

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 98-8021
Exam Date: 06/25/2026

1. Current Owner:
STATE OF IDAHO DEPT OF LANDS
PO BOX 83720 BOISE ID 83720-0050 AND

91 LIGHTS LLC
217 CEDAR ST PMB 191 SANDPOINT ID 83864-1410
2. Accompanied by: Luis Munilla
Phone No: 208-597-5152
Address: Same as above for 91 Lights, LLC.
Relationship to permit Holder: President – 91 Lights, LLC.

3. **SOURCE:** Tributary
UNNAMED STREAM FALL CREEK

Method of Determination: GPS, Arc Pro GIS and DRG Layer.

B. OVERLAP REVIEW

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

Water Right No.	Source	Purpose of Use	Basis
98-7718	SPRING, UNNAMED STREAM	DOMESTIC, RECREATION STORAGE	LICENSE

Comments: Licensed WR 98-7718 uses a different Unnamed Stream source as this Permit, along with a Spring source, for Domestic and Recreation Storage uses. The license was issued with a generic 40-acre QQ/Q POU legal description, but as the two WRs use separate sources, separate conveyance systems, and are for separate beneficial uses there is no concern for overlapping between 98-7718 & 98-8021.

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

Comments: State of Idaho Dept of Lands is a co-Owner of the WR due to the POD being located on IDL property.

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

UNNAMED STREAM SW¼ NW¼, Sec. 5, Twp 60N, Rge 01W, B.M. BOUNDARY County

Method of Determination: GPS. POD is a 5-ft concrete ringed dry well located on the stream with a 4-inch screened intake penstock pipeline located at -116° 30.1345, 48°34.9715.

PLACE OF USE: POWER

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
60N	01W	5									X								

Method of Determination: Beneficial use field exam, Arc Pro GIS software and Boundary County tax parcel maps.

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
UNNAMED STREAM	GRAVITY FLOW	N/A	N/A	N/A	2,600-FT (APPROXIMATELY) OF 4-INCH PVC PENSTOCK PIPELINE

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
5-GAL BUCKET						

2. Measurements: I conducted three 5-gal bucket measurements from the overflow discharged 6-inch pipe where it returns to Fall Creek; the average of three measurements equals 25.8 gpm or 0.06 cfs

E. FLOW CALCULATIONS

Measured Method: attempted three 5-gal bucket measurements as follows:

- 5-gal / 11.62 sec x 60 sec/min = 25.8 gpm
- 5-gal / 11.56 sec x 60 sec/min = 25.9 gpm
- 5-gal / 11.66 sec x 60 sec/min = 25.7 gpm with average of three measurements equaling 25.8 gpm or 0.06 cfs
- Manufacturer performance specifications identify the following flow (worksheet attached)
 - 2ea 1/4-inch nozzles, 125 PSI, 317 ft head (3,298 ft – 2,981 ft elevation change) = $21.3 \times 2 = 42.6$ gpm = 0.09 cfs

FLOW THROUGH NOZZLES IN GPM AT VARIOUS HEADS													
Feet	Psi	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1.0"	RPM for 4" Turbine
5	2.2	-	-	-	-	6.18	8.4	11	17.1	24.7	33.6	43.9	460
10	4.3	-	-	3.88	6.05	8.75	11.6	15.6	24.2	35	47.6	62.1	650
15	6.5	-	2.68	4.76	7.4	10.7	14.6	19	29.7	42.8	58.2	76	800
20	8.7	1.37	3.09	5.49	8.56	12.4	16.8	22	34.3	49.4	67.3	87.8	925
30	13	1.68	3.78	6.72	10.5	15.1	20.6	26.9	42	60.5	82.4	107	1140
40	17	1.94	4.37	7.76	12.1	17.5	23.8	31.1	48.5	69.9	95.1	124	1310
50	22	2.17	4.88	8.86	13.6	19.5	26.6	34.7	54.3	78.1	106	139	1470
60	26	2.38	5.35	9.51	14.8	21.4	29.1	38	59.4	85.6	117	152	1600
80	35	2.75	6.18	11	17.1	24.7	33.6	43.9	68.6	98.8	135	176	1850
100	43	3.07	6.91	12.3	19.2	27.8	36.6	49.1	76.7	111	150	196	2070
120	52	3.36	7.56	13.4	21	30.3	41.2	53.8	84.1	121	165	215	2270
150	65	3.76	8.95	15	23.5	33.8	46	60.1	93.9	135	184	241	2540
200	87	4.34	9.77	17.4	27.1	39.1	53.2	69.4	109	156	213	278	2930
250	108	4.86	10.9	19.9	30.3	43.6	59.4	77.6	121	175	238	311	3270
300	130	5.32	12	21.3	33.2	47.8	65.1	85.1	133	191	261	340	3590
400	173	6.14	13.8	24.5	38.3	55.2	75.2	98.2	154	221	301	393	4140
HARRIS OR TURGO									TURGO ONLY				

