

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 63-31145
Exam Date: 8/28/2019

1. Current Owner:
MICHAEL R GOODELL 14899 SAND HOLLOW RD CALDWELL ID 83607
2. Accompanied by: Mike Goodell
Phone No: (208) 899-1417
Address: 14899 Sand Hollow Rd, Caldwell, ID
Relationship to permit Holder: Same

3. SOURCE:
GROUND WATER

Method of Determination: Permit application, ArcMap, aerial imagery, USGS topography, and field examination.

B. OVERLAP REVIEW

1. Other water rights with the same place of use: YES Overlap

Water Right No.	Source	Purpose of Use	Basis
Black Canyon Irrig. Dist.	Payette River	Irrigation	Decreed

Comments: Black Canyon Irrigation Unit 2 surface water

2. Other water rights with the same point-of-diversion: NO Overlap

Water Right No.	Source	Purpose of Use	Basis

Comments: None

C. DIVERSION AND DELIVERY SYSTEM

1. LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER NW¼ NW¼ SW¼, Sec. 10, Twp 05N, Rge 03W, B.M. CANYON County

Method of Determination: Field examination, Garmin Handheld GPS, and ArcMap tools with aerial imagery.

PLACE OF USE: IRRIGATION

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
05N	03W	10									25	25	25	25					100.0
05N	03W	15		20	20		20	20		20									100.0

Total Acres: 200.0

Method of Determination: Aerial Imagery, ArcMap Tools, and observation during field exam.

3.

- Y Delivery System Diagram Attached (required). Indicate all major components and distances between components.
Y Indicate weir size/pipe as applicable.
Y Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.
Y Aerial Photo Attached (required for irrigation of 10+ acres).
Y 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
D0066199	Franklin	60	14F19-04-080528	Franklin STS Turbine	550 gpm

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
Inline flowmeter	Ultrasonic	Master Meter	Octave	44503573	4" 175 psi	

2. Measurements:

Measured Method: Inline flowmeter

Meter Type: Master Meter Octave

Meter Reading: 451.5 gpm or 1.006 cfs

E. FLOW CALCULATIONS

Additional Computation Sheets Attached

Theoretical calculation:

Open discharge from well into gated pipe and concrete ditch with 60 hp pump set estimated at 357 feet.

$$(8.8) \times (60 \text{ hp}) \times 0.70 / 1359 = 1.04 \text{ cfs or } 464.7 \text{ gpm}$$

F. VOLUME CALCULATIONS

1. Volume Calculations for irrigation:

$$V_{IR} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = (200 \text{ acres}) \times (4.5 \text{ af}) = 900 \text{ af}$$

$$V_{DR} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 = (1.04 \text{ cfs}) \times (260 \text{ days}) \times 1.9835 = 533.9 \text{ af}$$

$$V = \text{Smaller of } V_{IR} \text{ and } V_{DR} = 533.9 \text{ af}$$

2. Volume Calculations for Other Uses:

Using the Pond Loss Calculation Spreadsheet (attached) and ArcMap the following theoretical calculation was determined:

Surface area (GIS): 0.49 acres

Maximum pond depth: 10 feet

Average pond depth (estimation): $(10 \times 0.4) = 4$ feet

Pond Capacity (Spreadsheet): 1.96 af

Evaporative Losses: 1.2 af

Total Volume: 39.0 af

Time Required to Fill Pond: 1 day

G. NARRATIVE/REMARKS/COMMENTS

A field exam was conducted by WRA Allen Bradbury and accompanied by Mike Goodell on August 28, 2019. Current Canyon County taxlot data represents that the permit holder owns the land pertinent to the Place of Use (POU) and Point of Diversion (POD).

The well was drilled under drilling permit 965456-871515 and tagged with #D0066199. The well was completed on June 6, 2014 with a completed depth of 410 feet. The pump set was interpolated to be set at 357 feet based on the amount of drop pipe provided on the Coonse Well Drilling & Pump invoice provided by Mr. Goodell.

The system consists of a 60 hp 8-inch 3-phase Franklin motor (model 2396028521) and a 60 hp Franklin STS 550 gpm turbine pump. The submersible pump diverts water from the well to the north with an open discharge into a small regulating pond. Surface water from Black Canyon Irrigation 2nd Unit enters the pond from two different culverts.

