Facts About the Economic Value of the Delta Conveyance Project

Benefits, Costs, Commitments, and Innovations

The Delta Conveyance Project is one of California's most important climate adaptation projects. Extreme weather is leading to more rain, less snow, and a limited ability to capture and move water. The Delta Conveyance Project will protect supplies by capturing water when it is plentiful to better endure dry years and adapt to extreme weather. It protects against the threat posed by earthquakes, sea level rise and levee failure. And it helps resolve conflicts in the south Delta to both protect fish and provide needed water supply.

Need for Protecting the State Water Project

The State Water Project captures and moves water all over California, from the Bay Area to the Mexico border and communities in between. It is an affordable source of high-quality, clean, and safe water for 27 million Californians and 750,000 acres of agriculture. If the State Water Project service area were a nation, it would represent the eighth largest economy in the world. And it is an important foundation for an entire suite of water supply and resiliency programs implemented by local public water agencies.

Economic Benefits

The Delta Conveyance Project passes the benefit-cost test. It enables water needs to be satisfied and water supply reliability to be maintained. It protects against a declining baseline of supplies, allows SWP to adapt against climate change, guards against earthquake risks, and helps resolve conflicts in the south Delta by improving operational flexibility.

Cost Estimate

An updated cost estimate was prepared by the Delta Conveyance Design and Construction Authority (DCA), using a detailed and rigorous approach, the cost of the project is estimated to be $20.1B in real 2023 (undiscounted) dollars. A preliminary cost assessment conducted in 2020, early in the design process, showed the project would cost about $16B, which accounting for inflation to 2023 would result in a similar cost. This demonstrates that even as details are added, and refinements are made to the program, costs are holding steady. The DCA is also evaluating potential design or construction innovations that would help manage costs for the program.

Benefits Outweigh Costs

After adjusting to account for the value of money over time (see page 3 regarding "discounting"), the benefits are $37.96 billion and the costs are $17.26 billion. This results in a benefit-cost ratio of 2.2, meaning that the benefits outweigh the costs and every dollar spent generates $2.20 in benefits.

The project passes the benefit-cost ratio test, making the project economically viable and robust under all future scenarios analyzed.

Benefits are quantified in four different areas: Urban water supply reliability, agricultural water supply, water quality, and seismic reliability.

The primary benefit of the DCP is that the project protects against the expected effects of climate change and sea level rise, avoiding future shortages and maintaining water supply reliability.

Understanding Benefits

Urban Water Supply Reliability:

- More SWP deliveries under wetter periods allow agencies to:
  - Fill storage more frequently
  - Enter drought periods with higher reserves
  - Impose fewer periods of mandatory rationing
  - Reduce severity and frequency of shortages
- Urban economic benefits measured as consumers' willingness to pay (WTP) to avoid shortages.

Agricultural Water Supply

- Agricultural value of water based on the UC Davis Statewide Agricultural Production model and water market transaction data from Nasdaq Veles CA Water Index.

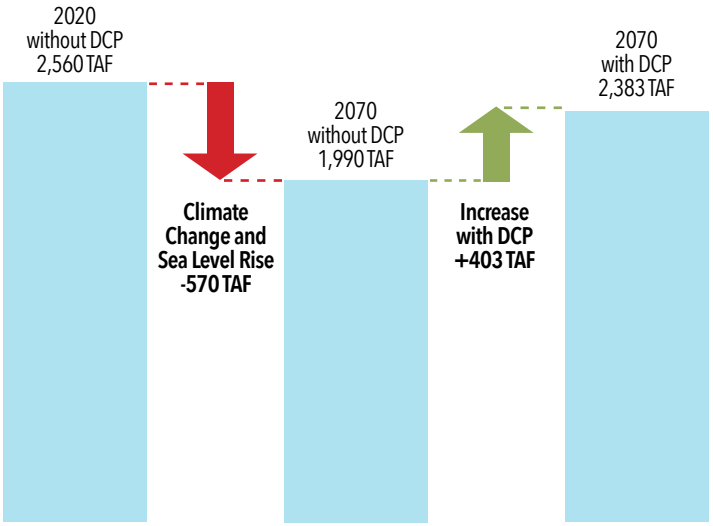
Water Quality:

- Lower salinity improves water quality.
- For urban agencies, this improves taste, the useful life of appliances, the cost of water softening, for example.
- For agricultural agencies, the cost is based on reducing requirements for additional irrigation water needed to flush salts from the root zone of crops.