125 PSI

- Permit authorized diversion rates: 0.83 cfs for Power BU.
- Recommended diversion rates for licensing purposes Permit 98-8021:
 - Power BU: 0.09 cfs based on micro hydro system specifications
- Maximum diversion rate = **0.09 cfs**.

F. VOLUME CALCULATIONS

1. Volume Calculations for irrigation: N/A

2. Volume Calculations for Other Uses:

- POWER annual volume = 0.09 cfs x 274 days x 1.9835 = **48.9 af** (non-consumptive use).
 - Volume analysis based on 365 days per year minus [31 days Oct + 30 days Sept + 15 days Aug + 15 days Nov] = 274 days hydro unit in operations on average within the 5-year development period.

G. NARRATIVE/REMARKS/COMMENTS

Field exam performed on 6/25/2026 with the right holder, Luis Munilla – President 91 Lights LLC., showed a micro hydropower system that used water from an unnamed stream to generate power. At the POD, stream water is captured in a 5-ft dry well which houses the penstock screened 4-inch intake pipe. The penstock incorporates approximately 2,600 ft of 4-inch PVC that has a cumulative 300 ft of head once it reaches the power station at the POU. I've included schematics which illustrate the approximate pathway of the buried pipeline, which does daylight for a short reach in a small drainage where the natural low point in the penstock system has a debris blow out tee valve installed.

At time of exam in summer of 2026 the State of Idaho is operating under a statewide Order Declaring Drought Emergency based on record-low snowpack coupled with warm spring temperatures. As a result of low snowpack levels in Northern Idaho, the Unnamed Stream was flowing a near late summer base flow by the late June during the exam. This supports the lower 0.06 cfs observed at time of exam versus the system capacity of 0.09 cfs as developed. I'm recommending **0.09 cfs** based on the system's capacity operating two ¼ inch nozzles; the 0.09 cfs power diversion rate and volume is considered **non-consumptive** as turbine overflow water returns directly to Fall Creek just below the confluence of the Unnamed Stream source and Fall Creek.

During the exam Mr. Munilla and I walked the POD & POU and traversed via side-by-side to the power station Power POU. I collected photographs of the system from diversion to beneficial use and to overflow discharge to Fall Creek. During the exam I used field maps to sketch the water conveyance system and during licensing review I used Arc Pro GIS & other web based aerial imagery to accurately designate the POD & POU. Mr. Manilla provided several support documents with submission of the Statement of Completion form received by IDWR on 9/2/2025. I relied on this information to evaluate in-part diversion rate and annual volume designation for licensing purposes.

At the power station, which is a concrete based metal walled structure, the Home Hydro / Hydro Induction Power turbine is installed below grade in an attempt to reduce winter freezing conditions on the system. Photographs provided by Mr. Munilla with the statement of completion clearly illustrate the two 1-inch hoses reduced from 4-inch penstock pipeline attached to nozzles on the turbine. At time of exam the concrete basin that houses the hydro turbine was submerged in water. It's unsure if this is a result of a leak in the main penstock pipeline or residual leaking in from spring runoff periods, but main power infrastructure was below water, and the turbine was off-line not producing power. It's probable that the turbine has incurred water damage and may need to be replaced or at minimum wiring harnesses replaced.