The pond has a maximum depth of 10 feet with an estimated average depth of $(10 \times 0.4) = 4$ feet. The surface area of the pond, as measured with ArcGIS measurement tools, is approximately 0.49 acres. The pond capacity was calculated at 1.96 ac-ft. Given the measured well production of 1.0 cfs, the refill rate is 24 hours. The pond storage is not described in the permit and is not necessary to describe since it meets the Departments 24-hour rule for refill. The permit holder reported that Black Canyon Irrigation, usually reduces his diversion rate to 7/10 of an inch per acre in August.

The proposed rate of diversion was 4.0 cfs on the original application, permit, and proof of beneficial use. The system was equipped with a 4-inch Master Meter Octave ultrasonic water meter. During the field exam, the well pump produced between 448 and 451 gpm or 1.0 cfs as observed on the water meter. Pump curves indicated that the pump could perform at rates around 510 to 525 gpm. A theoretical calculation, based on open discharge into the pond and an estimated pump set of 357 feet, yielded a theoretical flow of 1.04 cfs. I am recommending a license for 1.0 cfs as measured by the water meter and limited by the pond fill rate rather than the permitted rate of 4.0 cfs as no evidence supported the larger amount.

The POU was determined using aerial photography. These parcels have been under continuous irrigation as far back as Department aerial photography goes, which is 1980-1987. The permit authorized the irrigation of 200 acres. Aerial photography and field observation corroborated that the supplemental well water could be delivered to about 330 acres through two mainlines originating from multiple pumps from the pond. Water is delivered to a 10-tower pivot, two 7-tower pivots, and two 3-tower corner pivots. A few smaller corners are covered by handlines. At the time of the field exam three crops were under irrigation, including sugar beets, alfalfa, and corn. Proof of beneficial use was submitted on September 17, 2018. Review of 2013 through 2017 aerial imagery shows continual irrigation of the 330 acre POU during the beneficial use period and the amount of area irrigated has remained the same until present. Overlap analysis found overlap for the Black Canyon Irrigation surface water but no other overlap for POU or POD. This groundwater diversion supplements surface water on 330 acres of sprinkler irrigated farmland. I am recommending a POU based on limit of the permit of 200 acres.

On January 2, 2020 the landowner filed an application for permit #63-34847 to appropriate 1 cfs of groundwater for 130 acres. This application will add the acres not applied for under permit #63-31145. The approval of the new application for permit will incorporate the actual acres under sprinkler irrigation in each quarter-quarter. The existing well developed under that permit will continue to be used as a supplemental irrigation to the surface water, no additional water is being sought.

Conditions 046 and 26A were removed as per department licensing standards. Condition 01M will remain. Condition 121 was updated to 103. Condition WB7 for supplemental irrigation will remain. Inactive condition 104 was updated to condition 105. Condition 943 replaced conditions 065. Conditions 004 was removed since the POD is located on the water right holder's property.

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

H. RECOMMENDATIONS**1. Recommended Amounts**

<u>Beneficial Use</u>	<u>Period of Use</u>	<u>Rate of Diversion</u>	<u>Volume</u>
IRRIGATION	03/01 to 11/15	1.00 CFS	900 AF
<u>Totals:</u>		1.00 CFS	900 AF

