

**AMEC REPORT
AUGUST 2008**

**Updated Description of Infrastructure Associated with the
Delivery of Replacement Water to Snake River Farms**

EXHIBIT 1

**Updated Description of Infrastructure
Associated with the Delivery of**

**Replacement Water
to
Snake River Farms**

**Prepared for:
Idaho Ground Water Appropriators**

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CONTENTS

1.0	INTRODUCTION	2
2.0	DIRECT PUMPBACK TO SNAKE RIVER FARM	2
3.0	DELIVERY OF IDF&G WATER RIGHT NO: 36-4076 TO SNAKE RIVER FARM (BACK-UP ALTERNATIVE)	3

TABLES

1.0	MAJOR COMPONENTS OF THE DIRECT PUMPBACK ALTERNATIVE.....	2
2.0	MAJOR COMPONENTS OF IDF&G ALTERNATIVES	4

FIGURES

1.0	PROPOSED DIRECT PUMPBACK ALTERNATIVE SNAKE RIVER FARM DELIVERY CALL
2.0	PROPOSED IDF&G ALTERNATIVES SNAKE RIVER FARM DELIVERY CALL

1.0 INTRODUCTION

A variety of direct replacement water options have been developed that could offset the depletive effect of junior-priority ground water withdrawals on the Snake River Farm's (SRF) water rights. These alternatives include a direct pumpback alternative that could direct replacement water to the SRF hatchery and other alternatives involving collaboration with the Idaho Department of Fish and Game (IDF&G). This report is a revision of the June 2008 Mitigation Plan. A conceptual design of the direct pumpback alternative is provided in addition to information on the series of IDF&G alternatives.

2.0 DIRECT PUMPBACK TO SNAKE RIVER FARM

The Ground Water Districts are pursuing a direct pumpback alternative near the outlet of the SRF. As shown in Figure 1, water from the SRF facility is discharged into a channel that flows into the lake south of SRF. For purposes of a conceptual design for this Mitigation Plan, it is assumed that water would be diverted from the lake on the southeast shore and pumped to the inlet of the SRF raceways. However, water could also be directly diverted from SRF's discharge pipeline. A 25 HP pump and 2,230 feet of 8 to 12 inch diameter pipe would be needed to convey water to the SRF raceway inlet. Figure 1 shows the proposed diversion location as well as the conceptual layout of the pipeline and pump station.

The pipeline alignment and diversion location shown in Figure 1 may be adjusted following a more detailed design to address property boundaries and utility locations. Table 1 summarizes the major components of the direct pumpback alternative. This is a preliminary conceptual estimate of infrastructure requirements and does not include the intake structure, power supply, plumbing connections to the SRF raceway inlet, and other minor components. A more detailed design will be prepared upon direction by the IDWR to further pursue this alternative.

Major Components¹	Estimated Component Size
Pump Station	25 HP
Pressure Pipeline to the SRF Raceway Inlet	8 to 12 inch diameter
	2,230 linear feet

¹ All infrastructure is preliminarily sized for 2 cfs.

The direct pumpback alternative would not impact any other water users within the local area. The use of replacement water under this alternative is non-consumptive and consequently, all water pumped to the SRF raceway inlet would be returned to the lake, maintaining the same lake elevation. Also, this alternative does not require detailed negotiations or coordination with other neighbouring entities with exception to any necessary easements.

3.0 DELIVERY OF IDF&G WATER RIGHT NO: 36-4076 TO SNAKE RIVER FARM (BACK-UP ALTERNATIVE)

If the direct pumpback alternative does not prove to be viable, the Ground Water Districts may pursue an option using leased IDF&G water. The IDF&G owns and manages the Clear Lake Grade wetland mitigation site neighbouring SRF to the east. The North Snake and Magic Valley Ground Water Districts entered a Lease Agreement on May 28, 2008 with the IDF&G where the Ground Water Districts leased IDF&G's Decreed Water Right No. 36-4076, for the purpose of providing mitigation and replacement water to SRF.

The IDF&G currently receives water from four spring areas at the northern rim of the Snake River Canyon near the Clear Lakes Grade, as shown in Figure 2 at the end of this report. The following three alternatives have been developed for conveying these waters to the SRF hatchery in order to help meet SRF water right entitlements. Figure 2 provides a conceptual illustration of these alternatives.