Earthquake Disruption:

- Avoiding potentially significant disruption to statewide water supply caused by earthquakes saves time, saves money and protects water quality.

State Water Project Deliveries:



Missed Opportunity

If the Delta Conveyance Project were operational during the big winter storms of winter 2021-2022, January 1 through May 9, 2024, a significant amount of water could have been captured and moved.

Winter 2021-2022	January 2023	Jan 1–May 9, 2024
Amount of water that could have been captured:		
236,000 acre-feet	**228,000** acre-feet	**909,000** acre-feet
That's enough water to supply:		
Over **2.5 million** people for one year	Over **2.3 million** people for one year	Over **9.5 million** people for one year
or		
Nearly **850,000** households for one year	Nearly **800,000** households for one year	Over **3.1 million** households for one year

Assumptions that influence benefits and costs:

- Yield: assumed to provide about 403,000 acre-feet annually on average
- The cost of the project: assumed to be $20.1 billion in undiscounted 2023 dollars
- Real discount rates: between 2% and 1.4% (Federal Office of Management and Budget, Circular A-4 guidance)
- Environmental mitigation: $960 million
- Construction period: 15 years
- Life span of the project: 100 years

Summary of Benefits and Costs

	Main Cost Estimate	Cost with DCA Recommended Innovation Savings
	Present Value of Future Benefits	
	2023 ($M)	2023 ($M)
Urban Water Supply and Reliability	$33,300	$33,300
Agricultural Water Supply and Reliability	$2,268	$2,268
Urban Water Quality	$1,330	$1,330
Agricultural Water Quality	$90	$90
Seismic Reliability Benefits (Water Supply)	$969	$969
Seismic Reliability Benefits (Water Quality)	$2	$2
Total Benefits	**$37,960**	**$37,960**
	Present Value of Future Costs	
	2023 ($M)	2023 ($M)
Construction Costs	$11,486	$10,723
Other Project Costs	$3,021	$2,852
Community Benefit Program	$153	$153
Environmental Mitigation	$735	$735
O & M Costs*	$1,697	$1,697
Environmental Impacts after Mitigation	$167	$167
Total Costs	**$17,259**	**$16,327**
Benefit-Cost Ratio	**2.20**	**2.33**

*O&M Costs: includes operations and maintenance costs for project facilities

Understanding Discounting and the "Time Value of Money"

How does a Benefit-Cost Analysis account for inflation?

Inflation is the general increase in the price of goods and services over time, and it poses a challenge for benefit-cost analysis. To ensure a consistent comparison, all future costs and benefits reflect 2023 prices, a method known as using "real prices" in economic terms. This approach removes the distorting effects of inflation, allowing present-day expenditures to be directly comparable to future benefits and providing a clear basis for evaluating a project's economic viability.

How would unexpected inflation affect the analysis?

If inflation impacts future costs and benefits similarly, changes in the inflation rate will not affect the conclusions of the benefit-cost analysis. However, if inflation disproportionately affects costs or benefits, it could skew the analysis. This is unlikely for the DCP, where benefits tied to water rates and costs associated with construction expenses generally escalate in tandem.

Why does the Benefit-Cost Analysis account for the time value of money (e.g. discount future costs and benefits)?

