BUREAU OF RECLAMATION

Final Feasibility Report
Appendix L – Cost Allocation

North-of-the-Delta Offstream Storage Investigation

U.S. Department of the Interior

December 2020

Mission Statements

The Department of the Interior (DOI) conserves and manages the Nation's natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honors the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Final Feasibility Report
Appendix L – Cost Allocation

North-of-the-Delta Offstream Storage Investigation, California
Interior Region 10 • California-Great Basin

prepared for Reclamation by AECOM under Contract/Order No. GS-00F-188CA, 140R2018F0052

Cover Photo: Sites Reservoir proposed sites (Sites Project Authority)

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Appendix L. Cost Allocation

L.1 Introduction

This technical appendix to the Feasibility Report for the North-of-the-Delta Offstream Storage Investigation (Investigation) documents the cost allocation terminology and methods, and an initial cost allocation and apportionment to support Federal evaluation. The benefit analysis herein also considers economic guidance by the California Water Commission for the estimation of public benefits, in anticipation of potential funding eligibility under the State of California's Water Quality, Supply, and Infrastructure Improvement Act of 2014. The Investigation is a feasibility study evaluating alternatives to develop irrigation, municipal and industrial (M&I), and environmental water supplies, primarily through the construction of Sites Reservoir in Colusa and Glenn Counties, California.

Purpose and Scope

Estimating the benefits of the potential accomplishments of the alternatives is critical to establishing economic feasibility and identifying a corresponding recommended plan. The estimated benefits are used to allocate the costs of the alternatives among the various purposes and to identify cost-sharing responsibilities among Federal and non-Federal entities. The estimates of alternatives' costs are discussed in Section B.4, Cost Estimate, of Appendix B, Engineering.

Investigation-Specific Planning Objectives

The NODOS Investigation planning objectives were developed based on identified water resources problems, needs, and opportunities in the study area and specific direction in the study authorization. Planning objectives evolved over the course of the study. The economic analysis for the initial alternatives is considered in Attachment C.1. An initial objective for improvement of Delta Environmental and Export Water Quality was used for the evaluation of initial alternatives, but later refined and replaced with CVP Operational Flexibility and Delta Ecosystem Enhancement. Similarly, an initial secondary objective for sustainable hydropower was later dropped. The objectives for the final, refined analysis of alternatives are described below.

Final Primary Objectives

- **Water Supply:** The NODOS Sites Reservoir Project would provide increased water supply and improve the reliability of water deliveries for municipal, industrial, and agricultural uses, especially during drought conditions.
- **CVP Operational Flexibility:** CVP Operational Flexibility is the benefit accruing to the Federal Government from an increased ability to allocate additional water supplies through an investment by the United States in a water supply project. The investment would enable the Federal Government to deliver benefits and better meet project purposes by increasing the efficiency, reuse, or multiple use of existing supplies or by reducing the impacts of regulatory or capacity constraints on an existing Reclamation project. The NODOS Sites Reservoir Project would provide additional water to relieve some of the existing operational

constraints in the CVP system, and meet obligations under Federal and State law. This would include providing environmental benefits to anadromous fish, refuges, and water quality, as well as providing CVP yield diversification through new facilities.

- **Anadromous Fish:** The NODOS Sites Reservoir Project would benefit anadromous fish (including endangered winter-run Chinook salmon) and other aquatic species by improving temperatures in the Sacramento, Feather, and American rivers. Conserving higher storage levels in CVP reservoirs to be used for operational flexibility provides a distinct opportunity for benefits through the preservation of coldwater pools; it also improves downstream water temperature management in Below Normal, Dry, and Critical water years.
- **IL4 Water Supply for CVPIA Refuges[1]:** The NODOS Sites Reservoir Project would provide water that is needed to meet the IL4 refuge water supply demands established in the CVPIA (P.L. 102-575, Title 34). IL4 refuge water supply obligations established by the CVPIA are not being fully met at all refuges.
- **Delta Ecosystem Enhancement[2]:** The NODOS Sites Reservoir Project would enhance the Delta ecosystem by providing water to convey food resources from the floodplain to the Delta, thereby improving the food chain and quality of the Delta's estuarine habitat for use by Delta smelt and other species.

Final Secondary Objectives

- **Flood Damage Reduction[3]:** The NODOS Sites Reservoir Project would provide an opportunity to reduce flooding in local watersheds.
- **Recreation[4]:** Recreation in the immediate vicinity of the NODOS Sites Reservoir Project would provide opportunities for hiking, fishing, camping, boating, and mountain biking.

Final Alternatives

In accordance with the Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&Gs), the feasibility studies for the alternatives[5] analyze proposed action alternatives and a No Action Alternative. Attachment C.1 describes the initial alternatives and their economic evaluation.

Two alternatives (Alternatives A1 and D1) were selected as Final Alternatives. These alternatives correspond to Alternatives A and D in the initial alternatives, but without pumpback storage. These alternatives represent the range of reservoir sizes that the Authority is considering as it is "right

[1] This objective is one of the two ecosystem benefits accepted by the California Water Commission that grants the NODOS Sites Reservoir Project the eligibility for the Water Storage Investment Program funding. The California Department of Fish and Wildlife is the authorized agency to oversee the implementation of this benefit.
[2] This objective is one of the two ecosystem benefits accepted by the California Water Commission that grants the NODOS Sites Reservoir Project the eligibility for the Water Storage Investment Program funding. The California Department of Fish and Wildlife is the authorized agency to oversee the implementation of this benefit.
[3] This objective is one of the public benefits benefits accepted by the California Water Commission under the Water Storage Investment Program funding.
[4] This objective is one of the public benefits benefits accepted by the California Water Commission under the Water Storage Investment Program funding.
[5] Throughout the analysis, the NODOS project alternatives are generally referenced as the "alternatives."

sizing" the project for its member agencies. The key components of the action alternatives relevant to the economic analysis are summarized below.

- **Alternative A1:** Sites Reservoir would have a storage capacity of 1.27 million acre-feet (MAF). Water would be conveyed via the existing Tehama-Colusa (T-C) Canal (2,100 cubic feet per second [cfs]) and Glenn-Colusa Irrigation District (GCID) Canal (1,800 cfs), and a Delevan Pipeline with a diversion capacity of 2,000 cfs and release capacity of 1,500 cfs. The Delevan Pipeline would have a fish screen intake and pumping plant.
- **Alternative D1:** Sites Reservoir would have a storage capacity of 1.8 MAF. Water would be conveyed via the existing T-C Canal (2,100 cfs) and GCID Canal (1,800 cfs), and a Delevan Pipeline with a diversion capacity of 2,000 cfs and release capacity of 1,500 cfs. The Delevan Pipeline would have a fish screen and intake pumping plant.

L.2 Process Overview, Terms, and Potential Methods

Allocation of Federal water resources project costs is conducted to derive an equitable distribution of costs among the authorized project purposes, or those purposes proposed for authorization, in accordance with existing law. Cost allocation analysis is performed to provide an indication of the cost implications of constructing the project for each authorized purpose.

Process Overview and Terms

The cost allocation acceptability is an important step in the process of determining how the cost should be assigned. Three basic steps are associated with cost allocation and apportionment:

- Identify costs to be allocated.
- Allocate costs to project purposes.
- Apportion costs to beneficiaries.

The cost allocation process provides an important intermediary step towards evaluating the financial feasibility of potential alternatives, as illustrated in Figure L-1.

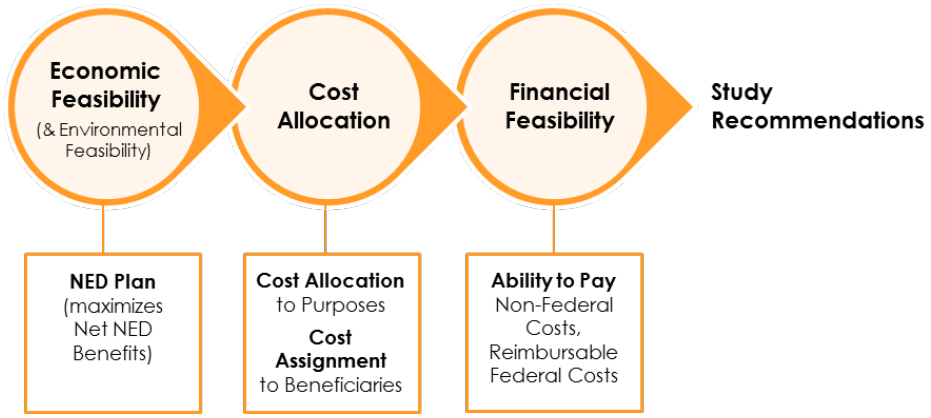


Figure L-1. Process for Evaluating Financial Feasibility

Costs Allocated

Total project costs allocated include construction costs, interest during construction (IDC), and operation, maintenance, and replacement (OM&R) costs. These costs are described in more detail in Appendix B – Engineering Designs and Costs, and are summarized below:

- Construction costs – Construction costs include field costs and non-contract costs to implement all elements of the project necessary to achieve the associated benefits.
- Interest during construction – IDC accounts for the economic (opportunity) cost of project expenditures during the period between when construction begins and benefits are derived.

Annual operation, maintenance, and replacement costs – OM&R costs are the costs required to assure continued benefits over the life of the project.

It should be noted that cost allocation is a financial exercise rather than an economic evaluation. Consequently, project costs may be presented differently in a cost allocation than in an economic analysis.

Allocating Costs to Project Purposes

Once all project costs have been identified, they are allocated to the project purposes. Specific costs are for project components that contribute to a single purpose. For each purpose, separable costs are the costs of the portion for multipurpose facilities due to the inclusion of the purpose in question. Separable costs include specific costs, and may include a portion of joint costs. They are estimated as the reduction in financial costs that would result if a purpose were excluded from an alternative. Joint costs are the costs remaining after separable costs have been removed.

Methods for allocating joint costs generally fall into two categories, depending on how benefits are considered. Benefits are derived in the economic analysis. Methods that do not consider benefits may divide joint costs between beneficiaries equally, or divide joint costs based on the beneficiaries' share of separable costs. Methods that consider the estimated benefits either divide the joint costs among beneficiaries proportional to the benefits each receives, or allocate their single-purpose cost for the benefits they receive (i.e., if the single-purpose cost is lower than its estimated benefits). Of these methods, the separable costs-remaining benefits (SCRB) method has historically been used to allocate Central Valley Project (CVP) facility costs. Other methods for allocating joint costs based on benefits include the alternative justifiable expenditure method and the share of total benefits method.

Apportioning Costs to Beneficiaries

The cost allocation process is designed so that costs associated with project purposes can be apportioned to beneficiaries for repayment. Once costs are allocated to the appropriate purpose, costs can be assigned to Federal and/or non-Federal partners based on a specific project authorization, existing Federal law, existing cost-sharing requirements, and the laws and objectives of non-Federal entities, including states, counties, and non-profit organizations.

L.3 Potential Cost Allocation Methods

This section discusses two potential cost allocation methods for multipurpose projects.