2. Recommended Amendments

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

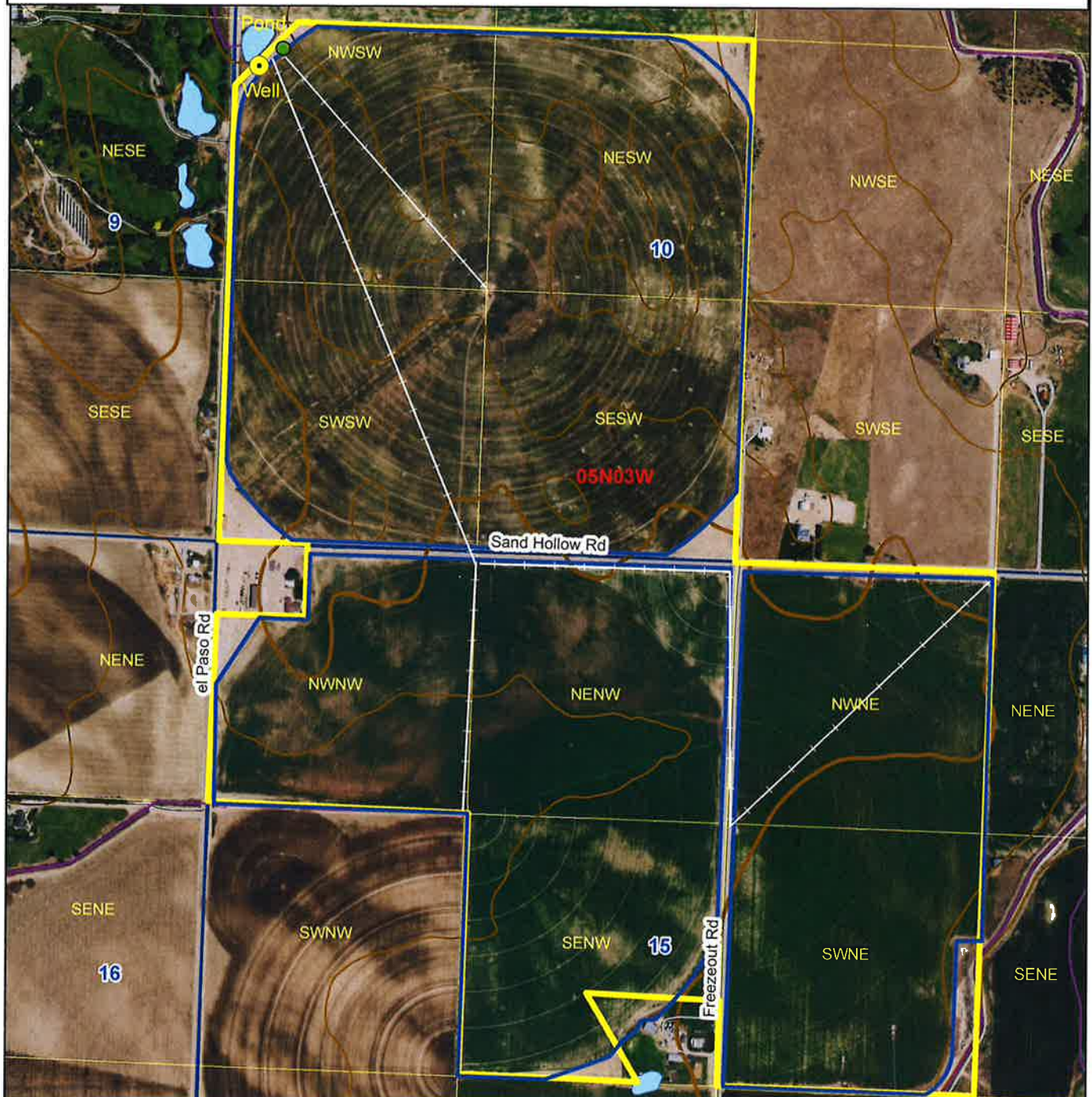
☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☒ None

I. AUTHENTICATION Allen Bradbury - Water Resource Agent, Senior

Field Examiner's Name Allen Bradbury Date 2/7/20
Reviewer Patrick Kelly Date 2-10-2020

Beneficial Use Field Report

System Design



Legend

- 63-31145 Modified POU
- 63-31145 Permitted POU
- Pipeline
- Contours

0 0.05 0.1 0.2 Miles



Pumping Capacity

60 HP Franklin STS 550 gpm pump set @ 357 ft with open discharge into pond.

Pump Equation: $(8.8) \times (60) \times (0.7) / (357 + (2.31 \times 0))$
 $Q = 1.04 \text{ cfs or } 464.67 \text{ gpm.}$

Master Meter Octave water meter measurement of 448-451 gpm or 1.006 cfs

Rate/Acre $(1.006 \text{ cfs} / 330.0 \text{ acres}) = 0.003 \text{ cfs/acre}$



Brad Little
Governor

State of Idaho

DEPARTMENT OF WATER RESOURCES

Western Region • 2735 W AIRPORT WAY • BOISE, ID 83705-5082

Phone: (208)334-2190 • Fax: (208)334-2348 • Website: www.idwr.idaho.gov

Gary Spackman
Director

December 10, 2019

MICHAEL R GOODELL
14899 SAND HOLLOW RD
CALDWELL ID 83607

RE: Water Right Permit No. 63-31145

Dear Mr. Goodell:

The Department of Water Resources is reviewing the permit referenced above prior to issuing a water right license. By issuing a license, the Department confirms the extent of development that has been established in compliance with the terms of the permit.

The examiner who verified your water use described the place of use developed is larger than what was described on your permit. The original permit covered 200 acres, while actual system development covers approximately 330 acres, an additional 130 acres. Changes that do not increase the authorized use of water under the permit can be requested and approved in accordance with Idaho Code § 42-211. Before a license can be issued, your permit must be amended to depict your water use as it was actually developed.

