Program Requirements Tab

Attachment A.2: Cost Effectiveness

Provide documentation indicating the proposed project is cost-effective. If there is at least one feasible alternative means of providing the same amount or more of the total public and non-public physical benefits as provided by the proposed project, calculate, display and document the least-cost of these alternative means and justify the proposed project by comparison.

WSIP Application Instructions, March, 2017

Response

The proposed project has a benefit cost ratio of 1.5 as discussed in Sites_A9 BCA Results under the BENEFIT CALCULATION, MONETIZATION, AND RESILIENCY TAB. The Federal Feasibility Report (see https://www.sitesproject.org/information/FeasibilityReport) independently analyzed the project using somewhat different economic methodologies and also concluded that the project was cost effective with a benefit to cost ratio of 1.45 (see Chapter 7 of the Federal Feasibility Report).

Feasible alternatives were evaluated. The NODOS Investigation by DWR and Reclamation identified three primary alternative locations for surface storage as potential alternatives to Sites Reservoir (Colusa Complex, Newville Reservoir, and Red Bank Reservoir). These alternatives are discussed in Chapter 4 of the Federal Feasibility Report (see) and in Chapter 2 of the Draft EIR/EIS (see https://www.sitesproject.org/information/DraftEIR-EIS). Red Bank Reservoir was screened out due to less suitable diversion locations and environmental impacts.

To provide a preliminary economic assessment for the three surface storage measures, costs for the construction of the reservoirs and the associated conveyance were compared with yield and unit costs. These costs are presented in Table 1. The estimated average annual cost per yield is similar in magnitude for Sites and Newville Reservoirs. The construction cost of Colusa Reservoir Complex would be approximately 4.4 times that of Sites Reservoir, and six times that of Newville Reservoir, while the increase in yield over what would be produced by the Sites and Newville Reservoirs is approximately 10 to 25 percent.

Table 1. Comparison of Total Construction and Yield Cost in 2015 Dollars

Attribute	Measure		
	Colusa Reservoir Complex	Sites Reservoir	Newville Reservoir
Gross Storage (acre-feet)	3,000,000	1,810,000	1,900,000
Dead Storage (acre-feet)	100,000	40,000	50,000
Construction Cost	$20.1B	$4.5B	$4.8B
Average Annual Cost [a]	$708M	$159M	$169M
Estimated Average Annual Yield (acre-feet)	328,000	274,000	275,000
Average Annual Cost/Yield (acre-feet)	$2,160/acre-foot	$579/acre-foot	$615/acre-foot

Note: [a] Per WSIP guidance, annual costs were based on a 93-year operating period and a 3.5 percent discount rate. Annual cost shown does not include any allowance for interest during construction or future O&M costs

Auburn Dam was also considered as a potential alternative to Sites Reservoir. Reclamation estimated the cost for Auburn Dam at $9.9 billion (compared to $4.7 billion for Sites Reservoir) with an average

annual yield of 229 TAF (compared to 450 TAF for Sites Reservoir) (*Folsom Auburn South Unit: Special Report: Benefits and Costs Update*, Reclamation, 2006).

As a result, the Newville Reservoir was determined to be the least cost alternative project that would result in comparable total overall benefits. Sites_A5 Documentation under the BENEFIT CALCULATION, MONETIZATION, AND RESILIENCY TAB includes a Least Cost Alternative that provides the same total physical benefits. No project specific estimates for Newville Reservoir non-construction costs were available. Therefore, a rough approximation of Newville Reservoir future full cost (i.e., including interest during construction, mitigation and future O&M costs) was estimated based on the corresponding Sites Reservoir costs and proportionally adjusted based on Newville's higher construction cost.

Consequently, assuming an eight year construction period and similar scheduling, the IDC cost for Newville Reservoir was estimated to be $820 million based on the WSIP required 3.5 percent discount rate. Environmental mitigation costs of $388 million were also assumed for the project. The present value of Newville Reservoir's total O&M expenses was estimated to be $838 million. Altogether, Newville Reservoir's estimated total project cost was estimated be $6,926 million in present value terms.

Throughout the analysis of benefits, the alternative project cost approach was used in monetization of several benefit categories (see Sites_A5 Documentation under the BENEFIT CALCULATION, MONETIZATION, AND RESILIENCY TAB). However, as discussed in the section, Shasta Lake Dam raise was determined to be a more appropriate alternative project for the benefit valuation of the Sites Reservoir's future ecosystem improvements.