

JOINT AUTHORITY / RESERVOIR COMMITTEE WORKSHOP

NOVEMBER 15TH



Purpose of Workshop

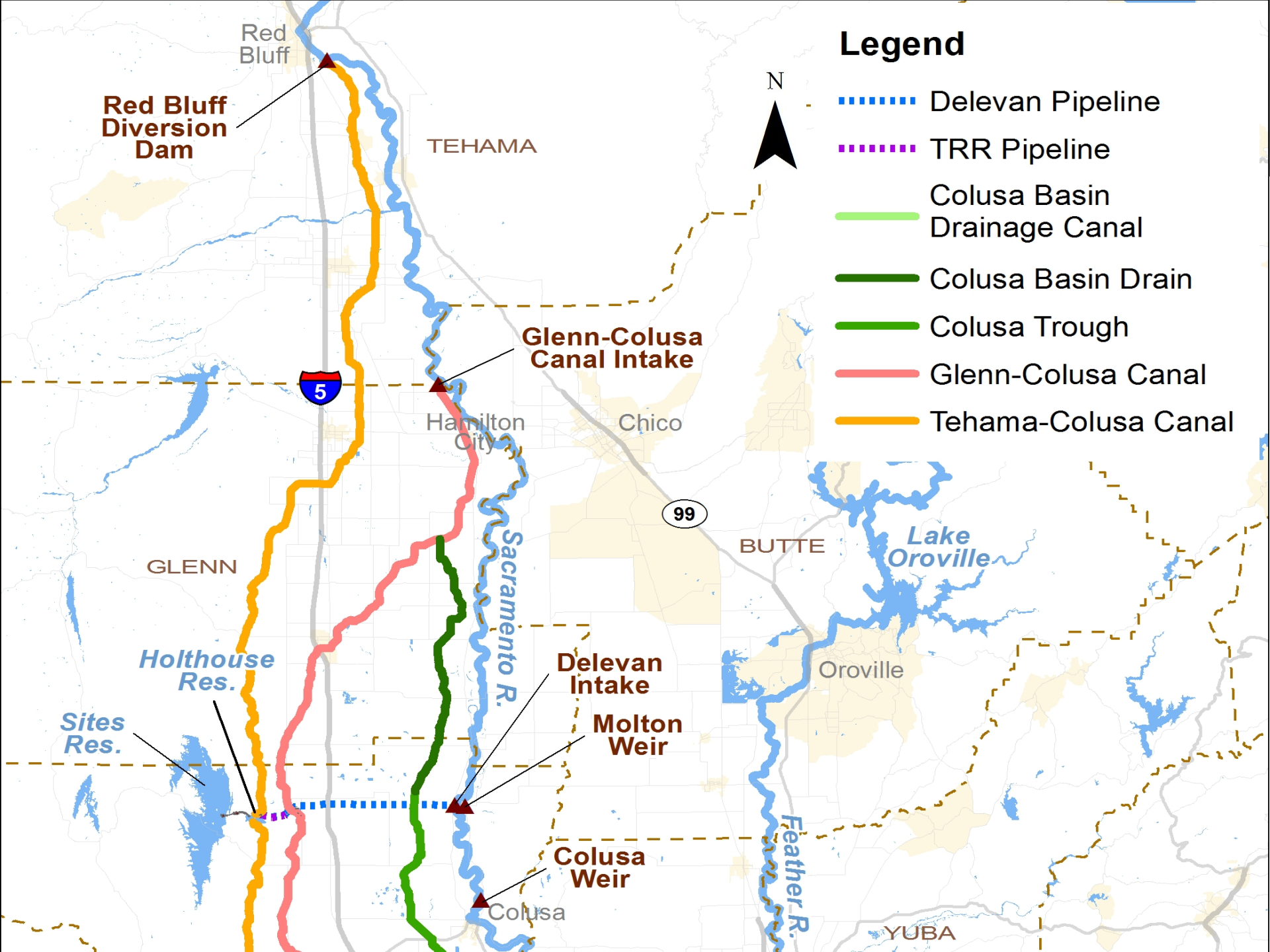
- Provide status update for participants' use in upcoming key decisions
 - Operations
 - Value Planning
 - Repayment
- Discuss next steps for the Project