For your convenience I've enclosed Application for Permit form that depicts the additional acres needed in each quarter-quarter to complete the total acreage actually irrigated in each section. Please review the permit application form carefully. If you concur with the information presented, please sign and return the form with the filing fee of \$100.00 within thirty (30) days.

If you do not concur, or if you have any questions about this information, please contact me as soon as possible at (208) 334-2190 or by email at allen.bradbury@idwr.idaho.gov. IDWR forms and other information can be found at www.idwr.idaho.gov.

Sincerely,

Allen Bradbury
Water Resource Agent, Senior

Enclosure(s): Application for Permit
Map

BENEFICIAL USE FIELD REPORT CALCULATIONS

Permit #: 63-31145
Owner: Mike Goodell

Proof Due: 11/1/2018
Priority Date: 3/8/2001

Proof Subm: 9/17/2018
Exam Date: 8/28/2019

Flow Rate 3.01 to 4.00
Fee Rate 4.00
Exam Fee \$175.00

0.00 to 0.20	\$50.00	2.01 to 3.00	\$150.00
0.21 to 1.00	\$100.00	3.01 to 4.00	\$175.00
1.01 to 2.00	\$125.00	4.01 to 5.00	\$200.00

Proposed Well Use: Irrigation
Permit Uses: Irrigation

Drill Date 6/6/2014

Depth: 410 ft

Pump Set: 357 ft

	cfs	gpm
Proposed Rate	4.00	1,795.32
Permit Rate	4.00	1,795.32
Proof Report	4.00	1,795.32
Irrig. Only	4.00	1,795.32
Stockwater		0.00
Domestic		0.00

Acres Proposed:	200.0
Acres Permitted:	200.0
Acres Developed:	200.0
GIS Acres	330.0

FLOW CALCULATIONS

Meter Type: Master Meter Octave
Meter Reading 451.50 gpm
 1.006 cfs

Nozzle Size	
Input # heads:	
Input gpm/head	
gpm/line	0.0
cfs/line	0.00

Theoretical Method

Q = $\frac{(8.8) \times (HP) \times E}{TDH}$	Est. Pump Set	minus 10' =				
	HP =	E =	H =	PSI =	Q =	Q =
	60.0	70.0%	357	0	1.04	464.67
					cfs	gpm

$$TDH = [(LIFT) + (PSI \times 2.31)]$$

TDH =	Lift =	PSI =	2.31
357.0	357	0	2.31

HP = Total Brake Horsepower of pumping plant (including booster)

Eff. = Pumping plant efficiency (assume 70% or 0.70)

TDH = Total dynamic head = [(LIFT) + (PSI X 2.31)]

PSI = Pumping pressure measured in PSI near pump (if open discharge assume [0])

Q = rate of flow in cubic feet per second,

Consumptive Use	4.5	Headgate Requirement	4.5	
Season of Use	3/1	11/15	=	260 days
Volume (VIR)	330.0	X	4.5	= 1,485.0 af
Volume (DR)	1.006	x	260	x 1.9835 = 518.78 af
BU Standard Rate	330.0	X	0.02	= 6.60 cfs
Rate/acre	1.006	/	330.0	= 0.003 cfs/ac

V I.R. = (Acres Irrigated) x (Irrigation Requirement)

V D.R. = [Diversion Rate (cfs)] x (Days in Irrigation season) x 1.9835

V = Smaller of V I.R. and V D.R

Recommendation Standards for diversion rate (choose most restrictive)

