



MEMORANDUM

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To: Elizabeth A. Tellessen
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601 W. Riverside Ave., Ste. 1900
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From: Eugene N.J. St.Godard, P.G., L.Hg., CWRE
Date: October 12th, 2015
Subject: Hydrologic Review, Scott Gardenhour Property, Oldtown, Idaho

--CONFIDENTIAL ATTORNEY WORK PRODUCT--

The Water & Natural Resource (WNR) Group, Inc. was retained by Elizabeth Tellessen, attorney for Mr. Scott Gardenhour, to review the hydrologic conditions and conduct surface water (stream) gauging activities on Albeni Falls Creek. This work is being conducted in order to support Mr. Gardenhour's water right application No. 97-7469 which is currently being reviewed.

Field work was conducted by Mr. Eugene St.Godard, a principal hydrogeologist and owner of the Water & Natural Resource Group, Inc. Gene has over 25 years' experience working in the consulting industry, specializing in hydrogeology and water rights. He has completed over 250 related ground water and/or water right projects in eastern Washington and northern Idaho. Mr. St.Godard is a licensed geologist in Idaho (#862) and Oregon, and a licensed geologist and hydrogeologist in Washington State and California. He is also a certified water right examiner in Idaho (#134) and Washington (#004).

The WNR Group visited Mr. Gardenhour's property on October 8th, 2015 which is located at 973 Freeman Lake Road near Oldtown, ID. Inspection of the hydrogeologic conditions only occurred within the property boundaries of Mr. Gardenhour's parcels. Albeni Falls Creek was flowing during our site visit and appears to be derived from a narrow incised valley located northeast of Mr. Gardenhour's house/property. Surface and groundwater is inferred to be hydraulically connected as water, which is interpreted to be mostly derived from precipitation and groundwater, enters Mr. Gardenhour's property. Albeni Falls Creek flows in a south-southwesterly direction and is contained within a shallow channel that is only 2 to 3 feet wide. The channel walls are sloughing and the creek channel is heavily choked with vegetation. The stream was flowing to the location of Mr. Gardenhour's surface water diversion which is used for irrigation. The location of the diversion is presented in Table 1 and shown in Photo 1. The creek flows past the Gardenhour house and continues in a southwesterly direction. In the southwestern part of Mr. Gardenhour's property, the creek is dammed from its natural course and all water is diverted to the south in a conveyance channel to the neighbor's property.

TABLE 1: GPS COORDINATES FOR GARDENHOUR STREAM DIVERSION

Station No.	Latitude	Longitude
GRDNHR	N48.19804	W-116.98781



Photo 1: Picture of surface water diversion used for irrigation of lawn.

In order to collect a flow of the creek, a straight channelized section of the creek was selected approximately 20-feet downstream of the diversion point. Stream gauging was conducted using a FlowTracker Handheld ADV (Acoustic Doppler Velocimeter) flow meter produced by SonTek/YSI Inc. Data is analyzed using Firmware Version 3.7 and the Smart QC Software Version 2.30. Measurements are collected at the transect station by measuring depth of water and collecting a velocity reading at $0.6 \times \text{depth}$ (Mid Section Discharge Equation method). Due to the narrow channel, measurements were collected at approximately every 0.25 foot across the stream section. The software then computes a mean discharge velocity for the stream. Parameters for the instrument are set to: 1) 30 second average time, 2) Discharge Mode, 3) 0.0 salinity, and 4) English units.

Table 2 presents the results of the measurement made on October 8th, 2015.

TABLE 2: SUMMARY OF STREAM FLOW MEASUREMENTS

Station	DATE	Time (ending)	Stream Width (ft)	Mean Depth (ft)	Mean Temp (F)	Mean Velocity (ft/s)	Total Discharge (cfs)
GRDNHR	10/8/2015	11:47	1.75	0.141	52.65	0.1626	0.0400

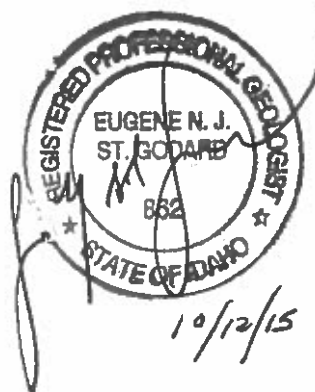
Flow in the creek was observed throughout Mr. Gardenhour's property. However, flow appeared to be obstructed beyond the diversion in the conveyance channel due to sloughing of sides and abundant vegetation. A good location to collect an additional flow in the constructed conveyance channel could not be conducted due to the poor conditions in the channel. But water was still present in the channel.