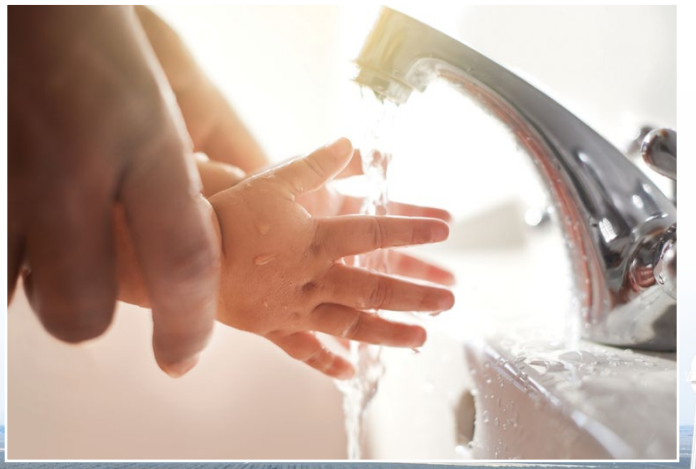
The time value of money is a recognition that money available today is worth more than the same amount in the future because it can be used immediately—to pay for things or to invest and earn more money. This concept is crucial, especially in long-term projects like the DCP, which assumes a 15-year construction period starting in 2029 followed by a 100-year operational project life.

How is the real discount rate applied?

The 'real discount rate' used in this process is determined based on federal guidance and calculated by taking the returns on treasury bills and subtracting the rate of inflation. This discounting process, distinct from the previously discussed use of real prices to account for inflation, helps prioritize projects that offer the best economic returns over their lifecycle, ensuring efficient allocation of resources.

Why is the cost of the project lower in the Benefit-Cost Analysis and higher in the cost estimate?

The cost estimate and benefit-cost analysis are equivalent but expressed differently. The cost estimate is presented in real 2023 dollars. The benefit-cost analysis is shown as "present value." Present value accounts for various distortions to the value of money over time, including inflation and the potential for investment and it is calculated using a "discount" rate.



Other Important Considerations:

Climate change

Climate change and sea level rise are expected to significantly reduce future SWP deliveries. Future precipitation and runoff are forecasted using multiple climate scenarios that show an annual loss of more than half a million acre-feet by 2070. The primary benefit-cost analysis assumes 1.8 feet of sea level rise by 2070. Multiple sensitivity analyses test robustness of this assumption. In each of the scenarios tested, the benefits of the project significantly exceed costs.

Transfers and Trading

If there are water years that a Public Water Agency's supplies exceed local needs, they may choose to transfer those supplies and the associated costs, consistent with water law and existing water supply contracts. This flexibility will allow PWAs to preserve water supplies for local needs and to transfer those excess supplies—and costs—to other parts of the state, particularly those with limited access to drinking water.

Unmitigated Environmental Impacts

Some environmental impacts are expected to be significant and unavoidable. Where possible, the cost of those impacts has been considered and included. This results in a cost of about $153 million for lost agricultural land, air quality, noise, and transportation impacts.

Cost of Doing Nothing

Failing to implement the Delta Conveyance Project has real financial consequences resulting from climate change, sea level rise and seismic events.

Some benefits of the Delta Conveyance Project are not monetized in the benefit-cost analysis and yet are compelling for decision-makers:

- Increased operational flexibility: Resolving conflicts in the south Delta between fish and water supply goals.
- Community Benefits Program: $200 million investments for high-priority local Delta projects, in addition to local business utilization, job training, and infrastructure leave-behinds that have potential to provide benefits that are ultimately likely to represent values beyond this funding commitment.
- Job creation: The project will create 5,000 high-paying jobs.
- Groundwater supplies: Protecting affordable surface water supplies relieves pressure on dwindling or constrained groundwater sources.

Cost Estimate: Conservative, Comprehensive, Based on Industry Standards

DWR approved the Bethany Alignment of the Delta Conveyance Project in December 2023 after concluding the project Environmental Impact Report (EIR). This approved project provided the basis for an updated cost estimate.

