404(b)(1) Guidelines Alternatives Analysis

Water Hollow Pond Project

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1.0 Introduction

The Army Corps of Engineers (COE) and the Environmental Protection Agency (EPA) jurisdiction and decision authority includes waters of the United States, including wetlands. One of the primary frameworks that these agencies use for evaluating potential impacts to wetlands, special aquatic sites, and related aquatic resources is the Clean Water Act (1977, as amended). The Clean Water Act, Section 404(b)(1) guidelines (Part 230.10) require that discharges into or fill of waters of the United States not be permitted if there is a practicable alternatives to the proposed discharge which would have less adverse impact on the aquatic ecosystems, as long as the alternative does not have other adverse environmental consequences.

Compliance with these guidelines is based on avoiding the placement of dredged or fill material within waters of the United States, including wetlands, by selecting the least damaging practicable alternative for the project. An alternative is practicable if it is available to the applicant and can be done when cost, existing technology, and logistics of the overall project purpose are taken into consideration. If a less damaging, practicable alternative can be identified, then it should be selected unless it involves other significant adverse environmental consequences. An alternative is considered practicable if an area not presently owned by the applicant could reasonable be obtained, utilized, expanded, or managed in order to fulfill the basic project purpose. The specific criteria that the COE and the EPA apply to the range or scope of these alternatives in determining whether or not they are in compliance with the 404(b)(1) guidelines are found in CFR 40, 230.10.

The basic decision to be made by the COE is whether to issue a Department of Army permit to allow the dredge/fill of the wetlands that would be impacted by the project. Issuance of such a permit may be conditioned upon specific mitigation measure designed to minimize adverse impacts.

In arriving at this decision, "The COE makes a determination that potential impacts have been avoided to the maximum extent practicable; remaining unavoidable impacts will then be mitigated to the extent appropriate and practicable by requiring steps to minimize impacts, and finally, compensate for aquatic resource values. This sequence of determinations/decisions is considered satisfied where the proposed mitigation is in accordance with specific provisions of a COE and EPA comprehensive plan that ensures compliance with the compensation requirements of Section 404(b)(1) guidelines." (COE and EPA MOA 1990). Information in the alternatives analysis should be sufficient to "rebut the presumption that no less damaging alternative to the project as proposed exists."

This submission comprises the alternatives analysis called for under Section 404(b)(1) of the Clean Water Act for the Water Hollow project.

1. 1 Purpose and Need

The proposed project is located in Water Hollow Canyon (Figure 1), which is owned by JRRT Enterprises. Water Hollow Creek is a tributary to Currant Creek and the Strawberry River system. The Central Utah Project (CUP) Bonneville Unit owns most of the water rights in Water Hollow and has constructed a transbasin tunnel to divert water from Water Hollow to Strawberry Reservoir. Approximately 80 percent of the flow in Water Hollow Creek is diverted through this tunnel. JRRT Enterprises owns the remaining water right of 0.8 cfs, which is released from the diversion and allowed to flow down Water Hollow Creek. Wetlands and riparian areas along Water Hollow Creek have been affected by this diversion. These wetlands have established a new equilibrium based on the 0.8 cfs that now flows down the creek to the JRRT diversion and on reduced livestock grazing.

JRRT uses their Water right in Water Hollow Creek to irrigate 54.3 acres of pasture at the mouth of Water Hollow using two 4-inch wheel lines. Currently, water for the sprinklers is provided by an irrigation system that JRRT has developed. Water is diverted from Water Hollow Creek approximately 1 mile above the confluence with Currant Creek, providing the elevation (approximately 120 feet) necessary to develop approximately 50 psi of water pressure to operate the sprinkler lines. Water is piped from the diversion to the pasture using a 12-inch pipeline that reduces to an 8- inch pipeline after 3/8 of a mile and ties into the 4-inch risers in the

pasture. Under this system, there is sufficient water in Water Hollow Creek for the sprinklers in the early summer. However, by July or August, depending on the year, the flow in the creek drops and there is insufficient water to meet the irrigation needs. Irrigation is then reduced to running one of the sprinkler lines, which results in excess time between irrigation periods. JRRT proposes to alleviate this shortfall by storing water above the irrigation diversion so that it can be released later in the summer and supplement the amount Of Water that is otherwise available for irrigation.