It should be noted that the measurement collected on October 8th is at a time when typically the hydrograph of creeks in this area are at annual low flow conditions. Also, it should be noted that the area is currently within a drought year. Therefore the flow which is currently observed can be inferred to be representative of the yearly low flow in a very low precipitation year. Essentially representative of the worst case scenario. Flow at the time of this site visit was recorded at 0.04 cfs. In my professional opinion, flows in higher precipitation years will most likely be greater than those observed at the current time. It should also be noted that flows within Albeni Creek are being restricted from the abundant vegetation within the creek (see Photo 2) and the sedimentation of the channel.



Photo 2: View looking upstream from diversion point showing existing condition of stream channel.

This Memorandum was prepared by:
Mr. Eugene St. Godard,
#862 licensed Geologist in Idaho.





Discharge Measurement Summary

Date Generated: Mon Oct 12 2015

File Information

File Name GRDNHR.WAD
Start Date and Time 2015/10/08 11:47:00

Site Details

Site Name
Operator(s)

System Information

Sensor Type FlowTracker
Serial # P3683
CPU Firmware Version 3.9
Software Ver 2.30
Mounting Correction 1.0%*

Units (English Units)

Distance ft
Velocity ft/s
Area ft²
Discharge cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.8%	5.8%
Velocity	3.2%	24.1%
Width	0.3%	0.3%
Method	4.2%	-
# Stations	6.6%	-
Overall	8.5%	24.8%

Summary

Averaging Int. 30 # Stations 8
Start Edge LEW Total Width 1.750
Mean SNR 32.8 dB Total Area 0.246
Mean Temp 52.65 °F Mean Depth 0.141
Disch. Equation Mid-Section Mean Velocity 0.1626
Total Discharge 0.0400

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	11:46	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	11:49	0.50	0.6	0.200	0.6	0.080	0.0474	1.00	0.0474	0.075	0.0036	8.9
2	11:49	0.75	0.6	0.200	0.6	0.080	0.1064	1.00	0.1064	0.040	0.0043	10.6
3	11:50	0.90	0.6	0.150	0.6	0.060	0.1425	1.00	0.1425	0.026	0.0037	9.3
4	11:51	1.10	0.6	0.150	0.6	0.060	0.1663	1.00	0.1663	0.030	0.0050	12.5
5	11:52	1.30	0.6	0.150	0.6	0.060	0.0987	1.00	0.0987	0.030	0.0030	7.4
6	11:55	1.50	0.6	0.200	0.6	0.080	0.4563	1.00	0.4563	0.045	0.0205	51.3
7	11:55	1.75	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0

Rows in italics indicate a QC warning. See the Quality Control page of this report for more information.