As I was unable to observe an actively generating power turbine, I'm reliant on the support documents provided with statement of completion to assess power generation. Fortunately, there are robust support docs to assist in making an annual volume determination. Mr. Munilla confirmed during the exam that when he started the project he thought the stream maintained flows year round but found out through the development period that in the past 5-years starting as early as May the stream flow begins to reduce to the point of partial to no power generation from June – December (ref: backfile statement of completion, Power curve for typical 12 month power generation doc). This is supported in that on average halfway through August – to – halfway through November stream flow doesn't support power generation. This is an average and dependent on seasonal climate variations.

I've assessed support documents and have recommended annual volume based on 274 days of power production throughout the year. During peak power generation, submitted documents illustrate the power turbine generates 1250 watt/hr. the power turbine generates power as configured with a flow rate of 0.09 cfs passing through the turbine the resulting annual volume = **48.9 af**. This is a generous volume designation considering the variable seasonal flows demonstrated over the past 5 years of Permit development period time, but the volume is solely non-consumptive in nature and there aren't any existing water rights located in between the POD and return flow to Fall Creek at time of licensing recommendation.

At time of field exam, the pressure gauge and amp hour gauge were not operable, presumably from water damage, and I wasn't able to evaluate accurate system elements to gage observed output watts nor accurate watt hour. In lieu of observed information I have computed theoretical data using a hydroelectric power output estimation formula below:

- Dynamic head (ft) x Flow (gpm) x 0.18 (factor) x Turbine Efficiency (range from 35% to 70 %F dependent on heads) = Output Watts.
- Using Statement of Completion support document data – 300 ft x 42.6 gpm x 0.18 x .5 = 1150 Watts
 - If the turbine with 2ea ¼-inch nozzles operates= at greater efficiency than 50% its reasonable the Applicant's Watts/hr is achieved.
- Using the flow rate observed at time of exam and 317 ft of head estimated at time of exam – 317 ft x 25.8 gpm x .18 x .5 = 736 Watts
 - Its reasonable base flow in the stream or a partially blocked penstock (debris collection) would reduce flow and result in reduced Watts/hr which is consistent with the low Watt/hr production demonstrated by the provided power curve at time of statement of completion.

Although the power system was not actively generating at time of field exam, I'm recommending license approval based on the physical power system in place with data provided demonstrating active power production within the development period of the Permit. I've recommended Power use with a year-round season of use despite two months being documented as zero power production; it's reasonable that the power system is dependent on several factors including seasonal climate variation, snowpack from prior year winter months, and there may be periods of every year that fluctuate water availability. The Right Holder is limited to an annual volume of 48.9 af and if it's found that greater volume is being passed through the power turbine additional water right filing(s) are required.

During licensing review, I have made several recommendations in change of conditions of approval as listed below:

- Removed 029 – no fish screen requirement was asserted by IDFG & there is a screened intake within the dry well.
- Removed 236, 082, 01N, & 932 based on compliance by the Right Holder.
- Removed 08A based on condition usage description.
- Revised 916 as the Permit transitions to a License
- Replaced 17H with R22 based on condition usage description.
- All other conditions on the Permit shall be carried forward to the license.

There is no overlapping water right concerns for licensing Permit 98-8021.

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>Annual Volume</u>
POWER	01/01 to 12/31	0.09 CFS	48.9 AF