- *IDF&G Alternative 1 (IDF&G Alt 1)* – This alternative involves the drilling of a well near IDF&G Spring 1 to a maximum of 200 feet in depth to enhance production from this spring. An evaluation of groundwater wells in the area, indicates that average static ground water levels are approximately 36 to 105 feet below the surface. This well would provide up to 2.66 cfs to the SRF raceway inlet. A new well and well pump and approximately 200 feet of 10 inch diameter pipe would be constructed to convey the water to the SRF raceway inlet.
- *IDF&G Alternative 2 (IDF&G Alt 2)* – If IDF&G Alt 1 does not provide the full mitigation requirement for SRF, IDF&G Alt 2 could provide additional flows from IDF&G Spring 2. As shown in Figure 2 water would be diverted at the confluence of two channels that currently convey IDF&G Spring 1 and 2 water. A 20 HP pump and 1,100 feet of 10 inch diameter pipe would be needed to convey water to the SRF raceway inlet.
- *IDF&G Alternative 3 (IDF&G Alt 3)* – This alternative would be constructed if IDF&G Alt 1 could not provide the full requirement for mitigation water for SRF and IDF&G Alt 2 was projected to be unable to make up the shortfall. Similar to IDF&G Alt 2, supplies would be diverted at the confluence of the existing channels conveying IDF&G Spring 1 and 2 water. These supplies would be gravity fed to the Alt 3 Pump Station. Water from IDF&G Springs 3 and 4 would be diverted near the inlet of the Clear Lake Grade culvert and also gravity fed to the Alt 3 Pump Station. Supplies would be pumped from this pump station through approximately 1,850 feet of 10 inch diameter pipe to the SRF raceway inlet.

All IDF&G alternatives would be connected to the inlet of the SRF raceways. Additionally 2.66 cfs (or the amount of water supplied to SRF, if less) would be provided as replacement water to

the IDF&G in order to sustain equivalent flows in the wetland mitigation site. This water would be pumped from the Snake River to the inlet of the IDF&G wetlands south of the highway, as shown in Figure 2. Depending on the final configuration of alternatives, IDF&G replacement water may also be needed closer to the actual point of diversion (IDF&G Alt 1 and/or IDF&G Alt 2) to maintain aquatic habitat near the drainage ditches. If this is the case, water could either be conveyed from the Snake River or the lake located at the outlet of the SRF hatchery. Additional infrastructure not shown on Figure 2 would be needed to convey this additional replacement water.

Table 2 summarizes the other major components for each IDF&G alternative. This is a preliminary conceptual estimate of infrastructure requirements and does not include diversion boxes, power supply, connections to the SRF raceway inlet, and other minor components. A more detailed design will be prepared upon completion and testing of the well described in IDF&G Alt 1.

Table 2 Major Components of IDF&G Alternatives		
Alternative	Major Components¹	Estimated Component Size
IDF&G Alternative 1	Well and Well Pump	Maximum of a 200' deep well
	Pressure Pipeline to the SRF Raceway Inlet	10 inch diameter 200 linear feet
IDF&G Alternative 2	Well and Well Pump	Maximum of a 200' deep well
	Pressure Pipeline from Alt 2 Pump Station to the SRF Raceway Inlet	10 inch diameter 1100 linear feet
	Alt 2 Pump Station	20 HP
IDF&G Alternative 3	Well and Well Pump	Maximum of a 200' deep well
	Gravity Pipeline from Alt 3 Diversion (inlet to Clear Lake Grade Culvert) to the Alt 3 Pump Station	10 inch diameter 1300 linear feet
	Gravity Pipeline from Alt 2 Diversion to Alt 3 Pump Station ²	10 inch diameter 850 linear feet
	Pressure Pipeline from the Alt 3 Pump Station to the SRF Raceway Inlet	10 inch diameter 1850 linear feet
	Alt 3 Pump Station	30 HP
	Snake River Pump Station	20 HP
Principle Method of Replacement to IDF&G Wetlands ³	Pressure Pipeline from the Snake River to the IDF&G Wetland (IDF&G Wetland Supply Line)	10 inch diameter 500 linear feet

¹ All infrastructure is preliminarily sized for 2 cfs.
² This pipeline would be constructed if the Alt 2 Pump Station is not developed to convey flows from the the IDF&G Alt 2 Diversion to the Alt 3 Pump Station. This eliminates the need for the Alt 2 Pump Station.
³ This is the principle method for replacing flows to the IDF&G wetlands downstream of the Clear Lakes Grade Culvert. If IDF&G water is replaced further upgradient at the IDF&G Alt 1 and/or IDF&G Alt 2 Diversions, the replacement of water may need to occur close to the point of diversion in order to maintain aquatic habitat. If this is the case, additional infrastructure would be needed to convey the replacement water.