In addition, JRRT recognizes the wildlife habitat, riparian/wetland habitat, and aesthetic values in Water Hollow Canyon associated with the stream. This project is also intended to enhance these values by increasing the variety and types of habitat present in the Canyon.

The need to be met by this project is to provide irrigation water for the pasture during the summer irrigation season. The purpose of the project is to: (1) meet this need by providing capacity to store water allocated under the water right to JRRT high enough in the canyon to develop sufficient water pressure to meet the requirements of the irrigation system; (2) to store the water at a location that will allow the investment in the existing irrigation system to continue to be utilized; and (3) to accomplish this in the most cost effective and least environmentally damaging way.

2.0 Description of Alternatives

Z I Alternative 1: No Action
Under the no-action alternative, the three proposed ponds described below under the Proposed Action would not be built. JRRT would continue to use the existing irrigation system as they have in the past, but there would be no water storage capability. While this alternative would eliminate potential impacts to wetlands along Water Hollow Creek due to the construction of the ponds, it would not meet the purpose of the project. Specifically, the shortfall in irrigation Capacity, particularly in the late summer, would not be addressed.

Z 2 Alternative 2: Proposed Action
Under this alternative, three on-stream ponds would be built in Water Hollow Canyon, as proposed in the permit application. These ponds are identified as ponds 6, 7, and 8. The surface area of Pond 6 would be approximately 3.7 acres with an earthen dam approximately 260 feet long with 2 20-fbot wide crest. Pond 7 would have a surface area of approximately 1.18 acres with an earthen dam approximately 140 feet long with a 20-lbot wide crest. Pond 8 would have a surface area of approximately 0.39 acres with an earthen dam approximately 180 foot long with a 20-foot wide crest. The dam height in each Case would be 8 feet with a planned maximum water depth of 6 feet. The pond basin would be excavated behind the dam using a track hoe, bulldozer, and other construction equipment, as appropriate. The sides of the pond would have a 1: 1 slope down to the maximum depth. The slope at the shoreline would be flattened to create an extended shallow water zone where wetland vegetation would be established to enhance the habitat and other values of the ponds and to offset the loss of wetlands along the stream channel that would be inundated by the project.

This alternative would meet the purpose and need of the project by storing water to meet the irrigation requirement while limiting the impact to the aquatic ecosystem to the length of stream within the footprint of the ponds. Approximately 2.67 acres of wetlands along the stream channel would be affected.

The cost estimate for constructing the three ponds under the Proposed Action would be $127,000. Additional costs would be incurred due to construction of the mitigation site.

Z3 Alternative 3: Ponds with Reduced Surface Area
This alterative would build three ponds holding the same volume of water in the same locations as described in the Proposed Action, but the design would be modified to reduce the surface area in order to reduce the wetland impact. This would be done by making the ponds deeper through excavation. This alternative would meet the purpose and need of the project. It would provide capacity to store water allocated under the water right to JRRT high enough in the canyon to develop sufficient water pressure to meet the requirements of the irrigation system, and it would allow the existing irrigation system to continue to be utilized. Relative to the

Proposed Action, the impact to wetlands would be reduced. However, the cost of this alternative would be higher due to additional excavation and dam construction costs. In addition, the higher dam would create additional aesthetic concerns. A higher dam would look less natural and be more difficult to blend in with the surroundings in the canyon. This alternative would also result in additional design and engineering costs for the deeper ponds with higher dams. Construction costs for this option are estimated at $157,000. In addition, JRRT estimates that approximately $30,000 has already been spent on the design and engineering of the Proposed Action ponds. Redesigning the three deeper ponds would incur additional redesign and engineering costs.