Totals: 0.09 CFS 48.9 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

Luke Bates – Sr Water Resource Agent

Field Examiner's Name LSB.D Date 7/30/2026

Reviewer Michelle Richman Date 8/10/26

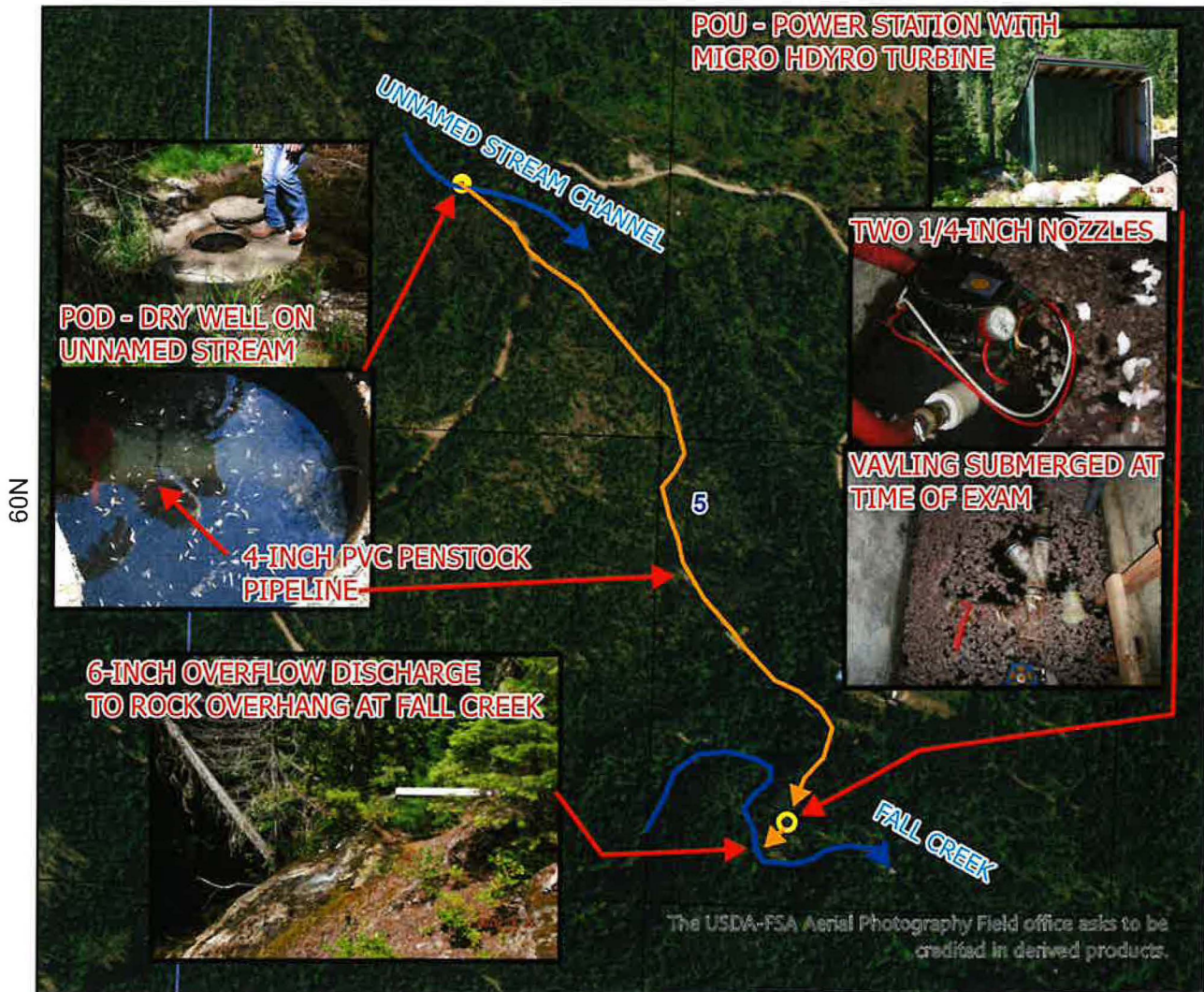
State of Idaho
Department of Water Resources

Attachment to Field Exam

98-8021
(POWER)

This map depicts the POWER system diagram. From Point of Diversion approximately 2,600 ft of 4-inch PVC routes to the power station, is reduced to two 1-inch supply hoses to hydro turbine nozzles, and discharges from hydro turbine via 6-inch PVC pipeline a short distance to Fall Creek.

01W



- | | |
|-----------------------|------------------|
| Point of Diversion | Townships |
| Place Of Use Boundary | Sections |
| State Outline | Quarter Quarters |