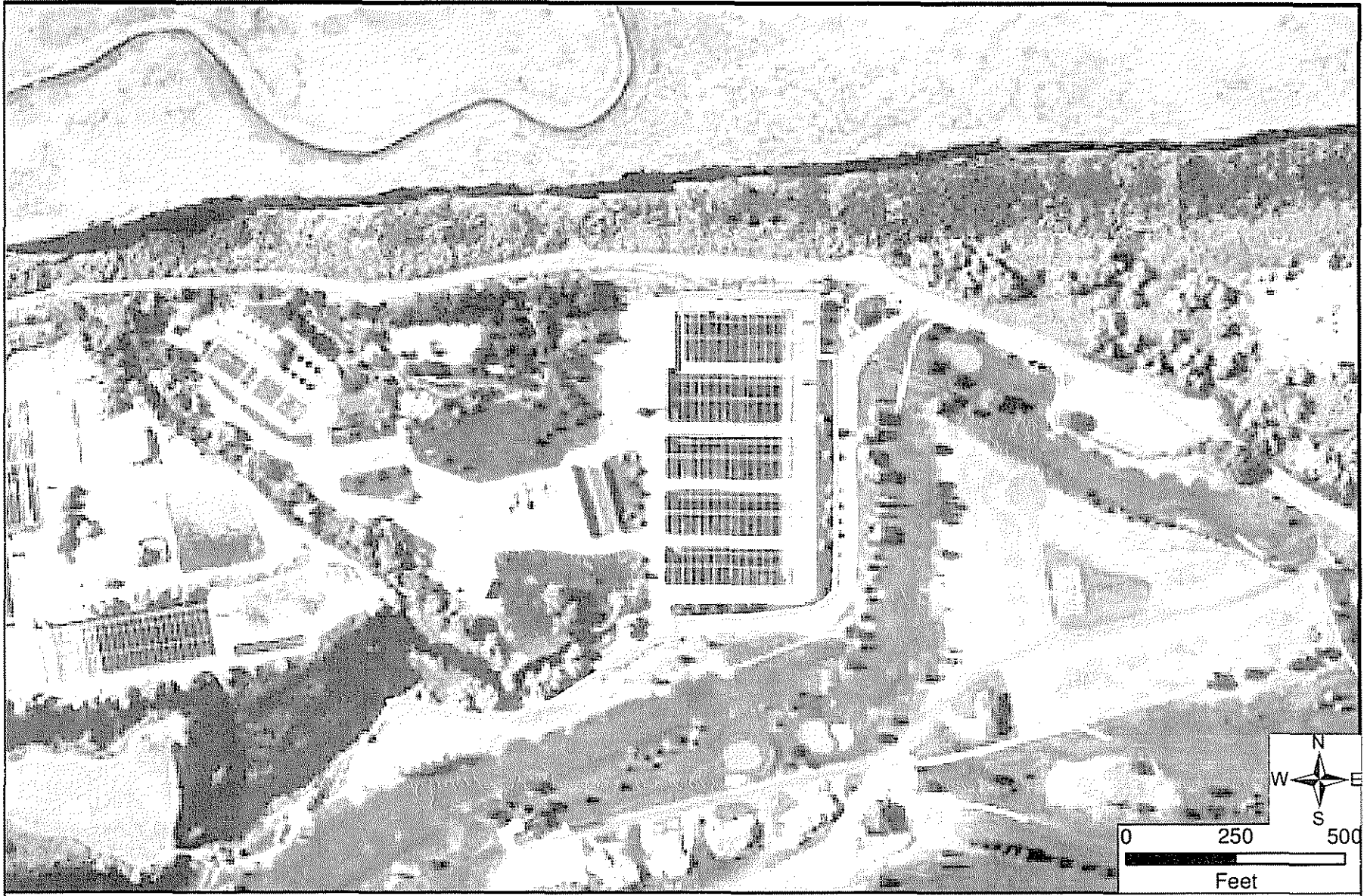


Figure 1

Proposed Direct Pumpback Alternative
Snake River Farm Delivery Call