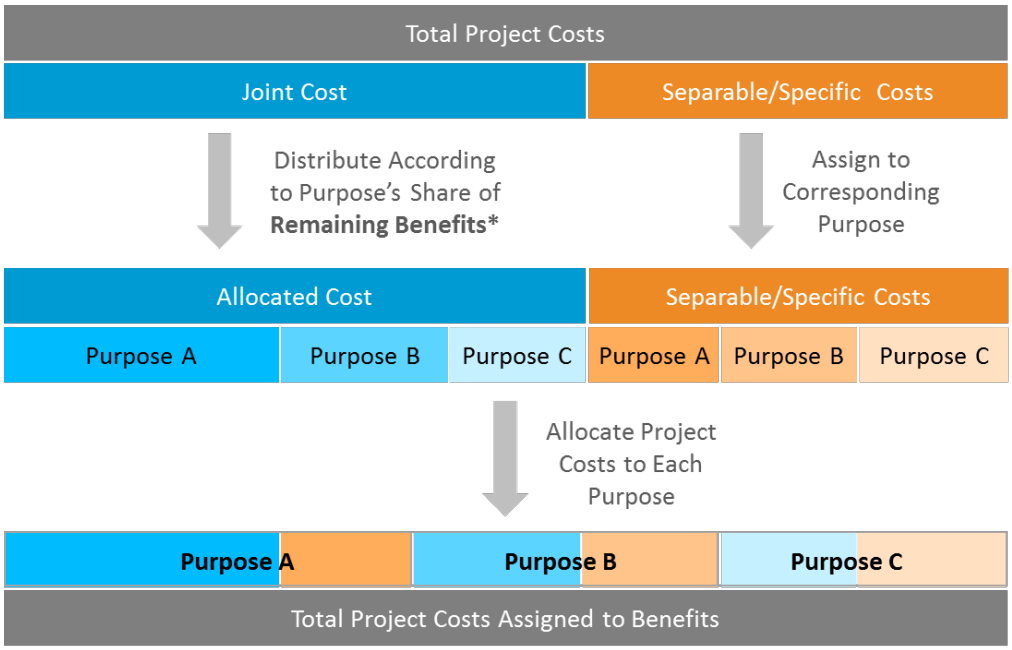
Separable Costs-Remaining Benefits Method

Distribution of project costs considers both the elements of the project that are directly tied to a project purpose, as well as the elements tied to multiple project purposes. A widely used method for cost allocation in Federal water resources projects is the SCRB method. This method distributes costs among the project purposes by identifying separable costs, and allocating joint costs in proportion to the remaining justifiable expenditure for each project purpose. Project costs (i.e., construction costs, IDC, and OM&R costs) can be grouped with respect to project purposes into separable and joint costs. Separable costs are the incremental costs of adding a purpose to a multipurpose project. Separable costs for a project purpose are estimated as the reduction in project costs that would result from excluding that purpose. Joint costs are the remaining project costs after all separable costs are excluded.

The SCRB method starts by identifying the separable costs for each project purpose. Separable costs are subtracted from the lesser of benefits or single-purpose alternative project costs to derive the remaining justifiable expenditures. Next, joint costs are allocated to the purposes in proportion to their remaining justifiable expenditures. The total cost allocated to a project purpose is the sum of its separable and allocated joint costs.

Alternative Justifiable Expenditure

The Alternative Justifiable Expenditure method is a modified SCRB method used in situations when derivation of the separable costs is not feasible. Cost allocation under the Alternative Justifiable Expenditure method is the same as under the SCRB method, except that specific costs (i.e., costs for project components that contribute to a single purpose and exclude the costs of a change in project design due to inclusion) replace separable costs. The remaining (joint) costs are apportioned among project purposes based on their total benefits. However, if no specific or separable costs can be identified, cost allocation can be directly carried out based on the distribution of benefits between project purposes.



* **Remaining Benefit** for each Purpose = Justifiable Expenditure - Separable Costs

Justifiable Expenditure = Minimum of: (1) Estimated Benefit, or (2) Single Purpose Alternative Cost

Figure L-2. Separable Cost-Remaining Benefit Method

L.4 Authorization for Federal Participation

Authorization for Federal financial participation in implementing Sites Reservoir is established by the *Water Infrastructure Improvements for the Nation Act*, 2015-2016 (Public Law 114-322).

Public Law 114-322, Section 4007 (a)(2) establishes Sites Reservoir as a qualified State-Led storage project:

> (2) State-led storage project.--The term "State-led storage project" means any project in a Reclamation State that —
>
> *(A) involves a groundwater or surface water storage facility constructed, operated, and maintained by any State, department of a State, subdivision of a State, or public agency organized pursuant to State law; and*
>
> *(B) provides a benefit in meeting any obligation under Federal law (including regulations).*

Further guidance is provided in Public Law 114-322, Section 4007(c)(2)(B)(i):

> Participation by the Secretary of the Interior in a State-led storage project under this subsection shall not occur unless—
>
> *(B) the State or local sponsor determines, and the Secretary of the Interior concurs, that--*
>
> *(i) the State-led storage project is technically and financially feasible and provides a Federal benefit in accordance with the reclamation laws;*

Further guidance is provided in Public Law 114-322, Section 4007(c):

> (1) In General.—Subject to the requirements of this subsection, the Secretary of the Interior may participate in a State-led storage project in an amount equal to not more than 25 percent of the total cost of the State-led storage project.
>
> (2) Request By Governor.—Participation by the Secretary of the Interior in a State-led storage project under this subsection shall not occur unless—
>
> *(A) the participation has been requested by the Governor of the State in which the State-led storage project is located;*
>
> *(B) the State or local sponsor determines, and the Secretary of the Interior concurs, that--*
>
> *(i) the State-led storage project is technically and financially feasible and provides a Federal benefit in accordance with the reclamation laws;*
>
> *(ii) sufficient non-Federal funding is available to complete the State-led storage project; and*
>
> *(iii) the State-led storage project sponsors are financially solvent;*

(C) the Secretary of the Interior determines that, in return for the Federal cost-share investment in the State-led storage project, at least a proportional share of the project benefits are the Federal benefits, including water supplies dedicated to specific purposes such as environmental enhancement and wildlife refuges; and

(D) the Secretary of the Interior submits to Congress a written notification of these determinations within 30 days of making such determinations.

Therefore, Section 4007(a)(2)(B) and Section 4007(c)(2)(B)(i) define the scope for Federal interest in State-led storage projects as: (1) providing Federal benefits in accordance with the Reclamation laws, and/or (2) providing a benefit in meeting obligations under Federal law. Alternatives A1 and D1 are formulated to provide a range of Federal benefits that include:

1. Increased CVP Operational Flexibility, by rescheduling deliveries that would otherwise be undeliverable due to conveyance or demand constraints.
2. Anadromous Fish by increasing Shasta Reservoir's Coldwater pool and improving the conditions of its water deliveries and downstream riparian habitat conditions.
3. Refuge water supply, through increased deliveries and reliability of Incremental Level 4 water (a Federal obligation).
4. Delta Ecosystem Enhancement through increased deliveries into the Yolo Bypass to increase desirable food sources for Delta smelt and other estuarine-dependent species.
5. Recreation from the construction of Sites Reservoir and recreational opportunities this provides.
6. Flood Damage Reduction from the construction and operation of the project facilities.

Applicable Authorities for Costs Assignment

Costs allocated to each purpose are assigned to the Federal government and non-Federal partners based on the specific project authorization, existing Federal law, existing cost sharing requirements, and laws and objectives of non-Federal entities, including states, counties, and non-profit organizations. Table L-1 summarizes existing legislation regarding Federal financial participation for purposes that could be used for allocating costs for the project alternatives.

Table L-1. Authorities for Federal Financial Participation

Purpose	Pertinent Legislation	Description
Federal Cost Share for a State-Led Project	Water Infrastructure Improvements for the Nation Act, 2015-2016 (Public Law 114-322)	Provides authorization for Federal funding in surface storage projects led by public agencies organized pursuant to State law and limits Federal participation to not more than 25% of the total cost of a State-led storage project.[2]
M&I Water Supply[1]	Reclamation Act of 1939, as amended	Provides for up-front Federal financing of M&I water supply purposes, with 100% repayment of capital costs (including interest during construction and interest over the repayment period); 100% of OM&R costs are non-Federal.
Irrigation Water Supply	Reclamation Act of 1902, as amended	Provides for up-front Federal financing of irrigation water supply purposes, with 100% repayment of construction costs, without interest, and OM&R costs by beneficiaries. This could be altered with aid to irrigation for the repayment of construction costs.
CVP Operational Flexibility	Water Infrastructure Improvements for the Nation Act, 2015-2016 (Public Law 114-322)	Provides for Federal construction funding of CVP operational flexibility benefits consistent with Federal cost share for a State-led project.
IL4 Water Supply for CVPIA Refuges	Water Infrastructure Improvements for the Nation Act, 2015-2016 (Public Law 114-322)	Provides for Federal construction funding of Refuge water supply benefits.
	Central Valley Project Improvement Act (Public Law 102-575)	Provides Federal share of up to 75% and 25% non-Federal share (State of California) for voluntary acquisition of Incremental Level 4 supplies to meet full Level 4 obligations. This authority does not apply to capital costs for construction of facilities.
Delta Ecosystem Enhancement	Water Infrastructure Improvements for the Nation Act, 2015-2016 (Public Law114-322)	Provides authorization for Federal funding of surface storage projects that yield Federal benefits, including water supplies dedicated to specific purposes such as environmental enhancement and wildlife refuges.
Anadromous Fish	Water Infrastructure Improvements for the Nation Act, 2015-2016 (Public Law114-322)	Provides authorization for Federal funding of surface storage projects that yield Federal benefits, including water supplies dedicated to specific purposes such as environmental enhancement and wildlife refuges.
Flood Damage Reduction	Reclamation Project Act of 1939	Discussed in Section 9(b) of the act. "*In connection with any new project…there may be allocated to flood control or navigation the part of said total estimated cost which the Secretary may find proper.*"
Recreation [1]	Federal Water Project Recreation Act of 1965, as amended by the Reclamation Recreation Management Act (Public Law 102-575)	Public Law 102-575 provides Federal share of up to 50% for separable investment costs, and non-Federal share of 100% for OM&R.

Notes:

[1] The Investigation is not pursuing Federal funding for the M&I water supply, irrigation water supply, flood damage reduction and recreation project benefit categories. The Investigation is pursuing Federal funding for CVP Operational Flexibility and Anadromous Fish capital costs under the WIIN Act. The authorities listed for these project benefit categories were considered during initial determinations of Federal interest in the Investigation. Construction under these authorities would need to be authorized by a specific act of Congress.

[2] Total cost interpreted as total capital cost.

CVP = Central Valley Project
Delta = Sacramento–San Joaquin River Delta
IDC = interest during construction
IL4 = Incremental Level 4
M&I = municipal and industrial
OM&R = operation, maintenance, and replacement
USC = United States Code
WIIN ActWater Infrastructure Improvements for the Nation Act

L.5 State Authority

In November 2014, California voters passed funding for the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1), a $7.5 billion water bond that will make needed investments in California's water management systems. Proposition 1 dedicates $2.7 billion for investments in water storage projects and designated the California Water Commission as the agency responsible for appropriately allocating these funds. The California Water Commission, through the Water Storage Investment Program, will fund the public benefits of eligible projects. Eligible projects must also provide measurable benefits to the Sacramento–San Joaquin River Delta (Delta) ecosystem or its tributaries.