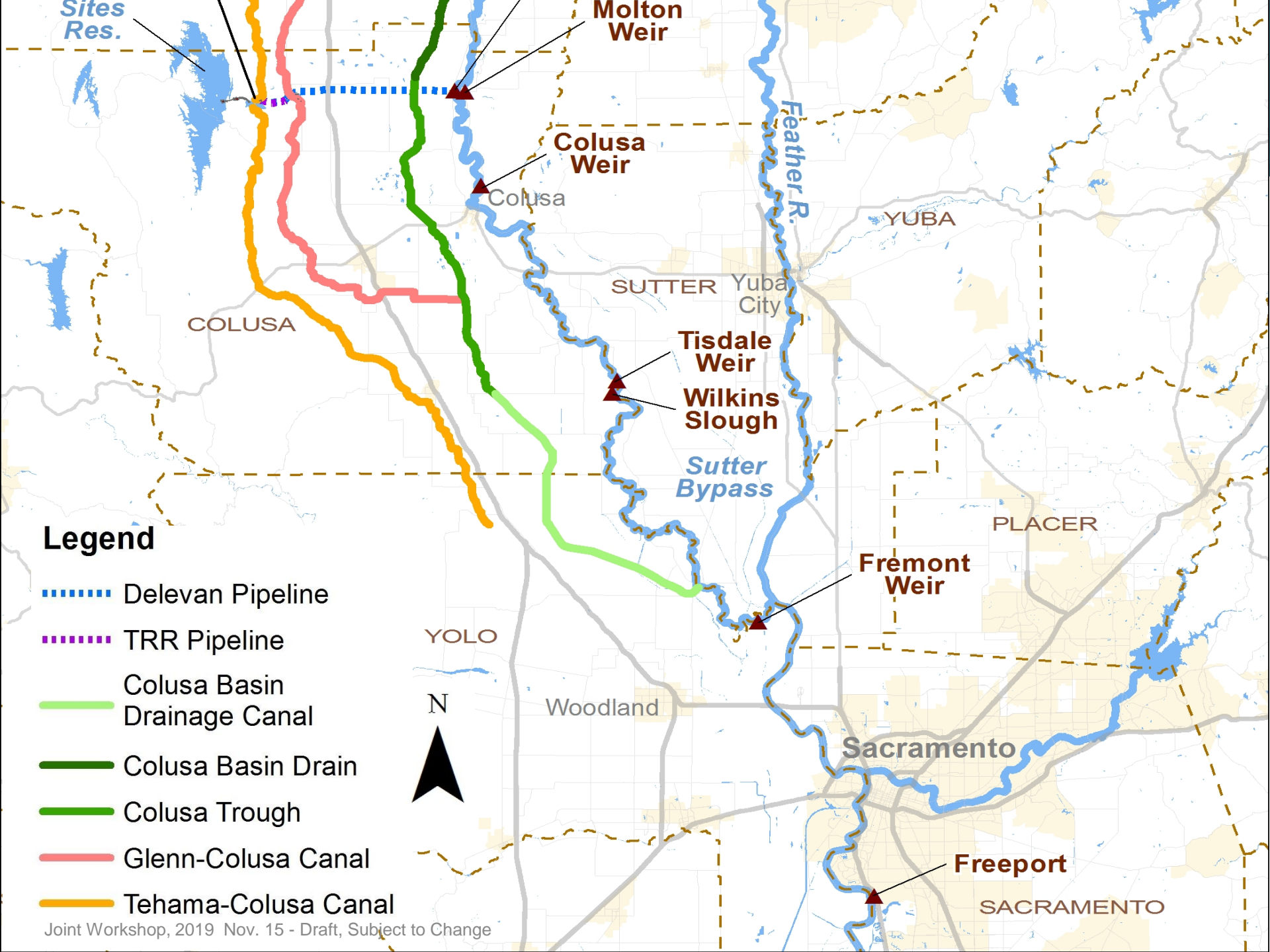
OPERATIONAL CONSIDERATIONS STATUS



Key Operational Activities

- Continued pre-application consultation discussions with CDFW on both construction and operational effects of the project to listed and fully-protected species
- Continued development of analysis tools for daily operations, bypass criteria, floodplain inundation and other operational effects
- Continued discussions with Reclamation on within year exchanges





Legend

- Delevan Pipeline
- TRR Pipeline
- Colusa Basin Drainage Canal
- Colusa Basin Drain
- Colusa Trough
- Glenn-Colusa Canal
- Tehama-Colusa Canal



Key Operational Considerations

- Wilkins Slough Bypass Flow
 - Indicator of in-river survival for juvenile salmonids
- Fremont Weir Notch
 - Protects bypass / floodplain rearing habitat and food production for juvenile salmonids
- Flows into the Sutter Bypass System
 - Protects bypass / floodplain rearing habitat and food production for juvenile salmonids
- Freeport Bypass Flow
 - Indicator of Delta survival for juvenile salmonids
- Net Delta Outflow Index (NDOI)
 - Spring NDOI directly correlates to fall longfin smelt population

Recent Operations Modeling

- Recent modeling included combination of Calsim and Daily Model analyses conducted at a screening level
- Additional modeling will be needed to:
 - Determine effects to species that result from the recent operational scenarios (e.g., temperature, life cycle, Delta hydrodynamics, etc.)
 - Reflect Reclamation as a cooperating partner only
 - Incorporate ROC on LTO and new requirements from the NMFS Biological Opinion in the baseline