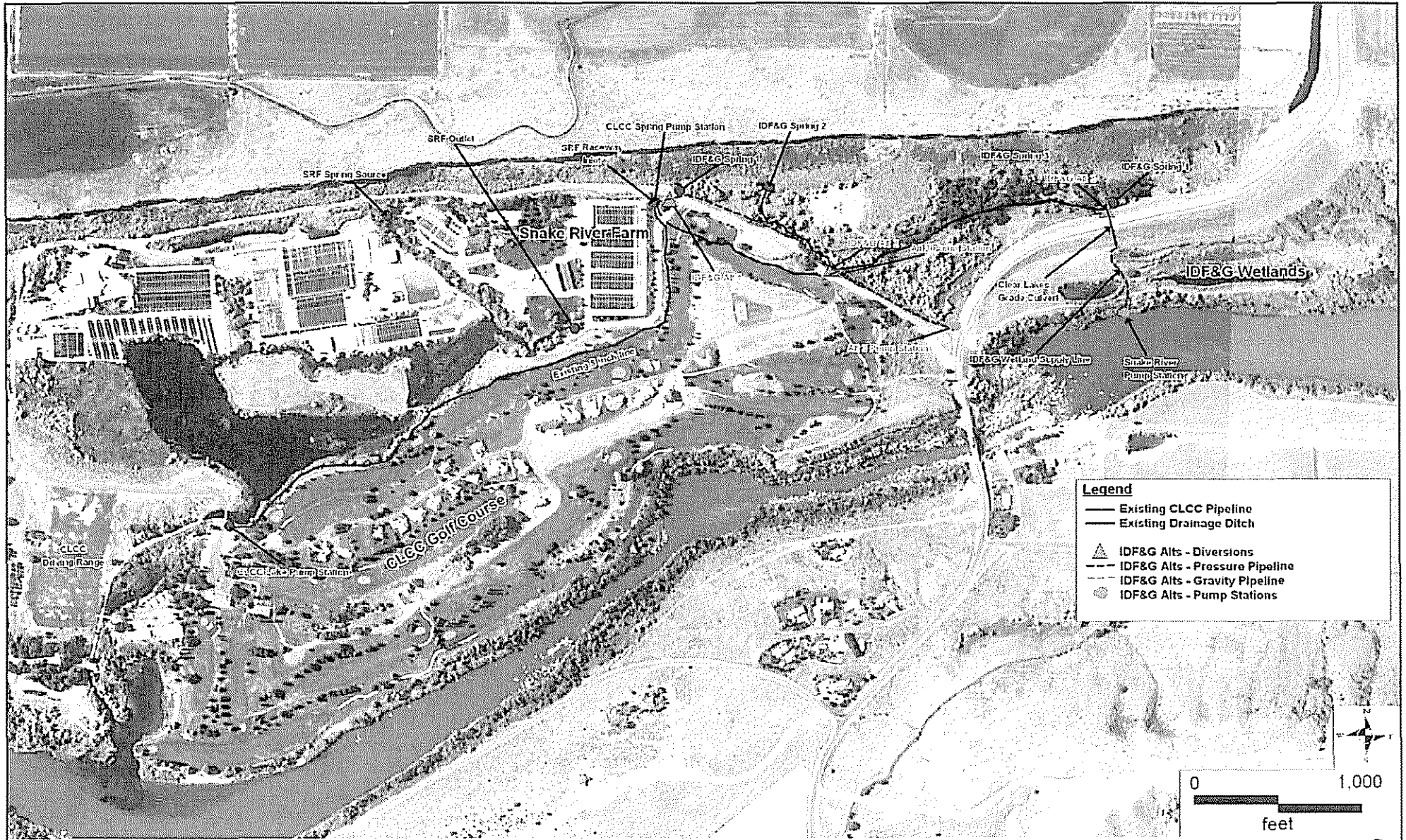


Figure 2

Proposed IDF&G Alternatives
Snake River Farm Delivery Call