The estimate is comprehensive, conservative, and reflects industry standard methodologies. It:

- Is based on the 6,000 cubic feet per second Bethany Reservoir Alternative as outlined in the project Final EIR
- Includes construction costs and other costs, like planning, management, land, mitigation, power and community benefits
- Uses cost estimating approach that builds up based on labor, equipment, materials, and schedule
- Uses a thorough reconciliation process with independent cost-estimating teams and resolves cost differences
- Assumes a reasonable 30% contingency to account for uncertainties

Methodology: A More Rigorous Approach

The updated cost estimate uses a more rigorous approach for concept-level designs. It:

- Uses engineering documentation in drawings and technical reports
- Develops costs based on unit rates, quantities, and durations
- Replaces most cost "allowances" with actual estimates and material price quotes
- Uses better understanding of ground conditions, schedule, and risks

The cost estimate has been prepared by the Delta Conveyance Design and Construction Authority, a joint powers agency comprised of the participating Public Water Agencies responsible for funding, and ultimately building, the project.

Total Project Costs Summary*

Feature	Total Cost ($M)
Construction Costs	
Intakes	$1,714
Main Tunnels	$6,353
Pumping Plant and Surge Basin	$2,536
Aqueduct Pipe and Tunnels	$563
Discharge Structure	$99
Access Logistics and Early Works	$253
Communication	$13
Restoration	$17
Construction Subtotal	**$11,548**
Contingency (30%)	$3,464
Total Construction Costs	**$15,012**

Feature	Total Cost ($M)
Other Project Costs	
DCO Oversight	$426
Program Management Office	$668
Engineering/Design/Construction Management	$2,167
Permitting and Agency Coordination	$67
Total Planning/Design/Construction Management	**$3,328**
Land	$158
DWR Mitigation	$960
Power	$415
CCWD Settlement Agreement	$47
Community Benefits Program	$200
Total Other Costs	**$1,780**

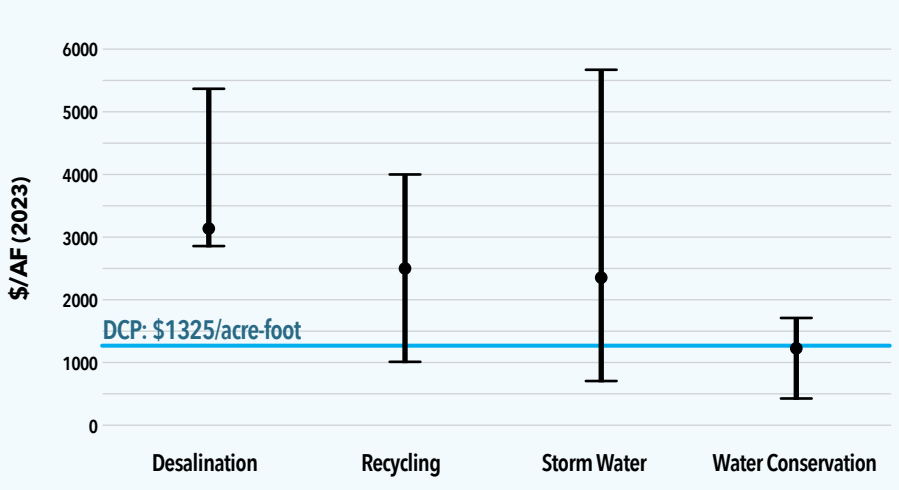
*Costs are in undiscounted 2023 dollars.

Total Project Costs = $20,120

Cost Category	Total Project Cost Estimate ($M)	Total Project Cost with Secondary Innovations Estimate ($M)
Construction Costs	$15,012	$14,008
Other Project Costs	$5,108	$4,886
Total Project Costs	**$20,120**	**$18,894**

Comparing the Delta Conveyance Project to Alternative Supplies

The per-acre cost of the Delta Conveyance Project is less than the costs of most other types of supplies. Alternative supplies also lack the ability to provide an equivalent scale of supply and are not able to protect the long-term stability of State Water Project supplies. While a full suite of options is being considered for California and local water purveyors, the Delta Conveyance Project is the most viable and irreplaceable.