Projects that may be funded by the State under Proposition 1 were selected by the California Water Commission through a competitive public process based on a project's expected return on the public investment, as measured by the magnitude of the public benefits provided. The public benefits categories defined by Proposition 1 include the following:

1. *Ecosystem improvements, including changing the timing of water diversions, improvement in flow conditions, temperature, or other benefits that contribute to restoration of aquatic ecosystems and native fish and wildlife, including those ecosystems and fish and wildlife in the Delta.*
2. *Water quality improvements in the Delta, or in other river systems, that provide significant public trust resources, or that clean up and restore groundwater resources.*
3. *Flood control benefits, including, but not limited to, increases in flood reservation space in existing reservoirs by exchange for existing or increased water storage capacity in response to the effects of changing hydrology and decreasing snow pack on California's water and flood management system.*
4. *Emergency response, including, but not limited to, securing emergency water supplies and flows for dilution and salinity repulsion following a natural disaster or act of terrorism.*
5. *Recreational purposes, including, but not limited to, those recreational pursuits generally associated with the outdoors.*

Article 4 of Chapter 8 of Proposition 1 identifies limitations regarding funding of public benefits. Proposition 1 limits funding in relation to quantified public benefits as follows:

a) *Ecosystem improvement benefits must be at least 50 percent of total public benefits requested for funding. If non-ecosystem public benefits are more than ecosystem public benefits, then the difference is not eligible for funding.*

b) *The public benefit cost share of a project, other than conjunctive use and reservoir reoperation projects, may not exceed 50 percent of the total costs of the project.*

c) *The entire package of public benefits provided by the project must be provided in a cost-effective manner.*

The Authority is pursuing funding for Sites Reservoir from the State of California under the Water Storage Investment Program component of Proposition 1. The State has made a provisional decision that the project is eligible for $816 million and this has been included in the initial cost allocation. State funds would be used for a portion of the non-Federal costs presented in subsequent sections. They are unlikely to impact Federal funding. The Commission awarded funds for ecosystem improvement (Incremental Level 4 water supply and Delta ecosystem improvement),

flood damage reduction, and recreation. No specific funding amount was tied to an individual project objective in the provisional funding decision.

L.6 Initial Cost Allocation

This chapter presents the cost allocation by purpose for Alternatives A1 and D1. Alternative D1 is the NED Plan, but the two alternatives have comparable net NED benefits and BCRs. Moreover, these two alternatives represent the range of reservoir sizes that the Authority is considering as it "right sizes" the project to meet the needs of its member agencies. This initial cost allocation uses the SCRB method.

Single-Purpose Alternative Costs

A single-purpose alternative cost is the cost of the most probable alternative providing the same level of benefit for that purpose as the entire multipurpose project. The single-purpose project cost is used to determine the justifiable expenditure for any given purpose by comparing it to its respective purpose's benefits.

Single-Purpose Alternative Requirements for Water Supply Purposes

The five project purposes of the delivery of water from Sites Reservoir include: M&I and Agricultural Water Supply; CVP Operational Flexibility; Incremental Level 4 Water Supply for CVPIA Refuges; Anadromous Fish (through water exchanges with Shasta Reservoir); and Delta Ecosystem Enhancement. Therefore, it was recognized that these water supply–dependent purposes require similar project facilities. The size of Sites Reservoir may be modified, depending on the amount of water to be provided for each purpose; and modification would be accomplished by varying the size of the earthen embankment dams. The conveyance systems to achieve these five project purposes are believed to be essentially the same. The actual size of the conveyance systems would be determined through the process of permitting the diversions and obtaining water rights. It is likely that the conveyance system would need to have significant capacity to fill even a smaller reservoir within the anticipated windows for permittable diversions.

For these five purposes, the least-cost single-purpose alternative projects were identified that could provide new water supplies equivalent to those that would be delivered by the project. See Table 9-4 for quantification of deliveries.

For the M&I and Agricultural Water Supply, it was assumed that the single-purpose alternative would need to be capable of providing a long-term average water supply of 115 thousand acre-feet (TAF) per year (Alternative A1) and 131 TAF (Alternative D1). In dry and critical years, a water supply of 248 TAF per year (Altnerative A1) and 289 TAF (Alternative D1) is required. It was also assumed that the single-purpose alternative would need to provide water supplies to both north-of-the-Delta and south-of-the-Delta beneficiaries.

For the CVP Operational Flexibility, under Alternative A1 the single-purpose alternative would need to be capable of providing a long-term average water supply of 69 TAF per year, and 87 TAF per year in dry and critical years. Under Alternative D1 the single-purpose alternative would need to be capable of providing a long-term average water supply of 73 TAF per year, and 114 TAF per year in dry and critical years. It was assumed that the single-purpose alternative would also need to provide water supplies to north-of-the-Delta and south-of-the-Delta beneficiaries.

For the Incremental Level 4 Water Supply for CVPIA Refuges, under Alternative A1 an average annual supply of 32 TAF per year is required, with a dry-year and critical-year supply of 44 TAF per

year. Under Alternative D1 an average annual supply of 34 TAF per year is required, with a dry-year and critical-year supply of 48 TAF per year is required for Incremental Level 4 Water Supply for CVPIA Refuges. See Table 9-4 for quantification of deliveries.

For Anadromous Fish benefits, an average annual supply of 132 TAF per year is required, and 198 TAF per year in dry and critical water years. Alternatively, a single-purpose alternative would increase the average annual numbers of salmon in the upper Sacramento River by about 986,000 juveniles. For the Delta ecosystem enhancement water supply, an average annual supply of 32 to 34 TAF per year is required, with a dry-year and critical-year supply of 51 to 57 TAF per year.

The potential single-purpose alternative projects had to have adequate design and cost analysis available to support the evaluation. Limited hydrology was available to support this analysis. Available hydrologic modeling data were used, and in some cases, extrapolated.

Screening and Selection of Single-Purpose Alternatives for Large Water Supply Purposes

All the water supply purposes require substantial quantities of reliable water deliveries. The very large quantities required by the project's water supply, CVP operational flexibility, and anadromous fish purposes and their large service area eliminate many smaller storage or water supply projects from consideration. Large-scale use of groundwater or water transfers as stand-alone measures have limited reliability for quantities of water this large. Desalination was also determined to be ineligible due to both its high cost and inability to readily serve north-of-the-Delta supply needs.

However, both the Incremental Level 4 Water Supply for CVPIA Refuges and Delta Ecosystem Enhancement purposes required smaller average water deliveries with annual averages varying from between 32 and 57 TAF) to a more limited service area. Therefore, other non-infrastructural water sources were determined to be more viable as lower-cost alternatives for meeting their water supply requirements than single-purpose development of Sites Reservoir.

Based on research and consultation with Reclamation planners, six potential reservoir projects were identified and assessed as potential alternative water supply projects: Thomas-Newville Reservoir (Glenn County); Colusa Reservoir Complex (Colusa/Glenn Counties); Cottonwood Creek Reservoir Complex (Tehama/Shasta Counties); Red Bank Project (Tehama County); Auburn Reservoir (Placer County); and Shasta Lake Enlargement (Shasta County).

Review of the proposed reservoirs determined that the four reservoir projects located north of the Delta were equal in cost or more costly than the Sites Reservoir Project (see Chapter 4 and Table A-7). Consequently, these four projects (Thomas-Newville Reservoir, Colusa Reservoir Complex, Cottonwood Creek Reservoir Complex, and Red Bank Project) were dismissed from further consideration.

The Shasta Lake Enlargement project was also analyzed as a potential alternative to the project. As discussed in Section C.6, the Shasta Lake Enlargement project was identified and used as the "least-cost alternative" to determine the project's anadromous fish benefits, based on its projected improvement in salmon habitat units. The 18.5-foot dam raise scenario for the Shasta Lake enlargement would result in a 634 TAF storage increase, an increase that can provide up to approximately 110 TAF per year in dry and critical years. Therefore, the Shasta Lake Enlargement project's water supply capabilities would be insufficient to meet the levels required for the North-of-the-Delta Offstream Storage (NODOS) project's water supply purpose. Existing operational

commitments and constraints further limit any possibility that the 18.5-foot dam raise scenario could be operated to meet the quantities required for NODOS project purposes.

The Auburn Reservoir project was also considered as a possible alternative for achieving the project's water supply benefits, because no other potential projects with suitable cost information and operations analysis were identified that could provide a similar quantity of water for both north-of-the-Delta and south-of-the-Delta purposes and users. Single-purpose alternative cost estimates of Auburn Reservoir as a large single-purpose water supply project alternative to the Sites Reservoir Project were developed based on a past feasibility analysis (Reclamation 2006c), which was adjusted to remove the separable costs of hydropower generation. Both the operations and potential deliveries from Auburn Dam were modeled using CALSIM II in the *Folsom South Unit Special Report Benefits and Cost Update*, December 2006.

This analysis determined that the development cost for the Auburn Reservoir project would be substantially higher than the development cost for the Sites Reservoir Project. In addition, development of the Auburn Reservoir project faces major, and possibly insurmountable, permitting and approval challenges. Consequently, it is considered unlikely that Auburn Dam could be developed as an alternative water supply source, and it would be more costly to develop than Sites Reservoir.

Based on the findings from the preliminary screening assessment and subsequent analysis, it was decided to consider single-purpose variations on the Sites Reservoir Project to support the cost allocation for water supply and CVP operational flexibility purposes. Single-purpose alternative costs for these purposes were determined based on an assessment of the approximate reservoir size that would be adequate to meet each purpose's total average annual yield (with consideration, as necessary, of dry and critical delivery quantities).

Single-purpose variations on the Sites Reservoir Project to provide the water supplies required by the anadromous fish purpose were also similarly considered by the cost allocation analysis. However, the benefit valuation for the project's anadromous fish purpose used a least-cost alternative approach of Shasta Reservoir Enlargement. (See Section C.6 – Anadromous Fish) Consequently, the single-purpose alternative for the anadromous fish purpose was based on the Shasta Reservoir Enlargement with the same value as that determined for its benefit valuation.

The likely reservoir size of single-purpose alternatives was determined by extrapolation of existing data and engineering judgment. Construction costs were similarly developed using the information for Alternatives A, B, C and D. For the water supply alternatives, cost reductions resulted from the full project result from either reduced sizing (e.g., lowering of Golden Gate and Sites Dams) or removal of project components (e.g., turbines for pumpback generation, Holthouse Reservoir, and recreation facilities) that were not associated with the single-purpose use. The OM&R costs for the single-purpose alternatives were estimated proportional to those for the full project (adjusted to account for the separable OM&R costs of other project purposes), and any applicable separable OM&R costs (e.g., conveyance energy costs) were also included.

The relatively narrow variance between the single-purpose cost estimates reflects the high proportion of fixed costs required for the service levels associated with any of these four purposes. The project costs for pipeline, pumping, inlet and outlet structures, and roadway improvements are largely independent of reservoir capacity. In addition, a major proportion of the construction work

required for reservoir enlargement is relatively inexpensive compared to the costs for supporting infrastructure facilities.