4.00 Permit Rate – the rate applied for

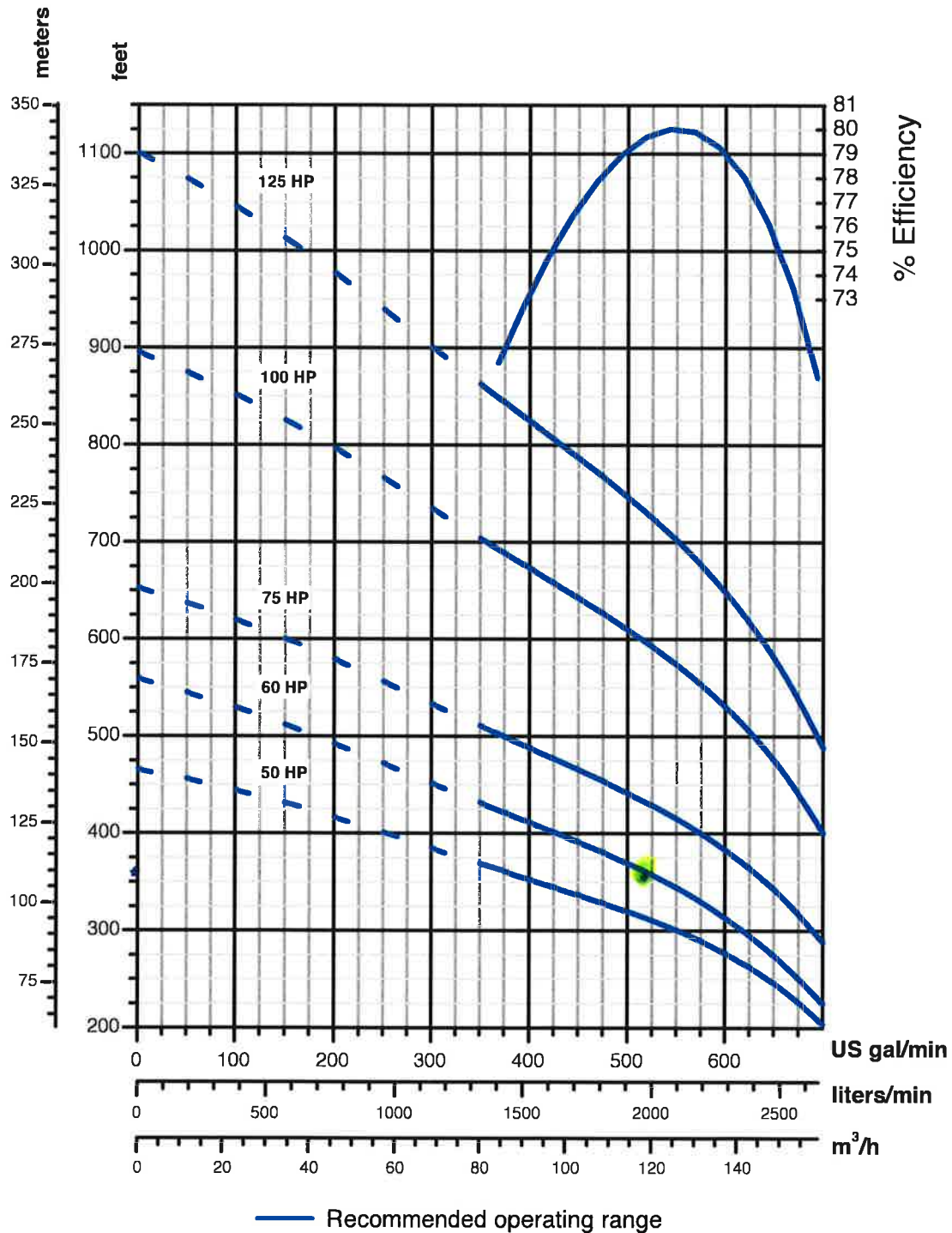
4.00 Fee Rate – the maximum rated paid for on the fee schedule.

6.60 Beneficial Use (BU) standard = x.x ac * 0.020 cfs/acre

1.006 Measured Value – the value measured in the field

Submersible Turbine Pumps

Model 550STS8 Performance



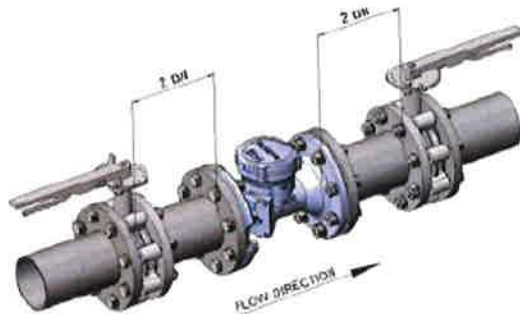
Note: Performance based on:
 -Fresh water, 68 °F
 -6" motor / 3450 rpm
 -8" motor / 3520 rpm

FPS
 STSseries

3.5 Additional installation requirements



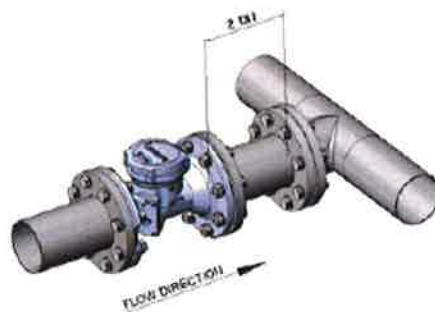
Zero (0) pipe diameters permitted before & after elbows (90°)