0 0.09 0.17 0.26 0.34 Miles

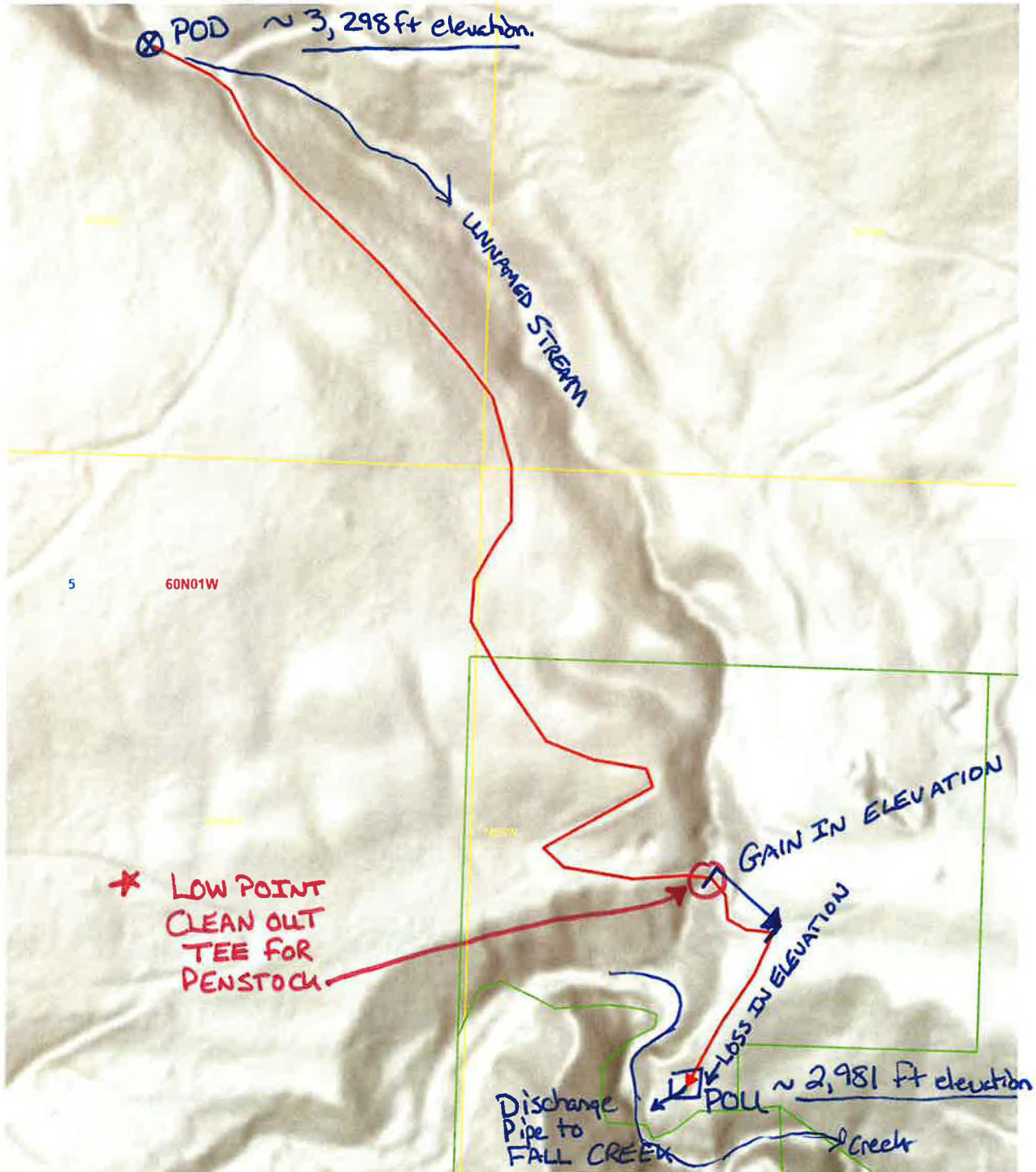


Imagery: 2023 Aerial Photography
Prepared By Bates, Luke

98-8021

ATTACHMENT TO FIELD EXAM

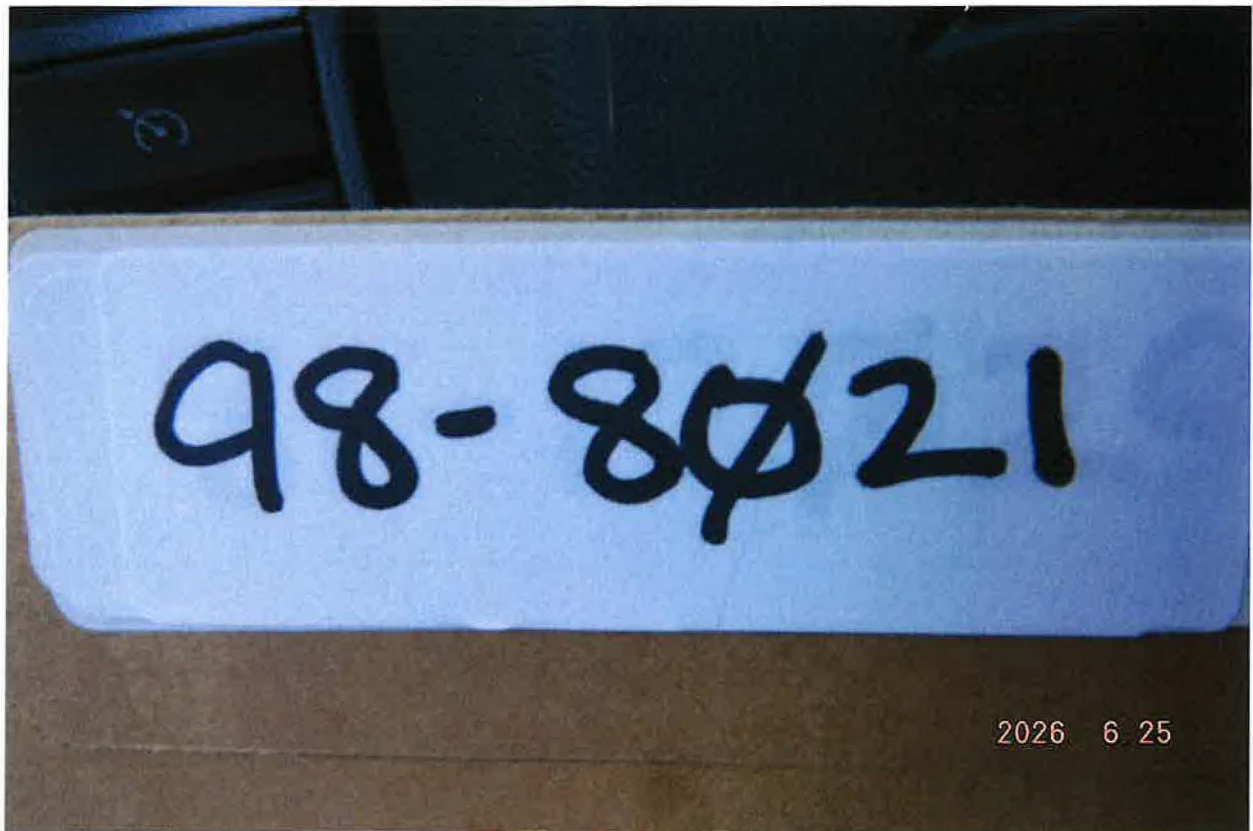
The imagery below illustrates the approximate penstock pipeline from POD to POU for Power purposes. Penstock was developed using approximately 2,600 ft of 4-inch schedule 40 PVC pipe which routes in-part along existing skid trails as it crosses sloped topography. Penstock has to overcome a section of elevation rise as described prior to a direct path dropping in elevation to the Power Station.



ArcPro GIS World Hillshade imagery layer



ArcPro GIS DRG imagery Layer



BENEFICAL USE FIELD EXAM DATE 6/25/2026



POD – UNNAMED STREAM DIVERSION USING DRY WELL CONSTRUCTED IN
SMALL POOL AREA OF STREAM



POD – DRY WELL WITH SCREENED INTAKE CONSTRUCTED INSTREAM POOL



INTERIOR DRY WELL – MESH SCREEN ON 4-INCH PVC PENSTOCK PIPELINE TO
POU



POU – POWER STATION



POWER UNIT – HOME HYDRO/HYDRO INDUCTION POWER BRAND MICRO-HYDRO
WITH 2EA ¼ - INCH NOZZLES INSTALLED.