Innovations Identify Significant Cost Savings

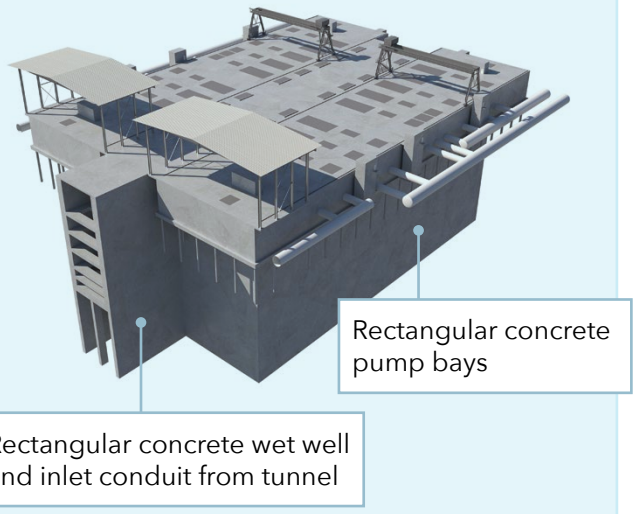
Value engineering is a part of the design phase of a project. It is used to cut costs, save time, reduce risk, or reduce community or environmental disturbances. The approved project represents a conservative configuration for analysis of impacts. An initial review of potential design and construction innovations shows an opportunity to reduce costs by about $1.2 billion.*

Innovation Example

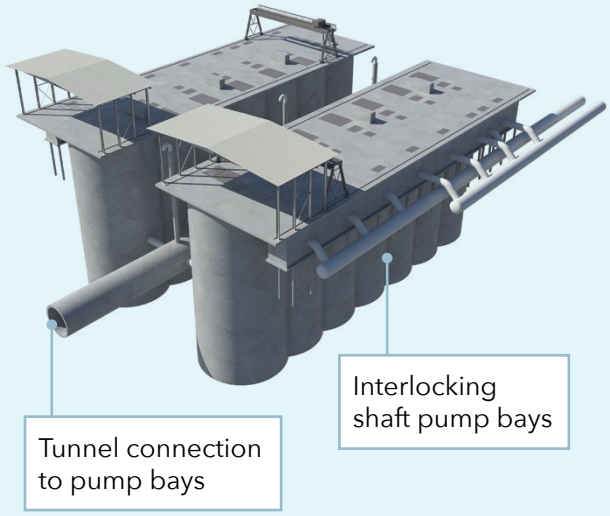
In the Engineering Project Report, the Bethany Reservoir Pumping Plant (BRPP) is a below-ground structure with vertical rectangular diaphragm walls and consists of dry-pit pump bays housing the pumping plant equipment and piping plus an adjoining rectangular concrete wet well and wet well inlet conduit connected to the tunnel reception shaft located along the center of the overall structure.

This innovation would replace the vertical, deep box diaphragm wall arrangement with interlinking shafts of diaphragm wall construction that would house the pumping plant equipment and piping and a tunnel that would replace the wet well and wet well inlet conduit, greatly reducing construction quantities and expediting schedule due to construction sequence improvements.

CURRENT PUMPING PLANT DESIGN



INNOVATION CONCEPT



INNOVATION ADVANTAGES:

- Reduces construction quantities (soil excavation, concrete, rebar)
- Shortens construction schedule by 981 days
- Reduces direct construction cost by $138,720,000
- No changes to above-ground site configuration and surface features

*Does not represent changes to the approved project description.

For More Information

For more information on cost, benefits, funding and financing of the State Water Project and the Delta Conveyance Project, view this FAQ or use the QR code.

For more about the Delta Conveyance Project, visit: **water.ca.gov/deltaconveyance**

For more about the project permitting process, visit: **deltaconveyanceproject.com**

For more information about project design and engineering, visit: **dcdca.org**