2.4 Alternative 4: Off-Site Pond Near Currant Creek

This alternative would provide water storage capacity to meet the irrigation requirements by building a pond near Currant Creek at the mouth of Water Hollow. Most likely a single, larger pond would be built, rather than three smaller ones, since this site would not be constrained by the narrow canyon. Under this alternative, water would be diverted from Currant Creek instead of Water Hollow to fill the pond. This would require the approval of a change application by the Division of Water Rights to move the water right from Water Hollow to Currant Creek. Since there would essentially be no difference in elevation between the pond and the pasture, this design would not develop gravity water pressure for the sprinkler lines. Therefore, this alternative would require a pump and electric motor to provide Water pressure for the sprinkler lines. In order to provide the necessary water pressure and volume, a 25-horsepower motor would be required.

In terms of environmental impacts, moving the JRRT water right from Water Hollow to Currant Creek would eliminate the source of water that is primarily responsible for maintaining the wetlands along Water Hollow Creek. Once the water right is moved, the remaining flow in Water Hollow would be diverted at the CUP diversion and the aquatic ecosystem along the entire length of Water Hollow would be severely impacted by the dewatering.

In terms of the purpose and need, this alternative would not provide for water storage at an elevation where water pressure could be developed via gravity, and would result in greater environmental impacts. Therefore, this alternative would not meet the purpose and need of this project.

The estimated cost of the pump, electric motor, intake structure, etc., would be $7,500, plus an additional electrical cost of approximately $6,000 per year to operate the pump for a 6-month irrigation season ($0.05 per horsepower per hour for a 180-day irrigation season). Assuming a 1 0-year project life and no increase in cost of electricity, electric costs would be approximately $60,000. The cost of constructing the pond would be approximately $70,000, based on a 21- acre pond (the combined capacity of the three proposed ponds in Water Hollow) and an assumed pond construction cost of $2.00 per cubic yard of excavation.. Therefore, the total cost of this alternative would be approximately 137,500.

2.5 Alternative 5: Pipe Half of the Water Right

Under this alternative, half of the JRRT water right (0.4 cfs) would be diverted from Water Hollow Creek as the creek enters JRRT property and would be piped down to the existing irrigation system. The other half of the water right would be allowed to flow down Water Hollow Creek to the existing diversion, where it would be diverted from the stream for irrigation use. This alternative would reduce the potential for water loss due to infiltration into the groundwater from the streambed, while leaving some water in the stream to at least partially maintain the riparian and wetland systems. This alternative would not meet the purpose and need of the project because it does not include the capability to store water appropriated under the water right for release when it is needed during the irrigation season. Although piping the water could reduce infiltration losses, additional water from storage e would be needed to meet the irrigation demand during the summer period. Further, reducing the flow in the stream below the JRRT property boundary by 50 percent relative to the Proposed Action would likely adversely affect the aquatic ecosystem. Thus, this alternative would not meet the requirements under 40 CFR 230.10(a) which require that an alternative have less adverse impact on the aquatic ecosystem.

In terms of cost, this alternative would require the installation of approximately 3 miles of 6-inch pipe. The estimated cost of this pipeline, based on a pipe cost of $0.87/foot for 6-inch PVC pipe and an installation cost of $2.00 per foot, would be approximately $46,000. The water diversion structure would cost an approximately $8,000, based on the cost of the diversion for the existing system. Due to the elevation and the water pressure that would develop in the pipeline, up to 3 pressure regulators would be required, at an estimated cost of $2,500 each. Based on these calculations, the cost of this alternative is estimated at $61,500.