Single-Purpose Alternatives for Incremental Level 4 and Delta Ecosystem Enhancement Purposes

Single-purpose development of Sites Reservoir for both Incremental Level 4 Water Supply for CVPIA Refuges and Delta Ecosystem Enhancement purposes was determined to be an overly costly approach for meeting the service requirements of these purposes, which require smaller average annual water deliveries for both Incremental Level 4 (IL4) Water Supply for CVPIA Refuges (32 and 34 TAF) and for Delta Ecosystem Enhancement purposes (51 and 57 TAF). These water quantities would also be delivered to a more limited service area. Consequently, non-infrastructural water sources (i.e., water transfer purchases) were determined to be more viable as lower cost alternatives for the water supply requirements of these purposes. However, water transfers may nonetheless be expected to underrepresent the benefits from the development of a new water supply source, because the land fallowing required for the transfers would also result in lost productivity and losses in local economic activity. Also, future water supply reliability would be greater from the Sites Reservoir Project than from water transfers, which would be more vulnerable to water supply shortages during dry and critical water years, especially over more extended drought periods.

As discussed above, water transfer pricing valuations were used to estimate the alternative cost for Incremental Level 4 Water Supply for Refuges (Section C.4) and Delta Ecosystem Enhancement purposes (Section C.11). Consequently, the single-purpose alternative cost for both purposes will be slightly higher than their respective benefit valuations which are based on lower adjusted SWAP adjusted-based valuations.

Single-Purpose Alternative for the Recreation Purpose

The value of recreation in the Sites Reservoir Project's geographic area is questionable without a large reservoir. However, several major project components would not be necessary to support recreational use of the large reservoir. More specifically, the Sacramento River Pumping-Generating Plant, Sacramento River Fish Screening Structure, and Delevan Pipeline facilities would not be required. The single-purpose project would still include the ability to fill Sites Reservoir from the Tehama-Colusa (T-C) and Glenn-Colusa Irrigation District (GCID) Main Canals, so the Sites and Terminal Regulating Reservoir (TRR) pumping/generating plants would be necessary. The bridge would also be required to provide access for recreation at the facilities on the western side of the reservoir.

The development cost for the excluded facilities, taken together, is estimated to total $1,279 million. This cost is excluded from the Sites Reservoir Project's total development cost to determine the development cost of the single-purpose alternative for recreation. As a result, the development cost of the single-purpose alternative for recreation is estimated to be $4,385 million, with a corresponding annualized development cost of $129.2 million. The OM&R cost for the recreation single-purpose alternative would be less than half ($12.8 million) that for the total project, because its water wheeling, pumping, and generation would be reduced to just the operations necessary to maintain reservoir conditions that are comparable to the project levels, and to offset reservoir water losses from evaporation and seepage. As a result, the single-purpose alternative cost for recreation was determined to be $141.9 million.

Single-Purpose Alternative for the Flood Reduction Purpose

The flood damage reduction benefits for the Sites Reservoir Project are primarily derived from the construction of Sites Dam on Stone Corral Creek. Flooding associated with this creek has been an ongoing source of flood damages, including the flooding of Maxwell and Interstate 5 in 2017. The single-purpose cost for the flood reduction purpose is derived from the development cost for a new reservoir on Stone Corral Creek for flood control purposes. Stone Corral Creek has a 100-year discharge of 7,870 cubic feet per second (cfs). Approximately 3,900 acre-feet of storage would be needed to retain 6 hours of flow to attenuate the peak flow downstream. The cost to develop a small offstream reservoir on Stone Corral Creek with the associated access roads and real estate is estimated to be $91 million. The development cost for these project components is estimated to total approximately $93 million (including approximately $2 million in IDC), with an estimated annualized cost of $2.7 million. The future OM&R cost for these facilities is estimated to be approximately $0.2 million per year. As a result, the single-purpose alternative cost for flood reduction was determined to be $2.9 million.

Description of Single-Purpose Alternative Costs

Single-purpose alternatives for Alternative A1 are described as follows:

- **Water Supply** – The single-purpose alternative would require construction of Sites Reservoir with a storage capacity of about 510,000 acre-feet. This would be sufficient to allow for average annual deliveries of about 115,000 acre-feet.
- **CVP Operational Flexibility** – A supply-based single-purpose alternative would require construction of Sites Reservoir with a storage capacity of about 315,000 acre-feet (this size was extrapolated below the available range of previously modeled alternatives). This would be sufficient to allow for average annual deliveries of about 69,000 acre-feet.
- **IL4 Water Supply for CVPIA Refuges** – The least-cost alternative for this purpose is based on projected cost of future water transfer purchases for the required 34,000 acre-feet of average annual water supply deliveries.
- **Anadromous Fish** – A water supply–based single-purpose alternative would require construction of Sites Reservoir with a storage capacity of about 610,000 acre-feet (this size was extrapolated below the available range of previously modeled alternatives). This would be sufficient to allow for average annual deliveries of about 138,000 acre-feet. This would allow for increasing the coldwater pool in Shasta Reservoir to increase the average annual numbers of salmon in the upper Sacramento River by about 214,000 juveniles. However, the single-purpose alternative for the anadromous fish purpose is instead determined more directly by projected fish population improvements, and based on the least-cost alternative of Shasta Lake Enlargement that was developed for the anadromous fish benefit valuation.
- **Delta Ecosystem Enhancement** – The least-cost alternative for this purpose is based on projected cost of future water transfer purchases for the required 57,000 acre-feet of average annual water supply deliveries.
- **Recreation** – The single-purpose alternative would require construction of the full-sized Sites Reservoir for water-related activities, and would provide comparable recreational experiences. However, Holthouse Reservoir, Sacramento River Pumping-Generating Plant, Sacramento River Fish Screening Structure, and Delevan Pipeline facilities would not be required. OM&R costs for water wheeling, pumping, and generation would be limited to

only those operations necessary to maintain reservoir conditions comparable to the project levels.

- **Flood Reduction** – Construction of a new Stone Corral Creek Reservoir would be sufficient to reduce the water floods of Stone Corral flows during major rain events, and to protect the city of Maxwell and Interstate 5 in the future from floods like the February 2018 flood.

Single-purpose alternatives for Alternative D1 are described as follows:

- **Water Supply** – The single-purpose alternative would require construction of Sites Reservoir with a storage capacity of about 580,000 acre-feet. This would be sufficient to allow for average annual deliveries of about 131,000 acre-feet. This is greater than the alternatives previously evaluated by California Department of Water Resources (DWR).
- **CVP Operational Flexibility** – A supply-based single-purpose alternative would require construction of Sites Reservoir with a storage capacity of about 330,000 acre-feet (this size was extrapolated below the available range of previously modeled alternatives). This would be sufficient to allow for average annual deliveries of about 73,000 acre-feet.
- **IL4 Water Supply for CVPIA Refuges** – The least-cost alternative for this purpose is based on projected cost of future water transfer purchases for the required 34,000 acre-feet of average annual water supply deliveries.
- **Anadromous Fish** – A water supply–based single-purpose alternative would require construction of Sites Reservoir with a storage capacity of about 680,000 acre-feet (this size was extrapolated below the available range of previously modeled alternatives). This would be sufficient to allow for average annual deliveries of about 164,000 acre-feet. This would allow for increasing the coldwater pool in Shasta Reservoir to increase the average annual numbers of salmon in the upper Sacramento River by about 268,000 juveniles. However, the single-purpose alternative for the anadromous fish purpose is instead determined more directly by projected fish population improvements, and based on the least-cost alternative of Shasta Lake Enlargement that was developed for the anadromous fish benefit valuation.
- **Delta Ecosystem Enhancement** – The least-cost alternative for this purpose is based on projected cost of future water transfer purchases for the required 51,000 acre-feet of average annual water supply deliveries.
- **Recreation** – The single-purpose alternative would require construction of the full-sized Sites Reservoir for water-related activities, and would provide comparable recreational experiences. However, Holthouse Reservoir, Sacramento River Pumping-Generating Plant, Sacramento River Fish Screening Structure, and Delevan Pipeline facilities would not be required. OM&R costs for water wheeling, pumping, and generation would be limited to only those operations necessary to maintain reservoir conditions comparable to the project levels.
- **Flood Reduction** – Construction of a new Stone Corral Creek Reservoir would be sufficient to reduce the water floods of Stone Corral flows during major rain events, and to protect the city of Maxwell and Interstate 5 in the future from floods like the February 2018 flood.

Table L-2 provides the single-purpose cost estimates for both Alternative A1 and Alternative D1.

Table L-2. Summary of Estimated Costs of Single-Purpose Alternatives ($2019 Dollars)

Purpose	TAF	Capital Cost ($M)	Annual ($M/yr)	Annual OM&R ($M/yr)	Total Annual Cost ($M/yr)
Alternative A1					
Water Supply[1]	115	$4,059	$119.5	$29.5	$149.0
CVP Operational Flexibility[1]	69	$3,890	$114.6	$20.1	$134.6
Incremental Level 4 Refuge[2]	32	na	na	na	$24.7
Anadromous Fish[2]	138	na	na	na	$14.4
Delta Ecosystem Enhancement[2]	57	na	na	na	$23.7
Recreation[1]	na	$4,385	$129.2	$12.8	$142.0
Flood Reduction	na	$93	$2.7	$0.2	$2.9
Alternative D1					
Water Supply[1]	131	$4,118	$121.3	$31.8	$153.1
CVP Operational Flexibility[1]	73	$3,904	$115.0	$19.9	$134.9
Incremental Level 4 Refuge[2]	34	na	na	na	$26.0
Anadromous Fish[2]	164	na	na	na	$18.0
Delta Ecosystem Enhancement[2]	51	na	na	na	$20.5
Recreation[1]	na	$4,385	$129.2	$12.8	$142.0
Flood Reduction	na	$93	$2.7	$0.2	$2.9

Notes:

[1] Annual cost includes interest and amortization based on a 2.75 percent Federal discount rate over 100 years.

[2] Annual cost based on estimated annual water transfers costs to meet purpose requirements

Totals may not sum exactly due to rounding.

$M/yr = million dollars per year
na = not applicable
OM&R = operation, maintenance, and replacement
TAF = thousand acre feet

Separable Costs

A project purpose's separable cost is the difference between the cost of the multipurpose project, and the cost of the project with the purpose omitted. The separable costs were subtracted from the justifiable expenditure to determine the remaining justifiable expenditure in the SCRB cost allocation process. Separable costs with the project purpose omitted were identified for the following project purposes:

- **Without Water Supply** – Without the Water Supply (i.e. Agricultural and M&I for the Authority's beneficiaries) purpose, the project would still require the reservoir, pumping facilities, and conveyance facilities to provide for increased CVP Operational Flexibility, Delta Ecosystem Enhancement, IL4 Water Supply for CVPIA Refuges, Anadromous Fish, flood reduction and recreation benefits. Therefore, there would be no separable capital costs for the Water Supply water supply purpose.

Separable energy use conveyance costs for the M&I and agricultural water supply deliveries are estimated to average approximately $9.7 million per year under Alternative A1 and $11.7 million under Alternative D1.

conveyance facilities to provide for increased Water Supply, Delta Ecosystem Enhancement, IL4 Water Supply for CVPIA Refuges, Anadromous Fish, flood reduction and recreation benefits. Therefore, there would be no separable capital costs for the CVP Operational Flexibility water supply purpose.

Separable conveyance costs for the CVP Operational Flexibility deliveries are estimated to average approximately $1.1 million per year under Alternative A1 and $0.9 million per year under Alternative D1.

- **Without IL4 Water Supply for CVPIA Refuges** – Without the IL4 Water Supply for CVPIA Refuges purpose, the project would still require the reservoir, pumping facilities, and conveyance facilities to provide for increased Water Supply, CVP Operational Flexibility, Delta Ecosystem Enhancement, Anadromous Fish, flood reduction and recreation benefits. Therefore, there would be no separable capital costs for the IL4 Water Supply for CVPIA Refuges purpose.