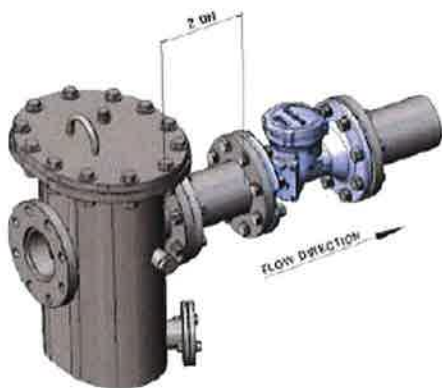
Minimum of two (2) pipe diameters before or after isolation valves
Open bore valves, such as resilient wedge gate valves can be bolted directly to the meter.



Minimum of five (5) pipe diameters after pump discharge.



Minimum of two (2) pipe diameters before tee connections, including test tees.



Minimum of two (2) pipe diameters before or after strainers for ISO version Octaves (primarily sold outside North American Market). AWWA length Octaves (primarily sold in North American markets) may be bolted directly to a strainer.



Zero (0) pipe diameters before and after elbows (90°) in vertical installations

63

Form 238-7
6/07IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0066199

Drilling Permit No. 965456-871515

Water right or injection well #

2. OWNER:

Name Michael R. Goodell

Address 14899 Sand Hollow Rd.

City Caldwell State ID Zip 83607

3. WELL LOCATION:

Twp. 5 North ☒ or South ☐ Rge. 3 East ☐ or West ☒

Sec. 10 1/4 NW 1/4 SW 1/4

Gov't Lot County Canyon

Lat. 43 47.126 (Deg. and Decimal minutes)

Long. 116 41.530 (Deg. and Decimal minutes)

Address of Well Site East across rd from 28371 El Paso Rd.

City Caldwell

(Give at least name of road, distance to road or landmark)

Lot Blk Sub. Name

4. USE:

☐ Domestic ☐ Municipal ☐ Monitor ☒ Irrigation ☐ Thermal ☐ Injection☐ Other

5. TYPE OF WORK:

☒ New well ☐ Replacement well ☐ Modify existing well☐ Abandonment ☐ Other

6. DRILL METHOD:

☐ Air Rotary ☒ Mud Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft ³)	Placement method/procedure
bentonite	0	360		

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/Schedule	Material	Casing	Liner	Threaded	Welded
14"	+2	320	.250	steel	☒	☐	☐	☒

Was drive shoe used? ☐ Y ☒ N Shoe Depth(s)

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N MethodManufactured screen ☒ Y ☐ N Type alloy machine

Method of installation

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
320	420	.025	---	14"	stainless	

Length of Headpipe Length of Tailpipe

Packer ☐ Y ☐ N Type

10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft ³)	Placement method
8-12 silica	300	420		

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☐ N Artesian Pressure (PSIG)

Describe control device

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 138 Static water level (ft) 138

Water temp. (°F) 58degF Bottom hole temp. (°F)

Describe access port metal cap

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Pump	Bailer	Air	Flowing artesian
212	450gpm	360minutes	☒	☐	☐	☐

Test method:

Water quality test or comments:

13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water	
				Y	N
18"	0	6	sand		X
"	6	26	sandy clay		X
"	26	38	sand		X
"	38	48	tan clay		X
"	48	55	tan clay		X
"	55	67	sand		X
"	67	75	tan clay		X
"	75	80	sand		X
"	80	86	tan clay		X
"	86	95	sand		X
"	95	112	tan clay		X
"	112	115	sand		X
"	115	128	sandy clay		X
"	128	140	sand	X	
"	140	143	tan clay		X
"	143	148	coarse sand	X	
"	148	162	tan clay		X
"	162	168	sand	X	
"	168	171	tan clay		X
"	171	183	coarse sand	X	
"	183	195	sandy clay		X
"	195	210	fine sand	X	
"	210	235	sandy clay		X
"	235	241	sand	X	
"	241	252	tan clay		X
"	252	281	sand	X	
"	281	305	tan clay		X
"	305	310	blue clay		X
"	310	450	coarse sand with blue clay strips	X	
"			lost 35 foot of hole		

Completed Depth (Measurable) 410ft

Date Started: Apr 10, 2014 Date Completed: Jun 6, 2014

14. DRILLER'S CERTIFICATION:

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Coonse Well Drilling Co. No. 409

*Principal Driller Date Jun 20, 2014

*Driller Date Jun 20, 2014

*Operator II Date

Operator I

* Signature of Principal Driller and rig operator are required.