2.6 Alternative 6: Pipe Entire Water Right

Under this alternative, the entire 0.8 cfs water right appropriated to JRRT would be diverted from Water Hollow Creek as the creek enters JRRT property and would be piped d own to the existing irrigation pipeline, approximately 3 miles. This alternative would result in the most efficient delivery of water to the irrigation system. However, this alternative would not meet the purpose and need of the project because it does not include the capability to store water appropriated under the water right for release when it is needed during the irrigation season. Further, because it would dewater approximately 3 miles of Water Hollow Creek, it would not meet the requirements under 40 CFR 230.10(a) which require that an alternative have less adverse impact on the aquatic ecosystem.

In terms of cost, the estimated cost of this alterative, based on a pipe cost of $2.90/foot for 10-inch PVC pipe and an installation cost of $2.00 per foot, would be approximately $78,000. The water diversion structure would cost approximately $8,000, based on the cost of the diversion on the existing system. Due to the elevation and the water pressure that would develop in the pipeline, up to 3 pressure regulators would be required, at an estimated cost of $2,500 each. Based on these calculations, the cost of this alternative is estimated at $93,500.

3.0 Comparison of Alternatives

Alternative 1 (No Action) has the least cost and the least environment al impact, but it would not meet the purpose and need of the project.

Alternative 2 (Proposed Action) would meet the purpose and need of the project. It would result in impacts to 2.67 acres of wetlands along the stream at each of the pond sites, but would maintain water in most of Water Hollow Creek. Of the alternatives that fully meet the purpose and need, the Proposed Action would have the least monetary cost.

Alternative 3 (Ponds with Reduce Surface Area) would meet the purpose and need and would reduce wetland impacts slightly, but would result in a higher monetary cost and would be undesirable from an aesthetic perspective due to the higher dams.

Alternatives 4 (Off-Site Ponds Near Currant Creek) does not meet the purpose and need of the project because it does not store the water where it can develop the water pressure necessary for the irrigation system via gravity and would require an electric pump. It also involves higher monetary costs than the Proposed Action and would have severe environment at costs to the aquatic ecosystem because Water Hollow would no longer have water released past the CUP diversion.

Alternative 5 and 6 (Pipe Half and Entire Water Right) would not meet the purpose and need of the project to increase the volume of water available for irrigation by storing water in ponds. In addition these alternatives would partially and completely, respectively, dewater Water Hollow Creek and result in more severe impacts to the aquatic ecosystem relative to the Proposed Action.

Table 1. Alternatives analysis matrix.

Alternative	Meets Purpose and Need?	Environmental Impact	Less Environmentally damaging Than the Proposed Action?	Cost
Alternative 1- No Action	No.	No additional impacts.	Yes.	0
Alternative 2- Proposed Action	Yes.	2.67 acres of wetland would be impacted at the three pond sites.	N/A	$127,000 construction costs of three ponds.
Alternative 3- Pond With Reduced Surface Area	Yes.	Impacts to wetlands reduced relative to the Proposed Action due to the reduced surface area	Yes.	$157,000 construction costs of three ponds.
Alternative 4- Off-Site Pond Near Current Creek	No. Pond located at the same elevation as the pasture would not provide gravity water pressure.	The JRRT water right would be moved to from Water Hollow to Currant Creek. All of the water in Water Hollow would be diverted by the CUP diversion and the aquatic ecosystem would be severely impacted by the loss of water.	No.	$137,500 to construct pond, install pumps, and electrical costs.
Alternative 5- Pipe half of the Water Right	No. Would not provide for water storage to meet irrigation needs and would result in impacts to the aquatic ecosystem due to reduced instream flows.	Wetlands along entire length of Water Hollow Creek below the property line would be affected by reduced stream flows.	No.	$61,500 pipe and construction costs.
Alternative 6- Pipe Entire Water Right	No. Would not provide for water storage to meet irrigation need and would result in impacts to the aquatic ecosystem due to loss of instream flows.	Wetlands along entire length of Water Hollow Creek below the property line would be impacted due to the loss of stream flow.	No.	$93,500 pipe and construction costs.

Table 1 summarizes the six alternatives analyzed in this Alternatives Analysis.

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