir, it is impossible to separate to which acres the surface water is being applied. A review of past aerial photography taken before the ground water rights were transferred in shows limited irrigation. The 1992 imagery, which is the closest year to the development period that I could find, showed approximately 14 to 15 acres irrigated, though it is difficult to determine exactly with the old photography.

At the direction of the State IDWR office, it was recommended to try to come up with a volume for permit 37-8157. There are no diversion records for the permit, and with the co-mingling of the ground and surface water, isolating the amount of surface water used would not be possible. The best way to get a volume is to determine how much surface water is flowing into the reservoir and calculate that amount for the irrigation season. On March 30, 2017 Corey Skinner, Manager of the IDWR Twin Falls Southern Region office, and myself made two measurements of the outflow of the reservoir. The first was a measurement of the flow over the outlet check. The width of the check is 39.5" and the head measurement was 0.07'. The formula for discharge of a standard contracted rectangular weir (the weir showed good contraction – see photo) is: $Q = 3.33(L-0.2h) h^{1.5}$. So, $Q = 3.33(3.29 - 0.2 \times 0.07) 0.07^{1.5} = 0.2$ cfs. We plugged the top of the weir and did a bucket and stopwatch test to check the leakage around the check and came up with 17.39 gpm or 0.04 cfs of leakage for a total flow of 0.24 cfs. The other method we used was to confine the flow below the check and do a bucket and stopwatch test there. The base of the concrete is notched at that point, which makes confinement of the flow easier. The average of our tests there was 4 seconds to fill a 5 gallon container, so 60 sec/min./4 seconds = 15 fills/min. x 5 gallons = 75 gpm or 0.17 cfs. I believe that the bucket method may have under measured the flow as we had to constrict the flow quickly and the entire flow may not have resumed through the notch that soon. In addition, that method isn't as accurate at higher flows. The 4" width of the check boards may have backed up the flow slightly which may have caused the weir check method to measure slightly high. So it is appropriate to average the two, which gives a flow of 0.21 cfs. Since the permit only allowed for 0.13 cfs, that is the flow rate which will be used to calculate volume. The formula for that is Volume = flow rate x days in irrigation season x 1.9835, or 0.13 cfs x 200 days x 1.98356 AF/day = 51.6 AFA. The other method for volume calculation is multiplying the acres irrigated (14.8) by the field headgate requirement (3.5 AF) which gives a volume of 51.8 AF. The smaller of the two is used for licensing, so I recommend 51.6 AF for the license. This volume includes seepage, evaporation, and numerous fills and refills.

After exiting the reservoir, the unnamed stream sinks before reaching Elkhorn Gulch Creek, as the flow drops off sharply for most of the year.

Mr. Keim said that they had no livestock, so the stockwater portion of the permit is being dropped at licensing. The season of use for Irrigation from Storage has been updated from 4/01 to 11/01 to the current 4/15 to 01/31.

10/31 P.S.

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

H. RECOMMENDATIONS

1. Recommended Amounts

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>ANNUAL VOLUME</u>
IRRIGATION STORAGE	01/01 to 12/31	51.6 AF
IRRIGATION FROM STORAGE	04/15 to 10/31	51.6 AF
<u>Totals:</u>		51.60 AF

2. Recommended Amendments

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

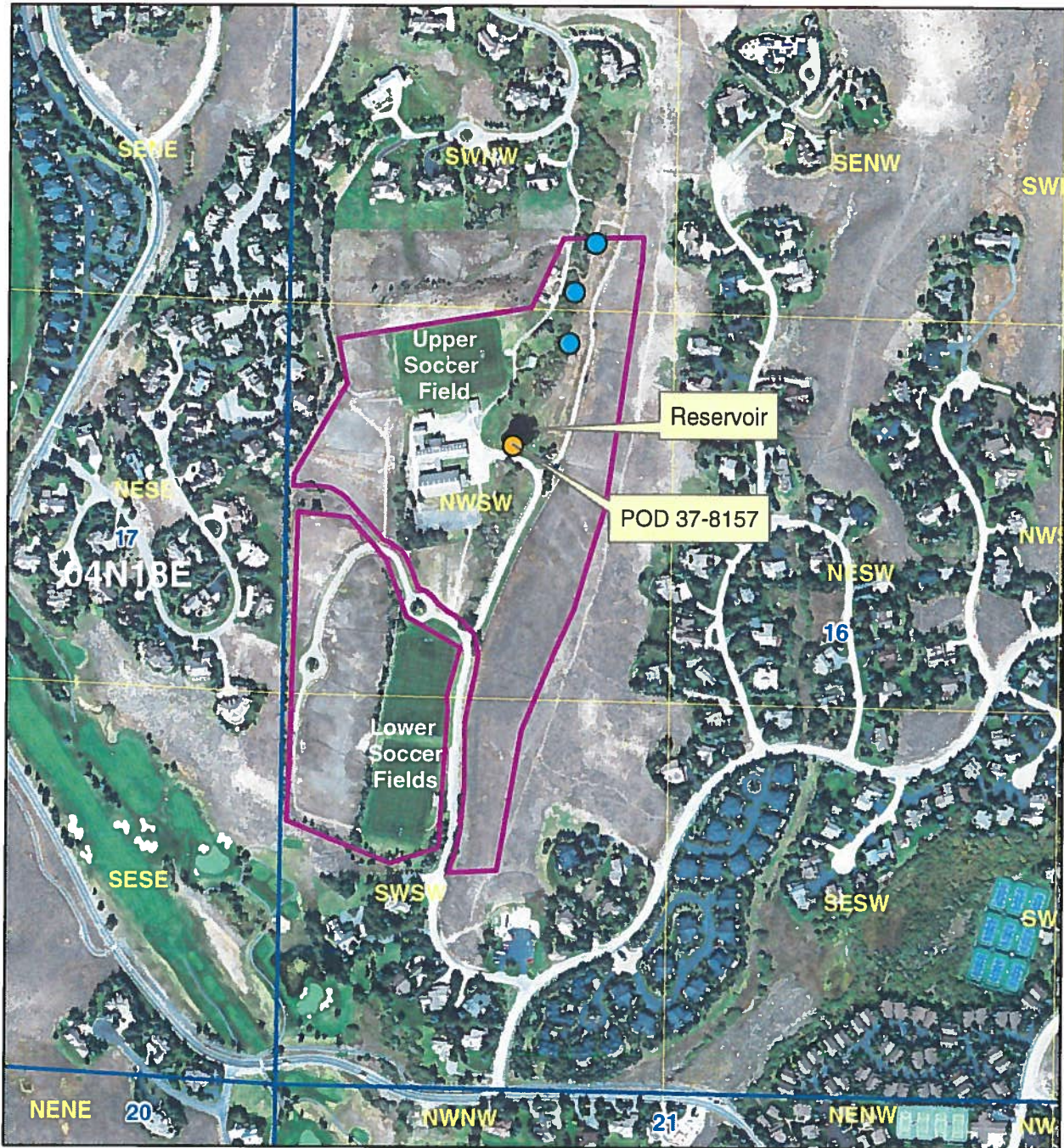
☒ Change P.U. as reflected above ☐ Add P.U. as reflected above ☐ None