POWER UNIT INFRASTRUCTURE UNDER WATER AT TIME OF EXAM WITHIN CONCRETE CONTAINMENT – REFERENCE STATEMENT OF COMPLETION BACKFILE FOR IMAGES PROVIDED BY RIGHT HOLDER OF WATER SYSTEM



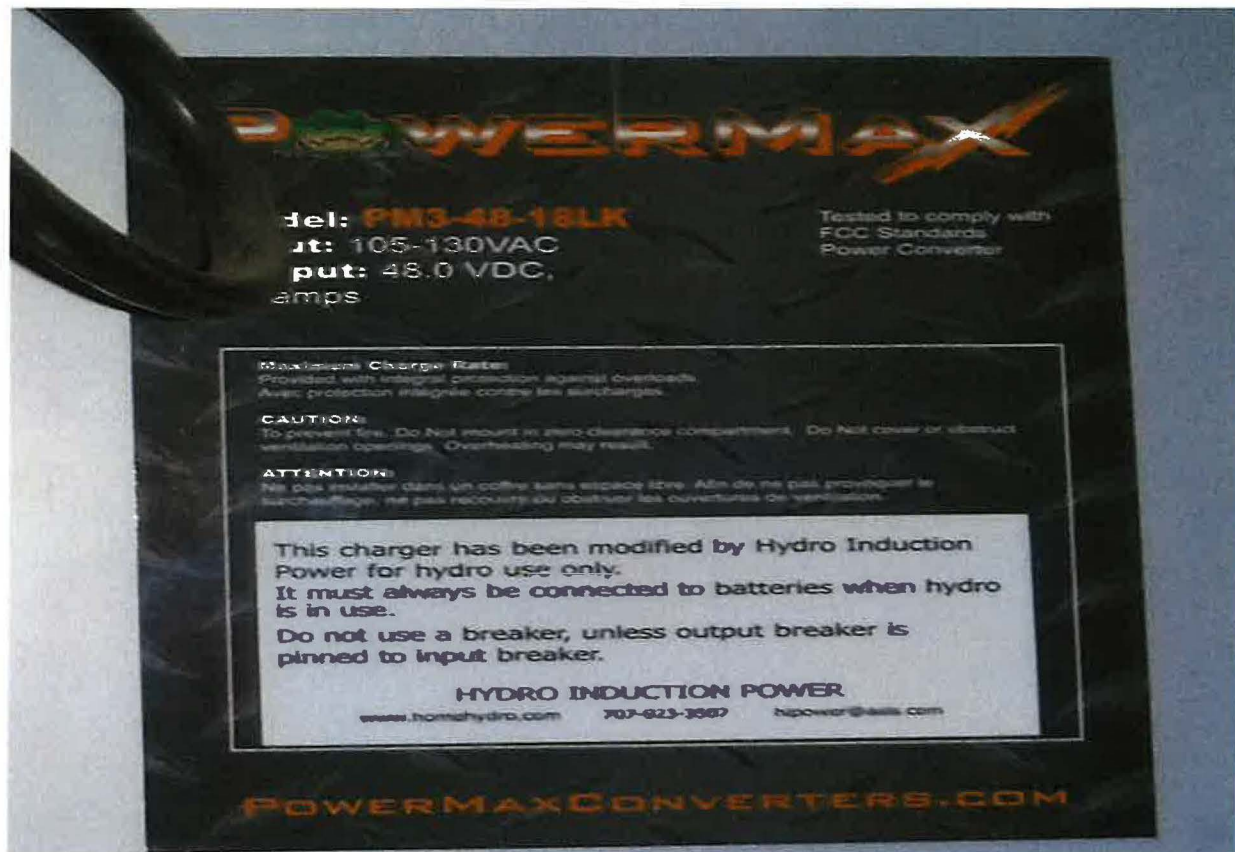
6-INCH DISCHARGE FROM MICRO-HYDRO RETURNS FLOW TO FALL CREEK SPLASHING DOWN ROCK CREEK FRONT



5-GAL BUCKET MEASUREMENTS TAKEN FROM OVERFLOW DISCHARGE PIPE AT FALL CREEK



2EA POWERMAX CONVERTERS MODEL PM3-48-18LK



ZOOM IMAGE OF ONE HYDRO INDUCTION POWER CONVERTER



MICRO HYDRO POWER BATTERY BANK (WHITE) – NOTE SOLAR BATTERY BANK ON R/H SIDE OF IMAGE; RIGHT HOLDER USES DUAL ENERGY SOURCES.