Discharge Measurement Summary

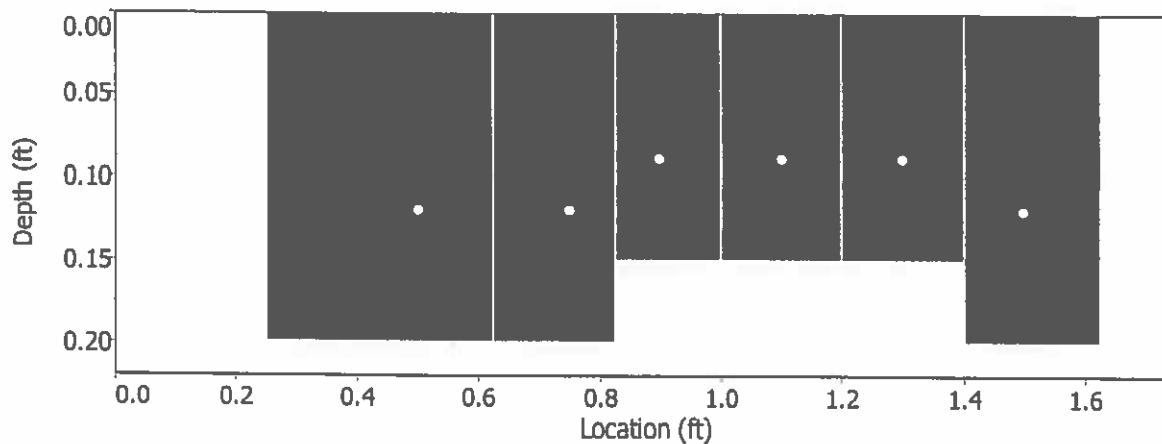
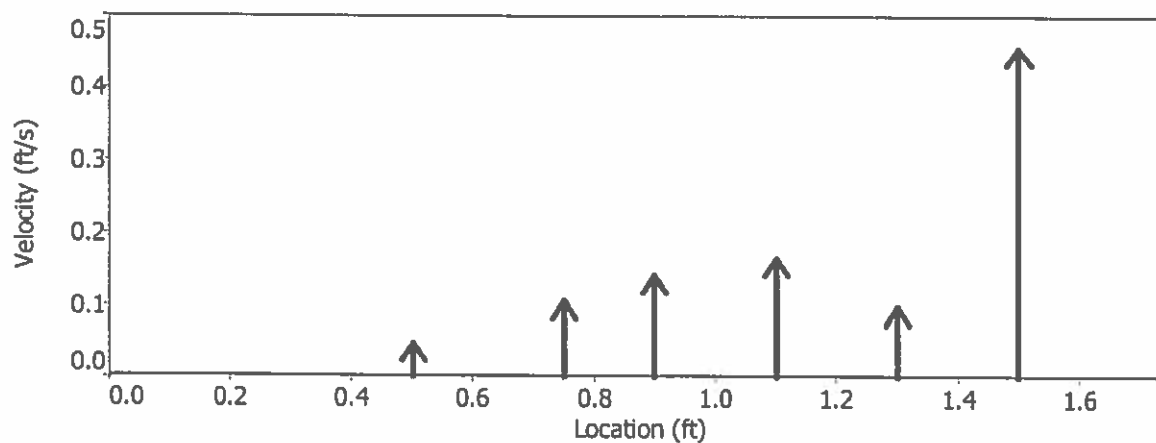
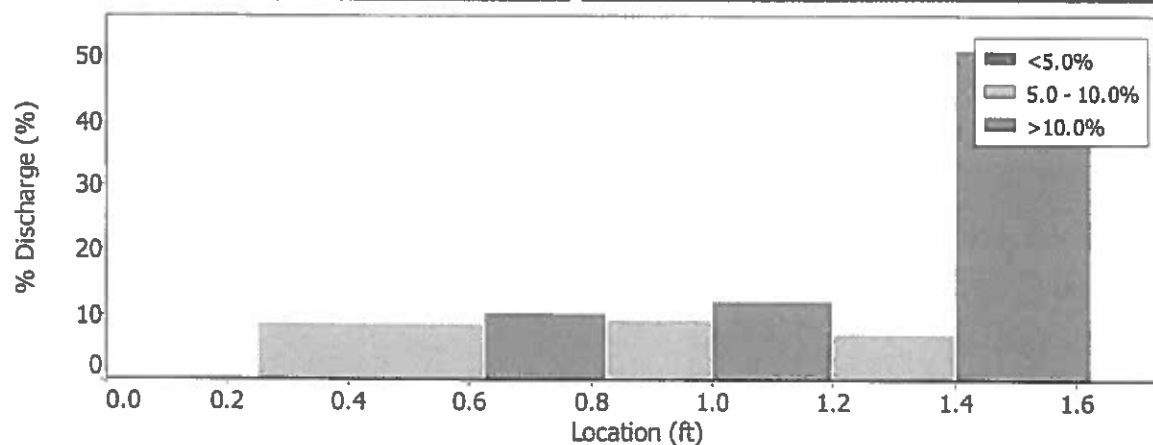
Date Generated: Mon Oct 12 2015

File Information

File Name GRDNHR.WAD
Start Date and Time 2015/10/08 11:47:00

Site Details

Site Name
Operator(s)





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Start Date and Time 2015/10/08 11:47:00

Site Details

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Quality Control

St	Loc	%Dep	Message
Data file was originally recorded with a mounting correction of 0.0% It has been adjusted for a mounting correction of 1.0%.			
1	0.50	0.6	SNR (44.0) is different from typical SNR (32.8)
		0.6	Boundary QC is Good; possible boundary interference
2	0.75	0.6	Boundary QC is Good; possible boundary interference
4	1.10	0.6	Boundary QC is Poor; possible boundary interference
5	1.30	0.6	Boundary QC is Fair; possible boundary interference