JUN 26 2014

WATER RESOURCES
WESTERN REGION

COONSE WELL DRILLING & PUMP CO., INC.

P O BOX 366
Middleton, ID 83644

Phone # 208-454-0190
Fax # 208-454-2743

INVOICE

BILL TO:

MIKE GOODELL
14899 SAND HOLLOW RD.
CALDWELL, IDAHO 83607

DATE**INVOICE #**

8/5/2014

204383

PROJECT		TERMS	DUE DATE
EL PASO RD		Due on receipt	8/5/2014
QTY	DESCRIPTION	UNIT PRICE	AMOUNT
1	60 HP 8-IN 6 STG F8STS0605508606, CODE # 2M4-0757, FRANKLIN STS TURBINE 550 GPM	2,988.50	2,988.50
1	60 HP 8-IN 3PH 460V 60HZ FRANKLIN MOTOR, MODEL 2396028521, S/N 14F19-04-080528	4,870.00	4,870.00
1	CERUS 60 HP PUMP PANEL	1,800.00	1,800.00
1	4-IN OCTAVE ULTRASONIC WATER METER	0.00	0.00
1	PUMP PANEL FRAME TO MOUNT PANEL	0.00	0.00
357	6-IN GALV DROP PIPE	14.95	5,337.15
365	2-3 W/ GROUND SUBMERSIBLE CABLE FLAT JACKETED H/D	5.20	1,898.00
12	#6 THHN WIRE	0.99	11.88
36	#4 THHN WIRE	1.45	52.20
1	14 X 6 WELL CAP FABRICATE	125.00	125.00
1	FABRICATE PUMP PANEL SUPPORT AND INSTALL		
70	6-IN PVC PIPE (SDR 17)		
1	MISC PLUMBING & ELECTRICAL		
70	6" SCH SDR 17 PVC PIPE		
1	OCTAVE ULTRASONIC FLOW METER		
1	THINNING AGENT		
1	BACKHOE (MINIMUM CHARGE)		
10	LABOR- INSTALL		

9508

DATE 8/11/2014

PAY TO Coonse Well Drilling

AMOUNT \$ 22,771.65

MEMO Invoice #204383

CATEG. Equipment:Purchase

ACCT. Business Checking

5

Payments Applied

\$0.00

Balance Due**\$22,771.65**

THANK YOU FOR YOUR BUSINESS! PLEASE PAY BY THIS INVOICE.

TERMS - All accounts are due and payable upon receipt of invoice. Accounts 30 days past due are subject to a finance charge of 1 1/2% per month (18% annual rate). In the event that this invoice has not been paid within 60 days, a property lien will be filed and legal fees for collection will be added to total amount due.

NOTE: THERE IS A 3% PROCESSING FEE ON CREDIT CARD PAYMENTS.

[illegible]

Total Storage Calculations

FILE NUMBER	63-31145
REVIEWER	AB
DATE	10/7/2019

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the total seepage, evaporation and fill capacity required for a pond.

User Input
Calculated value
Formula Explanations

Surface Area (AC.)	0.49	"Surface Area" Is automatically carried over from the "Seepage Loss" sheet.
Average Pond Depth (FT.)	4	"Average Pond Depth" depicts the actual depth of the pond either measured or estimated. Note: If you know the maximum depth and not the average depth, the Field Examiner's Handbook suggests multiplying the maximum depth by 0.4 to get the average depth, or you can use any method that seems reasonable to attain average depth.
Pond Capacity (AF)	1.96	Pond Capacity is calculated by multiplying the Pond Surface Area by the Average Pond Depth. If you know the capacity, divide the capacity by surface area and enter the average pond depth in the space above. Note: If pond capacity is determined using a method shown on the "Pond Capacity" sheet, the user may need to modify the value of "Pond Capacity" (cell B9) manually. Note that if the value is modified manually, the formula will be altered for future use.
Multiple Fill Volume Above Initial Fill to Fulfill From Storage Needs- "Multiple Fills" (AF)	0	The "Multiple Fill Volume Above Initial Fill" is the acre-feet of water required to meet a <i>from storage</i> component if the <i>from storage</i> component exceeds a one time fill. This section should not include the amount of water needed to fill the pond initially or the amount of water needed to maintain the pond level due to evaporation or seepage. For example: if a pond has a capacity of 5 acre feet and 2.5 acre feet of seepage and evaporation, but the pond is used for irrigation that requires 10 acre feet of from storage for the irrigation use, then you would insert 5 acre feet into this location (10 acre feet needed - 5 acre feet from the initial fill = 5 acre feet of additional storage needed). Note: You must have a "From Storage" component exceeding the initial fill on the permit to include a volume in this space.
Estimated Seepage Loss (AF)	35.8	The "Estimated Seepage Loss" is automatically carried over from the "Seepage Loss" sheet.
Estimated Evaporation Loss (AF)	1.2	The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet.
Total Volume Required (AF)	39.0	The "Total Volume Required" is calculated by adding the Pond Capacity, Multiple Fills, Seepage Loss, and Evaporation Loss amounts to determine the total amount of storage required.