  Separable costs for the conveyance of IL4 Water Supply to CVPIA Refuge deliveries from the Delevan pipeline to the refuge boundaries are estimated to average approximately $0.7 million per year under Alternative A1 and $0.7 million per year under Alternative D1.

- **Without Anadromous Fish** – Without the Anadromous Fish purpose, the project would still require the reservoir, pumping facilities, and conveyance facilities to provide for increased Water Supply, CVP Operational Flexibility, Delta Ecosystem Enhancement, IL4 Water Supply for CVPIA Refuges, flood reduction and recreation benefits. Therefore, there would be no separable capital costs for the Anadromous Fish water supply purpose.

  There would be no separable conveyance energy or other O&M costs solely for the Anadromous Fish purpose.

- **Without Flood Damage Reduction** – Without the Flood Damage Reduction purpose, the project would still require the reservoir, pumping facilities, and conveyance facilities to provide for increased Water Supply, CVP Operational Flexibility, Delta Ecosystem Enhancement, Anadromous Fish and recreation benefits. Therefore, there would be no separable capital costs for the IL4 Water Supply for Flood Damage Reduction purpose.

  There would be no separable conveyance energy or other O&M costs solely for the Flood Damage Reduction purpose.

- **Without Recreation** – Without the recreation purpose, the project would still require the reservoir, pumping facilities, and conveyance facilities to provide for increased Water Supply, CVP Operational Flexibility, IL4 Water Supply for CVPIA Refuges, Delta Ecosystem Enhancement, Anadromous Fish and flood reduction benefits. However, there would be $27.2 million in recreation-related facilities that would not be required. As a result the separable development cost for the facilities solely required for recreation are estimated to total $27.9 million (i.e., including $0.7 million in IDC) and would have an equivalent annualized cost of $0.8 million.

  In addition, estimated separable OM&R costs of $0.2 million would be incurred solely by the recreation operations. As a result, the total separable cost for recreation is estimated to be $1.0 million per year.

Joint Costs

The joint cost is the cost of facilities that serve two or more project purposes. The cost is the difference between the cost of the multipurpose project and the sum of the separable costs, as shown above. The joint cost is allocated to each purpose based on remaining justifiable benefits, which is the justifiable expenditure minus any corresponding separable costs.

Most of the project's OM&R costs are joint costs shared by all project purposes. The project's joint OM&R costs, which support all project purposes, include operations staffing, wheeling charges, and the "release only" generated power and pumping costs needed by the reservoir's operations.

Allocated Costs

The SCRB method allocates costs among beneficiaries proportional to the remaining justifiable benefits after separable costs are removed. Determination of the construction cost allocation is an essential part of the multipurpose planning process in which cost-sharing is required. The SCRB method provides the Federal Government with information needed to determine the magnitude and share of estimated project construction costs between project purposes. Cost allocation information is important for assessing plan acceptability. During subsequent planning and construction, the SCRB analysis provides the information required for allocating actual expenditures consistent with plan formulation and allocation principles.

The annual construction cost allocated to each project purpose is the total annual cost with OM&R costs and IDC removed.

Annual Cost – OM&R Cost – IDC Cost = Construction Cost

Annual separable costs are subtracted from the total annual cost to determine the total annual joint cost. The resulting allocated joint cost is based on the percentage of the remaining justifiable benefits of each project purpose. The total allocated costs are the sum of separable costs and allocated joint costs.

A similar approach is used to allocate OM&R costs. The total allocated joint OM&R costs for the project are calculated by subtracting the total separable OM&R costs from total OM&R costs of the project. The remaining total OM&R joint cost is then allocated between the project purposes based on the same percentages determined for allocating the total remaining justifiable expenditures between the project purposes.

The total allocated joint cost is calculated by subtracting the total separable construction cost from the project's total construction cost. The remaining total construction joint cost is then allocated between the project purposes, based on the same percentages determined for allocating the total remaining justifiable expenditures between the project purposes.

In the SCRB analysis, annual separable costs are subtracted from the total annual cost to determine the total annual joint cost. The resulting allocated joint cost is based on the percentage of the remaining benefits of each project purpose. The total allocated costs are the sum of the separable annual costs and the allocated annual joint costs. This approach can be used for developing allocated annual OM&R, annual capital, annual total, total construction, total IDC, and total capital costs.

Table L-3 shows the initial SCRB analysis and annual cost allocation by project purpose for Alternative A1. Table L-4 shows the corresponding total cost allocation for Alternative A1. Table L-5 shows the initial SCRB analysis and annual cost allocation by project purpose for Alternative D1. Table L-6 shows the corresponding total cost allocation for Alternative D1.

Table L-3. Initial SCRB Analysis and Annual Cost Allocation Summary for Alternative A1 ($ Millions) ($2019)

Item	Calculation	Water Supply	CVP Operational Flexibility	IL4 Water Supply for CVPIA Refuges	Anadromous Fish	Delta Ecosystem Enhance	Recreation	Flood Damage Reduction	Total
		A	B	C	D	E	F	G	T
SCRB Analysis									
1 Average Annual Benefits		$138.6	$47.1	$19.6	$14.4	$16.7	$2.4	$4.6	$243.5
2 Single-Purpose Projects		$149.3	$134.8	$24.7	$14.4	$23.7	$133.6	$2.8	-
3 Justifiable Expenditure	minimum of (1) or (2)	$138.6	$47.1	$19.6	$14.4	$16.7	$2.4	$2.8	$241.7
4 Separable Annual Costs		$10.0	$1.2	$0.4	$0.0	$0.0	$1.0	$0.0	$12.6
5 Remaining Benefits / Justifiable Expenditure	(3) - (4)	$128.6	$45.9	$19.2	$14.4	$16.7	$1.4	$2.8	$229.1
6 % Remaining Benefits	(A5 to F5) ÷ (T5)	56.1%	20.0%	8.4%	6.3%	7.3%	0.6%	1.2%	100%
7 Allocated Joint Costs	(A6 to F6) x (T7)	$120.9	$43.2	$18.0	$13.5	$15.7	$1.4	$2.7	$215.4
8 Total Allocated Costs	(4) + (7)	$130.9	$44.4	$18.4	$13.5	$15.7	$2.4	$2.7	$228.0
OM&R Annual Costs [1]									
9 Separable OM&R Cost		$10.0	$1.2	$0.4	$0.0	$0.0	$0.2	$0.0	$11.8
10 % Remaining Benefits	(6)	56.1%	20.0%	8.4%	6.3%	7.3%	56.1%	1.2%	100%
11 Allocated Joint OM&R Cost	(A10 to F10) x (T11)	$16.6	$5.9	$2.5	$1.9	$2.2	$0.2	$0.4	$29.6
12 Total OM&R Allocated Costs	(9) + (11)	$26.6	$7.1	$2.9	$1.9	$2.2	$0.4	$0.4	$41.4
Construction Annual Cost									
13 Separable Construction		$0.0	$0.0	$0.0	$0.0	$0.0	$0.8	$0.0	$0.8
14 % Remaining Benefits	(6)	56.1%	20.0%	8.4%	6.3%	7.3%	0.6%	1.2%	100%
15 Allocated Joint Construction	(A14 to F14) x (T15)	$92.8	$33.1	$13.8	$10.4	$12.1	$1.8	$2.0	$165.3
16 Total Allocated Construction	(13) + (15)	$92.8	$33.1	$13.8	$10.4	$12.1	$2.6	$2.0	$166.1
IDC Annual Cost									
17 Separable IDC		$0.0	$0.0	$0.0	$0.0	$0.0	$0.02	$0.0	$0.02
18 % Remaining Benefits	(6)	56.1%	20.0%	8.4%	6.3%	7.3%	0.6%	1.2%	100%
19 Allocated Joint IDC	(A18 to F18) x (T19)	$11.5	$4.1	$1.7	$1.3	$1.5	$0.1	$0.3	$20.5
20 Total Allocated IDC	(17) + (19)	$11.5	$4.1	$1.7	$1.3	$1.5	$0.2	$0.3	$20.5

Notes:
[1] Includes OM&R for facilities and conveyance costs for deliveries.
Annual costs shown in 2019 dollars based on 2.75 percent discount rate and 100-year period of analysis. Totals may not sum exactly due to rounding.
% = percent
CVP = Central Valley Project
CVPIA = Central Valley Project Improvement Act
IL4 = Incremental Level 4
OM&R = operation, maintenance, and replacement

Table L-4. Initial Total Cost Allocation Summary for Alternative A1 ($ Millions) ($2019)

Item	Calculation	Water Supply	CVP Operational Flexibility	IL4 Water Supply for CVPIA Refuges	Anadromous Fish	Delta Ecosystem Enhance	Recreation	Flood Damage Reduction	Total
		A	B	C	D	E	F	G	T
Allocation of Capital Cost (Construction + IDC)									
1 Separable Capital Cost		$0	$0	$0	$0	$0	$28	$0	$28
2 % Remaining Benefits	(6) of Table L-3	56.1%	20.0%	8.4%	6.3%	7.3%	0.6%	1.2%	100%
3 Allocated Joint Capital Cost	(A2 to E3) x (T3)	$3,639	$1,299	$543	$408	$473	$41	$80	$6,482
4 Total Allocated Capital Cost	(1) + (3)	$3,639	$1,299	$543	$408	$473	$69	$80	$6,510
Allocated IDC Costs									
5 Separable IDC Costs		$0	$0	$0	$0	$0	$0.8	$0	$0.8
6 % Remaining Benefits	(6) of Table L-3	56.1%	20.0%	8.4%	6.3%	7.3%	0.6%	1.2%	100%
7 Allocated Joint IDC Costs	(A6 to E6) x (T7)	$402	$143	$60	$45	$52	$4	$9	$715
8 Total Allocated IDC Costs	(5) + (7)	$402	$143	$60	$45	$52	$5	$9	$716
Allocated Construction Costs									
9 Separable Construction Costs		$0	$0	$0	$0	$0	$27	$0	$27
10 % Remaining Benefits	(6) of Table L-3	56.1%	20.0%	8.4%	6.3%	7.3%	0.6%	1.2%	100%
11 Allocated Joint Construction Cost	(A10 to E10) x (T11)	$3,238	$1,156	$483	$363	$421	$36	$71	$5,767
12 Total Allocated Construction Cost	(9) + (11)	$3,238	$1,156	$483	$363	$421	$64	$71	$5,794

Notes:
Costs shown in 2019 dollars and interest and amortization based on 2.75 percent discount rate and 100-year period of analysis. Totals may not sum exactly due to rounding.
% = percent
CVP = Central Valley Project
CVPIA = Central Valley Project Improvement Act
IDC = interest during construction
IL4 = Incremental Level 4
OM&R = operation, maintenance, and replacement

Table L-5. Initial SCRB Analysis and Annual Cost Allocation Summary for Alternative D1 ($ Millions) ($2019)