I. AUTHENTICATION

Field Examiner's Name Jim B. [Signature] Date 10-5-17

Reviewer [Signature] Date 11/24/17

System Diagram 37-8157



Legend

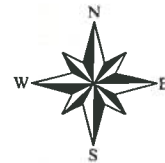
 Township/Range

 Sections

QQ

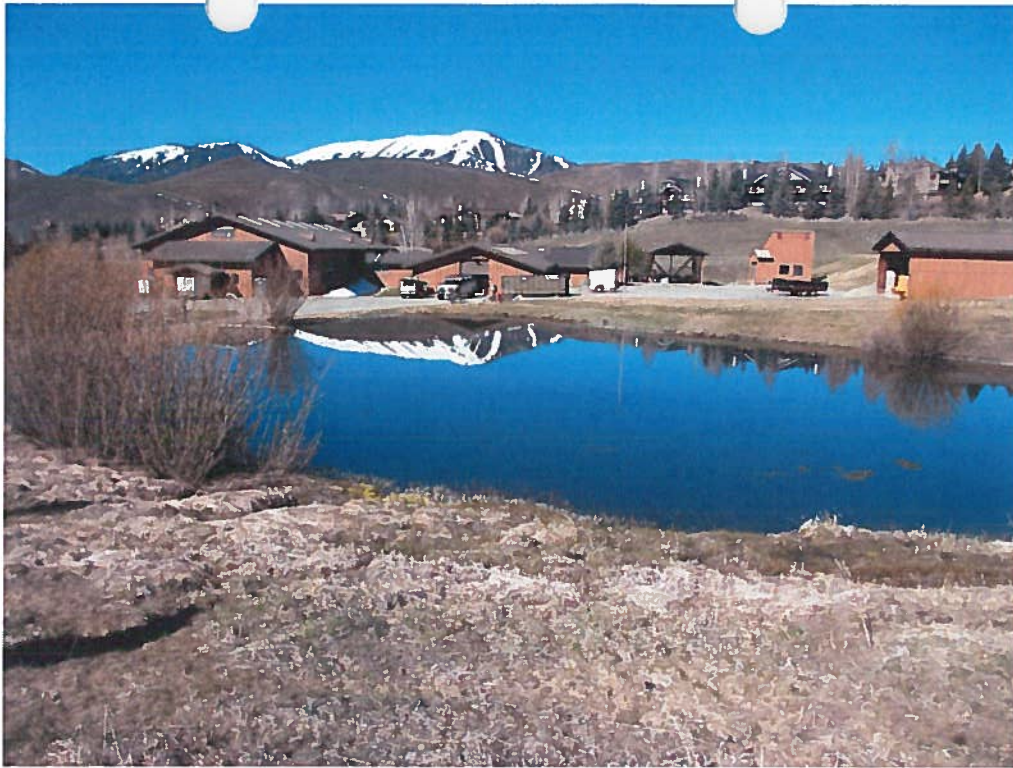
 PPU - Rights 37-8157, 37-22681, and 37-20901

 Ground Water PODs (Wells) for 37-22681 and 37-20901



0 0.05 0.1 0.2 Miles





Views of the irrigation pond at the Community School property in Elkhorn



Field Exam 37-8157



Sprinklers on outlying areas of property



Field Exam 37-8157



A measurement was made at the spillway check at the outlet of the pond by measuring the head and the check width and using the formula for flow in standard contracted rectangular weirs.

Another measurement was made below the check by forcing all of the outflow into the narrow outlet slot and performing a bucket and stopwatch test.





Spillway at south end of pond

One of the pumps use to pressurize the pond water



Field Exam 37-8157



Soccer fields (photo taken on 4/19/2016 – grass had not greened up yet)

Soccer fields – pasture is behind fence



Field Exam 37-8157

SENE

SWNW

SE

NESE

17 04N18E

NWSW

16

NE

1992 Imagery - 14.8 acres Irrigated

SESE

SWSW

SE