Flow Rate into Pond (CFS)	1.00	The "Flow Rate into Pond" depicts the actual flow, either measured or estimated, into the pond. For offstream facilities, this will be equivalent to "diversion to storage" rate.
Highest Daily Evaporation Rate From Evaporation Tab. (mm/Day)	4.81	This number is carried over from the "Evaporation Loss" sheet. It is the highest recorded number in the "Precipitation Deficit Table".
Required Daily Maintenance Volume (AF/Day)	0.11	"Required Daily Maintenance Volume" is the maximum volume of water needed on any given day during the year to maintain pond volume. It is calculated by adding the highest daily evaporation loss to the average daily seepage loss in acre feet. The average daily seepage loss is calculated by dividing the "Estimated Seepage Loss" by 365 days. This is acceptable, since the seepage rate shouldn't vary throughout the season unless the pond completely freezes over during the winter months. The highest daily evaporation loss is calculated by dividing the Highest Daily Evaporation Rate by the 304.8 conversion factor and multiplying this number by the pond surface area to attain a combined daily acre feet requirement.
Minimum Maintenance Flow (CFS)	0.05	The "Minimum Maintenance Flow" is the minimum amount of flow required to maintain the level of the pond. This number is determined by dividing the "Maximum Required Daily Maintenance Volume" by 1.9835. This flow can be used to determine if the flow rate into the pond is adequate to maintain the pond level.
Days Required to Fill the Pond	1	The "Days Required to Fill the Pond" is calculated by dividing the "Pond Capacity" by the "Flow Rate" minus "Minimum Maintenance Flow" multiplied by 1.9835. This section will assist you in determining if the flow rate being diverted to the pond is adequate to fill the pond while maintaining the pond level. The length of time to fill the pond will help determine if the flow rate is adequate for the size of pond being proposed. If this number is approximately 6 months (180 days) or more, the reviewer should have a discussion with the applicant to make sure he/she understands that it will take a significant length of time to fill the pond.
Days Required to Fill the Pond at 13,000 Gallons per Day	-30	Some water users may want to fill a pond under the 13,000 gallons per day domestic exemption. The "Days Required to Fill the Pond at 13,000 Gallons per Day" is calculated by converting the "Pond Capacity" and the "Required Daily Maintenance Volume" to gallons. The "Pond Capacity" is then divided by 13,000 gallons minus the "Required Daily Maintenance Volume" in gallons to determine the number of days to fill pond. If this number is approximately 6 months (180 days) or more, the reviewer should have a discussion with the applicant to make sure he/she understands that it will take a significant length of time to fill the pond. Negative values indicate that the supply of 13,000 gallons per day is not enough volume to overcome the required daily maintenance volume; the pond will never fill.



Figure 1. A 14-inch well casing goes to a 4.5 inch galvanize pipe through a flowmeter and valve to an 8-inch plastic outlet pipe.



Figure 2. Plastic outlet pipe goes through bank and open discharges into pond.



Figure 3. Well tag #D0066199.



Figure 4. Master Meter Octave flow meter, readings varied from 437.8 to 451.5 gpm.



Figure 5. The 0.5 acres holding pond is approximately 8 to 10 feet deep at the deepest point.



Figure 6. Surface water flowing into pond.



Figure 7. Pumping station from pond.



Figure 8. Full circle pivot irrigating sugar beets north of Sand Hollow Road.



Figure 9. Three quarter wiper pivot irrigating alfalfa south of Sand Hollow Road.



Figure 10. Wiper pivot irrigating corn crop along Freezout Road near the intersection of Sand Hollow and Freezout Roads.