Item	Calculation	Water Supply	CVP Operational Flexibility	IL4 Water Supply for CVPIA Refuges	Anadromous Fish	Delta Ecosystem Enhance	Recreation	Flood Damage Reduction	Total
		A	**B**	**C**	**D**	**E**	**F**	**G**	**T**
SCRB Analysis									
1 Average Annual Benefits		$161.7	$48.4	$20.7	$18.0	$14.5	$2.4	$4.6	**$270.4**
2 Single-Purpose Projects		$153.5	$135.0	$26.0	$18.0	$20.5	$133.6	$2.8	**-**
3 Justifiable Expenditure	minimum of (1) or (2)	$153.5	$48.4	$20.7	$18.0	$14.5	$2.4	$2.8	**$260.4**
4 Separable Annual Costs		$12.1	$1.0	$0.4	$0.0	$0.0	$1.0	$0.0	**$14.5**
5 Remaining Benefits / Justifiable Expenditure	(3) - (4)	$141.4	$47.4	$20.3	$18.0	$14.5	$1.5	$2.8	**$245.9**
6 % Remaining Benefits	(A5 to F5) ÷ (T5)	57.5%	19.3%	8.2%	7.3%	5.9%	0.6%	1.1%	**100%**
7 Allocated Joint Costs	(A6 to F6) x (T7)	$138.5	$46.4	$19.9	$17.7	$14.2	$1.5	$2.8	**$240.9**
8 Total Allocated Costs	(4) + (7)	**$150.6**	**$47.4**	**$20.3**	**$17.7**	**$14.2**	$2.5	$2.8	**$255.4**
OM&R Annual Costs [1]									
9 Separable OM&R		$12.1	$1.0	$0.4	$0.0	$0.0	$0.2	$0.0	**$13.7**
10 % Remaining Benefits	(6)	57.5%	19.3%	8.2%	7.3%	5.9%	0.6%	1.1%	**100%**
11 Allocated Joint OM&R Cost	(A10 to F10) x (T11)	$17.6	$5.9	$2.5	$2.2	$1.8	$0.2	$0.4	**$30.6**
12 Total OM&R Allocated Costs	(9) + (11)	**$29.7**	**$6.9**	**$2.9**	**$2.2**	**$1.8**	$0.4	$0.4	**$44.3**
Construction Annual Cost									
13 Separable Construction		$0.0	$0.0	$0.0	$0.0	$0.0	$0.8	$0.0	**$0.8**
14 % Remaining Benefits	(6)	57.5%	19.3%	8.2%	7.3%	5.9%	0.6%	1.1%	**100%**
15 Allocated Joint Construction	(A14 to F14) x (T15)	$107.5	$36.1	$15.4	$13.7	$11.0	$1.2	$2.1	**$187.1**

Item	Calculation	Water Supply	CVP Operational Flexibility	IL4 Water Supply for CVPIA Refuges	Anadromous Fish	Delta Ecosystem Enhance	Recreation	Flood Damage Reduction	Total
		A	**B**	**C**	**D**	**E**	**F**	**G**	**T**
16 Total Allocated Construction	(13) + (15)	$107.5	$36.1	$15.4	$13.7	$11.0	$2.0	$2.1	**$187.9**
IDC Annual Cost									
17 Separable IDC		$0.0	$0.0	$0.0	$0.0	$0.0	$0.02	$0.0	**$0.02**
18 % Remaining Benefits	(6)	57.5%	19.3%	8.2%	7.3%	5.9%	0.6%	1.1%	**100%**
19 Allocated Joint IDC	(A18 to F18) x (T19)	$13.3	$4.5	$1.9	$1.7	$1.4	$0.1	$0.3	**$23.2**
20 Total Allocated IDC	(17) + (19)	$13.3	$4.5	$1.9	$1.7	$1.4	$0.1	$0.3	**$23.2**

Notes:
[1] Includes OM&R for facilities and conveyance costs for deliveries.
Annual costs shown in 2019 dollars based on 2.75 percent discount rate and 100-year period of analysis. Totals may not sum exactly due to rounding.
% = percent
CVP = Central Valley Project
CVPIA = Central Valley Project Improvement Act
IL4 = Incremental Level 4
OM&R = operation, maintenance, and replacement

Table L-6. Initial Total Cost Allocation Summary for Alternative D1 ($ Millions) ($2019)

Item	Calculation	Water Supply	CVP Operational Flexibility	IL4 Water Supply for CVPIA Refuges	Anadromous Fish	Delta Ecosystem Enhance	Recreation	Flood Damage Reduction	Total
		A	**B**	**C**	**D**	**E**	**F**	**G**	**T**
Allocation of Capital Cost (Construction + IDC)									
1 Separable Capital Cost		$0	$0	$0	$0	$0	$28	$0	$28
2 % Remaining Benefits	(6) of Table L-3	57.5%	19.3%	8.2%	7.3%	5.9%	0.6%	1.1%	100%
3 Allocated Joint Capital Cost	(A2 to E3) x (T3)	$4,217	$1,414	$605	$538	$432	$46	$84	$7,336
4 Total Allocated Capital Cost	(1) + (3)	$4,217	$1,414	$605	$538	$432	$74	$84	$7,365
Allocated IDC Costs									
5 Separable IDC Costs		$0	$0	$0	$0	$0	$1	$0	$1
6 % Remaining Benefits	(6) of Table L-3	57.5%	19.3%	8.2%	7.3%	5.9%	0.6%	1.1%	100%

Item	Calculation	Water Supply	CVP Operational Flexibility	IL4 Water Supply for CVPIA Refuges	Anadromous Fish	Delta Ecosystem Enhance	Recreation	Flood Damage Reduction	Total
		A	B	C	D	E	F	G	T
7 Allocated Joint IDC Costs	(A6 to E6) x (T7)	$465	$156	$67	$59	$48	$5	$9	$809
8 Total Allocated IDC Costs	(5) + (7)	$465	$156	$67	$59	$48	$6	$9	$810
Allocated Construction Costs									
9 Separable Construction Costs		$0	$0	$0	$0	$0	$27	$0	$27
10 % Remaining Benefits	(6) of Table L-3	57.5%	19.3%	8.2%	7.3%	5.9%	0.6%	1.1%	100%
11 Allocated Joint Construction Cost	(A10 to E10) x (T11)	$3,752	$1,258	$538	$479	$385	$41	$75	$6,527
12 Total Allocated Construction Cost	(9) + (11)	$3,752	$1,258	$538	$479	$385	$68	$75	$6,554

Notes:
Costs shown in 2019 dollars and interest and amortization based on 2.75 percent discount rate and 100-year period of analysis. Totals may not sum exactly due to rounding.

% = percent
CVP = Central Valley Project
CVPIA = Central Valley Project Improvement Act
IDC = interest during construction
IL4 = Incremental Level 4
OM&R = operation, maintenance, and replacement

L.7 Initial Cost Assignment

This chapter describes the initial cost assignment of allocated costs as non-Federal costs, Federal costs, and non-Federal costs that may be potentially eligible as Federal costs.

Cost assignment was conducted on a purpose by purpose basis, based off relevant authorities. The assignment percentages used as the basis for assigning costs are consistent with the existing Federal authorities (see Table L-1).

The assignment of costs includes costs to accomplish all purposes consistent with the planning objectives. The cost assignment amounts to a total construction cost of $5,794 million and a total annual OM&R cost of $41.4 million for Alternative A1. Under Alternative D1, the total construction cost is $6,552 million and $44.3 million Pursuant to WIIN Act requirements, the proportion of Federal benefits are at least proportional to the Federal capital cost cost-share for the Recommended Plan.

Table L-7 provides the initial construction cost assignment for Alternative A1. It is anticipated that Federal funding for the Recommended Plan will be provided via the WIIN Act, which caps Federal funding participation at 25 percent of the total project cost; the initial allocation in Table L-7 meets this requirement. Of the construction costs allocated for the Alternative A1, 25 percent of construction costs are estimated to be Federal costs and 75 percent are estimated to be non-Federal costs. As shown in Table L-7, the Federal construction costs for the Alternative A1 would be $1,446 million.

Table L-7. Construction Cost Assignment for Federal and Non-Federal Partners: Alternative A1

			Cost Assignment ($ millions)			
	Total		Federal		Non-Federal Partners[a]	
Purpose/Action	Percent	Cost	Percent	Cost	Percent	Cost
Alternative A1: Construction Cost Assignment – Nominal Value						
Anadromous Fish	6.3%	$363	80.0%	$290	20.0%	**$73**
CVP Operational Flexibility	19.9%	$1,156	100%	$1,156		
Water Supply	55.9%	$3,238			**100%**	$3,238
M&I Water Supply	*88.9%*	*$2,878*			***100%***	*$2,878*
Agricultural Water Supply	*11.1%*	*$360*			***100%***	*$360*
Delta Ecosystem Enhancement	7.3%	$421			**100%**	**$421**
IL4 Water Supply for CVPIA Refuges	8.3%	$483			**100%**	$483
Recreation	1.1%	$64			**100%**	**$64**
Flood Damage Reduction	1.2%	$71			**100%**	**$71**
Total	**100%**	**$5,794**	**25.0%**	**$1,446**	**75.0%**	**$4,348**

Notes:

[a] Includes State and Authority members paid funding.

Sub-allocations between M&I and agricultural use are based on relative benefits.

Totals may not sum exactly due to rounding.

CVP = Central Valley Project
CVPIA = Central Valley Project Improvement Act
IDC = interest during construction
IL4 = Incremental Level 4
M&I = municipal and industrial

Table L-7 also shows cost sub-allocations by use and between beneficiaries. The construction cost sub-allocation between water supply uses (i.e., M&I and agricultural supply) is based on their relative benefits.

Table L-8 provides the initial construction cost assignment for Alternative D1. It is anticipated that Federal funding for the Recommended Plan will be provided via the WIIN Act, which caps Federal funding participation at 25 percent of the total project cost; the initial allocation in Table L-8 meets this requirement. Of the construction costs allocated for the Alternative D1, 25 percent of construction costs are estimated to be Federal costs and 75 percent are estimated to be non-Federal costs. As shown in Table L-8, the Federal construction costs for the Alternative D1 would be $1,641 million.

Table L-8 also shows cost sub-allocations by use and between beneficiaries. The construction cost and joint OM&R costs sub-allocation between water supply uses (i.e., M&I and agricultural supply) is based on their relative benefits.

Table L-8. Construction Cost Assignment for Federal and Non-Federal Partners: Alternative D-1

	Total		Cost Assignment ($ millions)			
			Federal		Non-Federal Partners[a]	
Purpose/Action	Percent	Cost	Percent	Cost	Percent	Cost
Alternative D1: Construction Cost Assignment – Nominal Value						
Anadromous Fish	7.3%	$479	80.0%	$383	20.0%	$96
CVP Operational Flexibility	19.2%	$1,258	100%	$1,258		
Water Supply	57.2%	$3,752			100%	$3,752
M&I Water Supply	*90.0%*	*$3,375*			*100%*	*$3,375*
Agricultural Water Supply	*10.0%*	*$376*			*100%*	*$376*
Delta Ecosystem Enhancement	5.9%	$385			**100%**	$385
IL4 Water Supply for CVPIA Refuges	8.2%	$538			**100%**	$538
Recreation	1.0%	$68			100%	$68
Flood Damage Reduction	1.1%	$75			100%	$75
Total	**100%**	**$6,554**	**25.0%**	**$1,641**	**75.0%**	**$4,913**

Notes:

[a] Includes State and Authority members paid funding.
Sub-allocations between M&I and agricultural use are based on relative benefits.
Totals may not sum exactly due to rounding.
CVP = Central Valley Project
CVPIA = Central Valley Project Improvement Act
IDC = interest during construction
IL4 = Incremental Level 4
M&I = municipal and industrial

As shown in Table L-9, the Federal annual OM&R costs for Alternative A1 would be $7.4 million. The assignment of OM&R costs is not subject to the same WIIN Act constraint on capital costs. Federal funds are requested for the CVP Operational Flexibility and IL4 Water Supply for CVPIA Refuges purposes. Non-Federal OM&R costs will be funded by Local Agency Partners and the State.

OM&R costs under the CVP Operational Flexibility project purpose will be assigned to beneficiaries, such as CVP contractors and other non-Federal entities, as determined through operational agreements for these supplies.

The project's non-Federal partners will pay 100 percent of the IL4 Water Supply for CVPIA Refuges purpose's OM&R expenses that are not attributable to conveyance (i.e., diversions and filling). Under the planned assignment of costs for the NED Plan, the cost to convey IL4 Water Supply for CVPIA Refuges from the Delevan pipeline discharge to the refuges would be consistent with CVPIA cost share requirements (75 percent Federal and 25 percent State). These costs would vary by year, depending on hydrology and the amount of water delivered from the project. Financial feasibility will be demonstrated through upfront payment of the construction cost.

Table L-9 also shows cost sub-allocations by use and between beneficiaries. The joint OM&R costs sub-allocation between water supply uses (i.e., M&I and agricultural supply) is based on their relative benefits. The sub-allocations of their separable OM&R costs for conveyance are based on their water delivery quantities

Table L-9. Annual OM&R Cost Assignment per WIIN for Non-Federal Partners: Alternative A1

Purpose/Action	Total Annual Percent	Total Annual Cost	Cost Assignment ($ millions per year)			
			Federal		Non-Federal Partners[a]	
			Percent	Cost	Percent	Cost
Alternative A1: OM&R Cost Assignment – Annual						
Anadromous Fish	4.5%	$1.9			100%	$1.9
CVP Operational Flexibility	17.3%	$7.1	100%	$7.1		
Water Supply	64.3%	$26.6			100%	$26.6
M&I Water Supply	*92.2%*	*$24.5*			*100%*	*$24.5*
Agricultural Water Supply	*7.8%*	*$2.1*			*100%*	*$2.1*
Delta Ecosystem Enhancement	5.2%	$2.2			100%	$2.2
IL4 Water Supply for CVPIA Refuges[b]	6.9%	$2.9	9.9%	$0.3	90.1%	$2.6
Joint		*$2.5*			*100%*	*$2.5*
Separable		*$0.4*	*75%*	*$0.3*	*25%*	*$0.1*
Recreation	0.9%	$0.4			100%	$0.4
Flood Damage Reduction	0.9%	$0.4			100%	$0.4
Total	**100%**	**$41.4**	**18.0%**	**$7.4**	**82.0%**	**$33.9**

Notes:

[a] Includes State and Authority members paid funding.

[b] OM&R costs associated with IL4 refuge water supplies can be broken down into two categories: (1) the cost of filling the reservoir, which is a joint cost that will be paid for by the Non-Federal partners, and (2) the cost of delivering water from the Delevan Pipeline Discharge to the Refuge, which a separable cost that is subject to the cost-share requirements of CVPIA. The annual OM&R cost for IL4 refuge water supply has two distinct components:

1. The cost to divert water to fill the reservoir and other reservoir O&M costs ($2.5 million for Alt A1)
2. The cost to deliver water from the reservoir (end of the Delevan Pipeline) to the refuge boundary ($0.4 million for Alt A1)

The first component is treated as a joint cost and allocated 100% to the JPA. The second component is a separable conveyance cost and subject to the 75/25 cost share requirement under CVPIA. Therefore, $0.3 million is allocated to the Federal government and $0.1 million is allocated to the non-Federal partners. The Federal government is allocated approximately 9.9% ($0.3 million) of the $2.9 million in total annual OM&R costs allocated to IL4 refuge water supply.

Sub-allocations between M&I and agricultural use are based on relative benefits and water delivery quantities.
Totals may not sum exactly due to rounding.
CVP = Central Valley Project
CVPIA = Central Valley Project Improvement Act
IL4 = Incremental Level 4
M&I = municipal and industrial
OM&R = operation, maintenance, and replacement
WIIN = Water Infrastructure Improvements for the Nation

As shown in Table L-10, the Federal annual OM&R costs for Alternative D1 would be $7.2 million. The assignment of OM&R costs is not subject to the same WIIN Act constraint on capital costs. Federal funds are requested for the CVP Operational Flexibility and IL4 Water Supply for CVPIA Refuges purposes. Non-Federal OM&R costs will be funded by Local Agency Partners and the State.

OM&R costs under the CVP Operational Flexibility project purpose will be assigned to beneficiaries, such as CVP contractors and other non-Federal entities, as determined through operational agreements for these supplies.

The project's non-Federal partners will pay 100 percent of the IL4 Water Supply for CVPIA Refuges purpose's OM&R expenses that are not attributable to conveyance (i.e., diversions and filling). Under the planned assignment of costs for the NED Plan, the cost to convey IL4 Water Supply for CVPIA Refuges from the Delevan pipeline discharge to the refuges would be consistent with CVPIA cost share requirements (75 percent Federal and 25 percent State). These costs would vary by year, depending on hydrology and the amount of water delivered from the project. Financial feasibility will be demonstrated through upfront payment of the construction cost. The Federal Government may also use existing CVPIA funding to pay for conveyance costs associated with delivering water supplies from the project to the Refuges. Non-Federal OM&R costs will be funded by Local Agency Partners and the State.

Table L-10 also shows cost sub-allocations by use and between beneficiaries. The joint OM&R costs sub-allocation between water supply uses (i.e., M&I and agricultural supply) is based on their relative benefits. The sub-allocations of their separable OM&R costs for conveyance are based on their water delivery quantities.

Table L-10. Annual OM&R Cost Assignment per WIIN for Non-Federal Partners: Alternative D1

Purpose/Action	Total Annual Percent	Total Annual Cost	Cost Assignment ($ millions per year)			
			Federal		Non-Federal Partners[a]	
			Percent	Cost	Percent	Cost
Alternative D1: OM&R Cost Assignment – Annual						
Coldwater for Anadromous Fish	5.1%	$2.2			100%	$2.2
CVP Operational Flexibility	15.6%	$6.9	100%	$6.9		
Water Supply	67.0%	$29.7			100%	$29.7
M&I Water Supply	*93.2%*	*$27.7*			*100%*	*$27.7*
Agricultural Water Supply	*6.8%*	*$2.0*			*100%*	*$2.0*
Delta Ecosystem Enhancement	4.1%	$1.8			100%	$1.8
IL4 Water Supply for CVPIA Refuges[b]	6.4%	$2.9	10.3%	$0.3	89.7%	$2.6

Purpose/Action	Total Annual Percent	Total Annual Cost	Cost Assignment ($ millions per year)			
			Federal		Non-Federal Partners[a]	
			Percent	Cost	Percent	Cost
Joint		*$2.5*			*100%*	*$2.5*
Separable		*$0.4*	*75%*	*$0.3*	*25%*	*$0.1*
Recreation	0.9%	$0.4			100%	$0.4
Flood Damage Reduction	0.8%	$0.3			100%	$0.3
Total	**100%**	**$44.3**	**16.2%**	**$7.2**	**83.8%**	**$37.1**

Notes:

[a] Includes State and Authority member paid funding.

[b] OM&R costs associated with IL4 refuge water supplies can be broken down into two categories: (1) the cost of filling the reservoir, which is a joint cost that will be paid for by the Non-Federal partners, and (2) the cost of delivering water from the Delevan Pipeline Discharge to the Refuge, which a separable cost that is subject to the cost-share requirements of CVPIA. The annual OM&R cost for IL4 refuge water supply has two distinct components:

1. The cost to divert water to fill the reservoir and other reservoir O&M costs ($2.5 million for Alt D1)
2. The cost to deliver water from the reservoir (end of the Delevan Pipeline) to the refuge boundary ($0.4 million for Alt D1)

The first component is treated as a joint cost and allocated 100% to the JPA. The second component is a separable conveyance cost and subject to the 75/25 cost share requirement under CVPIA. Therefore, $0.3 million is allocated to the Federal government and $0.1 million is allocated to the non-Federal partners. The Federal government is allocated approximately 10.3% ($0.3 million) of the $2.9 million in total annual OM&R costs allocated to IL4 refuge water supply.

Sub-allocations between M&I and agricultural use are based on relative benefits and water delivery quantities.

Totals may not sum exactly due to rounding.

CVP = Central Valley Project
CVPIA = Central Valley Project Improvement
IDC = interest during construction
IL4 = Incremental Level 4
M&I = municipal and industrial
OM&R = operation, maintenance, and replacement
WIIN = Water Infrastructure Improvements for the Nation

L.8 Ability to Pay

Reclamation law requires that investments be repaid by the beneficiaries, except for investments for the common welfare or defense. Financial feasibility depends on the ability of project beneficiaries to collectively pay the project costs. Where costs exceed an individual beneficiary's repayment ability, costs may be paid by other beneficiaries as Reclamation policy allows if resources are available. This ability-to-pay analysis evaluates the financial feasibility for Alternatives A1 and D1.

The non-Federal partner is the Authority, which would be responsible for all costs that are not allocated to the Federal government. The Authority is in the process of securing funding from California through WSIP for the State's cost share. The CWC has identified $1,008 million in Sites Reservoir public benefits that are eligible for funding under WSIP. The Authority funding amount from WSIP is $816 million. The WSIP investment would fund the Authority for the costs allocated by the State to project benefits that are considered public, including the IL4 Water Supply for CVPIA Refuges, Delta Ecosystem Enhancement, Recreation, and Flood Damage Reduction purposes.

Water Supply Benefits (Authority)

The costs for water supply benefits have been assigned to the Authority. The Authority is developing Phase 2 agreements for its cost-sharing partners to fund the Final EIR/EIS, WSIP feasibility study, and permitting for the project. Phase 2 agreements for 2020 are scheduled to be executed in September 2020.

The Authority has developed an enterprise financial model to support projected revenues, expenses, and appropriate cash balances during the design and construction and through project operations, and is expected to finance construction of the project in 2022. An agreement from the Authority to provide upfront funding to pay the non-Federal share of the construction costs of the project must be secured before beginning construction of the project.

The financial model sets up two primary funds to transfer money for construction. The first is the Construction Fund. Inflows are (in order of priority based on lowest cost): WSIP funds, WIIN Act Funds (if available), cash from participants, interim loan draws, Water Infrastructure Finance and Innovation Act (WIFIA) loan draws, and finally, revenue bond draws. Transfers from the Construction Fund will fund the interim loan payoff for pre-construction costs and construction expenses. The model is programmed to maintain a minimum construction fund balance each month to reflect prudent cash flow management practices. When expenses would result in the monthly ending balance dropping below the minimum balance, draws would be initiated from the available sources in priority order. Each year in June from 2023 to 2029, revenue bonds would be issued to provide enough funds to cover expenses, and the Construction Fund would not be allowed to fall below the minimum balance before the next revenue bond issue is sold.

The other fund used during project construction is the Revenue Bond Fund. Starting in June 2023, a revenue bond would be issued to refinance the interim loan balance for the pre-construction phase and provide funds (along with the other sources of revenue) to pay for construction expenses until the next revenue bonds are issued. The initial revenue bond sale in 2023 would provide the initial deposit to the Revenue Bond Fund, and each month a draw would be made to transfer funds from the Revenue Bond Fund to the Construction Fund. Funds remaining in the Revenue Bond Fund would earn interest at a short-term rate. Additionally, with each revenue bond offering, a portion of the proceeds would be deposited in a Revenue Bond Fund subaccount, called the Debt Service Reserve Fund, where it would be held for the benefit of revenue bondholders if a shortfall in debt service payments on revenue bonds occurs. The Debt Service Reserve Fund balance would earn interest at a long-term rate. These interest earnings would add to the Revenue Bond Fund balance and would be used to pay construction costs.

Upfront cost sharing of costs assigned to non-Federal participants will be provided. The Department of the Interior would negotiate and enter into an agreement with non-Federal partners on behalf of the United States for planning, permitting, design, and construction costs up to 25 percent of the total project cost.

Operational Flexibility

Assessments of the ability of agricultural beneficiaries to pay were performed. Methodologies for these analyses vary by project purpose, as summarized below:

- The ATP for agricultural water users is based on a crop budget analysis for representative farm types to estimate farm-level payment capacity at the water district level and is adjusted

to account for district operations and maintenance (O&M) costs and any additional financial capacity of the district.

Observable trends indicate the ATP increases for each type of beneficiary with the implementation of the project. These trends include increasing crop prices and yields; increased plantings of higher-value permanent crops; repayment of outstanding CVP facility capital costs by 2030; and increasing California populations. Costs included in irrigation ATP analyses include the cost of all water supplies, including the use of groundwater wells and sources of surface water, and existing CVP obligations. Because the majority of existing CVP capital obligations would be repaid by 2030, it is assumed that current CVP water contractors would continue to have the ATP at least equal to their currently allocated share of existing CVP capital obligations, less any aid to irrigation received. Accordingly, payment capacities for each type of beneficiary would increase over time as existing obligations are paid down.

Agricultural Water Supply Beneficiaries

Given that there are more than 250 current contracting entities within the CVP service area that supply water to farmers producing hundreds of commodities across a large geographic area in California (Shasta County to the north to Kern County to the south), detailed analyses for each contracting entity are not available. For this Feasibility Report, an initial ATP was performed for a representative irrigation contractor from four regions of the CVP. Reclamation project construction costs allocated to irrigation are eligible for adjustment based on the irrigation contractor's ATP. The ATP concept does not generally apply to OM&R costs payable by irrigation contractors. In the cases in which ATP does apply to OM&R costs, it is because project-specific legislation has made such costs eligible to receive irrigation assistance.

Participation in new storage at Sites Reservoir under WIIN is not expected to result in an increase in ATP relief for any CVP contractor. ATP analyses for irrigation contractors investing in storage projects consider the following (Reclamation 2019):

- The irrigation contractor's current status with additional investment in the storage project and the benefits to the irrigation contractor. An irrigation contractor shown to be able to pay their eligible obligations with the WIIN investment will not receive any aid to irrigation.
- If the irrigation contractor does not have the ATP as estimated with the additional WIIN investment, then the operation will be considered without the WIIN investment or the benefits from that investment. Any irrigation contractor without the ATP following analysis without the WIIN investment would be eligible for aid-to-irrigation, as the investment did not impact their criteria for aid-to-irrigation.
- Subsequent requests for ATP analyses will be based on a similar approach.

The estimation of a district's ATP begins with a payment capacity analysis. Payment capacity is the estimated residual net farm income available for payment of Federal and non-Federal assessed water costs, with the deduction of on-farm production and investment expenses and appropriate allowances for management, equity, and labor. Non-farm revenues are not included in the payment capacity assessment. The number of representative farms selected should be adequate to capture the different types of operations in the district and should reflect differences in crops grown, farm sizes, and water sources and costs. Each representative farm is modeled using available crop budget information. The estimated payment capacity for each representative farm is then aggregated to the

district level according to the proportion of the district's total acreage or total water deliveries associated with each farm type.

For this study, financial feasibility is determined by comparing the representative CVP agricultural contractor's ATP with the allocated construction costs, IDC, and O&M costs for Alternatives A1 and D1 (Table L-11).

Table L-11. Allocated Irrigation Water Supply Costs ($ millions)

Cost Type	Alternative A1 ($ millions)	Alternative D1 ($ millions)
Allocated Construction Cost	**$1,156**	**$1,258**
Annualized Costs		
Irrigation Water Supply Repayment Cost (40-year repayment with no interest)	$28.9	$31.5
Operations and Maintenance	$6.0	$6.0
CVP Additional Pumping Costs	$0.9	$0.9
Total Annual Irrigation Water Supply Cost (40-year repayment with no interest)	**$35.8**	**$38.4**

Notes:
Project features and costs are described in detail in Appendix B. Costs are presented in millions and 2019 dollars.
CVP = Central Valley Project

New water service or repayment contracts may be needed to repay the cost for operational flexibility. At present, the existing contracts are scheduled to conclude in 2030 (construction for Sites Reservoir is scheduled to conclude in 2030). The increment of agricultural water supply from the selected alternative would be addressed through new repayment contracts with existing CVP contractors who are willing and able to pay the incremental costs.

The costs would be repaid over a 40-year period. At present, the specific agricultural contractors considered to be beneficiaries have not been identified. If new contracts were established, the $35.8 million (Alternative A1) and $38.4 million (Alternative D1) in allocated irrigation water supply costs would be distributed over the average annual estimated increase in agricultural deliveries. The results are summarized in Table L-12.

Table L-12. Scenario 2 Repayment through New Contracts for Irrigation Supply

	Alternative A1	Alternative D1
Allocated Irrigation Supply Cost ($ millions per year)	$35.8	$38.4
Average Increase in Irrigation Deliveries (TAF)	69	73
Cost per AF	$517	$525

Notes:
AF = acre-foot
TAF = thousand acre-feet

Analysis of the ATP for specific contractors would be conducted to provide a determination of financial feasibility and would consider the 2030 deadline for repayment of current CVP capital costs, per Public Law 99-546.

district level according to the proportion of the district's total acreage or total water deliveries associated with each farm type.

For this study, financial feasibility is determined by comparing the representative CVP agricultural contractor's ATP with the allocated construction costs, IDC, and O&M costs for Alternatives A1 and D1 (Table L-11).

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New water service or repayment contracts may be needed to repay the cost for operational flexibility. At present, the existing contracts are scheduled to conclude in 2030 (construction for Sites Reservoir is scheduled to conclude in 2030). The increment of agricultural water supply from the selected alternative would be addressed through new repayment contracts with existing CVP contractors who are willing and able to pay the incremental costs.

The costs would be repaid over a 40-year period. At present, the specific agricultural contractors considered to be beneficiaries have not been identified. If new contracts were established, the $35.8 million (Alternative A1) and $38.4 million (Alternative D1) in allocated irrigation water supply costs would be distributed over the average annual estimated increase in agricultural deliveries. The results are summarized in Table L-12.

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Notes:
AF = acre-foot
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Analysis of the ATP for specific contractors would be conducted to provide a determination of financial feasibility and would consider the 2030 deadline for repayment of current CVP capital costs, per Public Law 99-546.

CVP Irrigation Costs Repayment Status and ATP Trends

Relief from CVP capital repayment and CVPIA Restoration Fund charges is provided to contractors who are eligible for aid to irrigation, as demonstrated through an ATP study. Table L-13 shows the status of CVP repayment of construction costs for existing facilities.

Historically, several contractors located north of the Delta that would benefit from improved operational flexibility have received "aid to irrigation" rate adjustments. However, the number of these districts has been declining in recent years. For example, eight CVP contractors located on the Tehama-Colusa Canal that had been receiving aid to irrigation since the mid-1990s were no longer eligible for the program in 2012 (Reclamation 2014) due to improved financial circumstances. Similarly, of the 49 irrigation contractors receiving full relief that were reviewed, 24 are no longer eligible for the program and four are now receiving partial relief. This trend may be attributed to increased prices and yields for crops, such as rice and almonds. There has been a trend toward increased permanent crop plantings in Tehama and Colusa counties, which typically generate greater returns. For example, acres planted in almonds in Colusa County increased from 23,240 in 2003 to 46,806 in 2018 (U.S. Department of Agriculture 2018). Similarly, walnut acres have nearly doubled in the two counties over the same time period.

Table L-13. CVP Irrigation Cost Construction Repayment Status at the End of FY 2018

CVP Construction Cost and Repayment	CVP Costs and Repayment ($ million)
Existing CVP Facility Construction Costs Allocated to Irrigation[1]	**$1,871**
Repayments of Irrigation Costs	
Irrigation Districts Repayment[2]	$895
Other Repayments Realized[3]	$118
Total Repayments of Irrigation Costs	**$1,012**
Anticipated Future Repayment of Irrigation Costs	
Repayment of Costs by Irrigation Districts	$641
Repayment of Costs by Irrigation Assistance[4]	$60
Other Anticipated Future Repayment[5]	$142
Total Anticipated Future Repayments of Irrigation Costs	**$842**
Credits[6]	**$17**

Source: Bureau of Reclamation, California-Great Basin Region, 2019. Statement of Project Construction Cost and Repayment (SPCCR)
Notes:
1 Total includes all CVP construction costs to date.
2 Estimated repayment includes matured repayment and water service contracts.
3 Other repayments realized include contributions and revenues that Reclamation calls "incidental revenues," such as excess water sold to irrigation districts or revenue from land leased for grazing.
4 Irrigation assistance is the amount of construction costs allocated to irrigation that the Secretary of the Interior determines that irrigation districts are unable to pay for a given project, which is repaid from other revenue sources, when available.
5 Other anticipated future repayment includes repayment anticipated through future repayment contracts and contracts that have been deferred, among other things.
6 Credits relieve water users from a portion of their allocated repayment obligations. Types of credits include Congressionally authorized repayment reductions and construction expenses determined to be non-reimbursable.
CVP = Central Valley Project
FY = Fiscal Year

Assuming that CVP water contractors are on track with Public Law 99-546 requirements and repayment occurred over a 40-year period, the resulting annual repayment obligations (including

conveyance costs) would be approximately $35.8 million (Alternative A1) and $38.4 million (Alternative D1).

Summary

Based on the initial ATP analysis performed, CVP irrigation contractors that would receive water supply benefits from CVP Operational Flexibility would likely be able to repay the allocated project costs. Increasing crop prices and yields and the transition to more valuable permanent crops suggest that the ATP is increasing with the potential to benefit from NODOS.

L.9 References

Reclamation. 2006c. *Auburn-Folsom South Unit Special Report: Benefits and Costs Update.* December.

Acronyms and Other Abbreviations

cfs	cubic feet per second
CVP	Central Valley Project
Delta	Sacramento–San Joaquin River Delta
DWR	California Department of Water Resources
GCID	Glenn-Colusa Irrigation District
IDC	interest during construction
IL4	Incremental Level 4
M&I	Water Supply
NODOS	North-of-the-Delta Offstream Storage
OM&R	operation, maintenance, and replacement
SCRB	separable costs-remaining benefits
TAF	thousand acre-feet
T-C	Tehama-Colusa
TRR	Terminal Regulating Reservoir
WIIN Act	Water Infrastructure Improvements for the Nation Act