Summary of Operational Scenarios Currently Being Discussed

Criteria	8,000 Wilkins with WaterFix Criteria	Scaled Diversion with WaterFix Criteria	Potential Revised Project – Sept 2019
Reservoir Size	1.5 MAF	1.5 MAF	1.5 MAF
Delevan Intake	Not included; Outlet only facility	Not included; Outlet only facility	Not included; Outlet only facility
Wilkins Slough Bypass Flow	8,000 cfs	8,000 cfs April/May; all other times, 5,000 cfs; Scaled diversion	8,000 cfs April/May; all other times, 5,000 cfs; Scaled diversion
Fremont Weir Notch	Prioritize the Fremont Weir Notch preferred alternative	Prioritize the Fremont Weir Notch preferred alternative	Prioritize the Fremont Weir Notch preferred alternative
Flows into the Sutter Bypass System	Consider frequency and duration of spills at Moulton, Colusa, and Tisdale	Consider frequency and duration of spills at Moulton, Colusa, and Tisdale	Consider frequency and duration of spills at Moulton, Colusa, and Tisdale
Freeport Bypass Flow	Modeled WaterFix Criteria (applied daily)	Modeled WaterFix Criteria (applied daily)	15,000 cfs Jan-March; 13,000 cfs in December; 11,000 cfs all other times (monthly average)
Net Delta Outflow Index (NDOI) Prior to Project Diversions	Modeled WaterFix Criteria (using >44,500 cfs between March and May as a surrogate)	Modeled WaterFix Criteria (using >44,500 cfs between March and May as a surrogate)	None; Minor changes in X2; Mitigation proposed
Total Deliveries (Average / Dry Year)	~220 TAF ~302 TAF	~234 TAF ~312 TAF	~332 TAF ~477 TAF

Potential Deliveries Range from 200,000 AF to 250,000 AF

Major Permitting / Operations Challenges

- Challenges:
 - Magnitude of anticipated temperature benefit above Red Bluff need to be reassessed due to revised operational criteria
 - Discussions with Reclamation and analysis of water rights considerations on within year exchanges in Shasta are on-going
 - USFWS has announced it is updating the status review for longfin smelt and may propose it for listing under the Federal ESA but already consulting under CESA
 - Future Delta Conveyance and Voluntary Agreements may effect Sites operations and diversions but working to account for these in revised operational criteria

Major Permitting / Operations Opportunities

- Opportunities:
 - Delta Conveyance, Voluntary Agreements, Eco Restore, and other projects present opportunities for improved fisheries conditions and for collaboration on science, monitoring and mitigation
 - Sites is anticipated to perform well and provide more water supply and ecosystem benefits in future climate change scenarios

Key Takeaways

- Permittable operations, reflecting current permitting discussions, may result in a range from 200,000 AF to 250,000 AF average annual deliveries at Holthouse
- 200,000 AF average annual deliveries at Holthouse should be viewed as more of a "floor" -- additional science, monitoring and implementation of other actions (Eco Restore, VAs, etc) could increase this
- Additional detailed modeling on revised operational scenarios is needed to reduce uncertainties and refine analyses
- Additional discussions is needed with the regulatory agencies to develop and refine operational parameters to ensure they are implementable and meet the intended biological outcome

VALUE PLANNING STATUS



Overview

- Ad hoc representatives from the Reservoir Committee and Authority Board met on October 2 and 14, 2019 to discuss approaches that could potentially lower the cost of the project. AECOM and others conducted initial analyses on these approaches.
- Several facility modifications were identified, and nine alternative key facility layouts were developed. Further evaluation of these is needed.
- Appraisal level costs were developed in October 2015 dollars and escalated to 2018 dollars. These costs ranged from \$3.4 to \$4.0 billion (excluding risk management and financing costs) versus the \$5.2 billion for Alternative D.
- Authority agents developed comments on the appraisal evaluation but did not identify any “fatal flaws”.

Value Planning Alternatives – Comparison

Features	Value Planning Alternatives								
	1	2	3	4a	4b	5a	5b	6a	6b
Cost (\$billions)	\$4.0B	\$4.0B	\$3.9B	\$3.8B	\$3.9B	\$3.5B	\$3.9B	\$3.4B	\$3.6B
Savings from 1.8 MAF Alternative D	\$1.2B	\$1.2B	\$1.3B	\$1.4B	\$1.3B	\$1.7B	\$1.3B	\$1.8B	\$1.6B
1.5 MAF Reservoir	•	•	•	•	•	•	•	•	
1.3 MAF Reservoir									•
Funks/Sites PGP	•	•		•	•	•	•		
Replace Sites PGP with Two Smaller Plants			•					•	•
Delevan Canal/Pipeline Release	•	•	•	•	•				
Dunnigan Canal to CBD Release						•		•	
Dunnigan to River Release							•		•
Multi-Span Bridge	•		•	•	•	•	•	•	•
South Road to Lodoga		•							
South Road to Residents	•		•	•	•	•	•	•	•
Rockfill Embankment Dam	•	•	•			•	•		
Earthfill Dam				•				•	•
Hardfill Dam					•				

CBD = Colusa Basin Drain

MAF = million acre feet

PGP = Pumping/Generating Plant

TCRR = Tehama-Colusa Regulating Reservoir

15 TRR = Terminal Regulating Reservoir

Alternative 1 – Reduce Reservoir to 1.5 MAF, change bridge to multi-span bridge, and substitute a release only canal for the single Delevan pipeline from Colusa Basin Drain to TRR near TCC - \$4.0B. The other features are generally consistent with Alternative D - \$5.2B

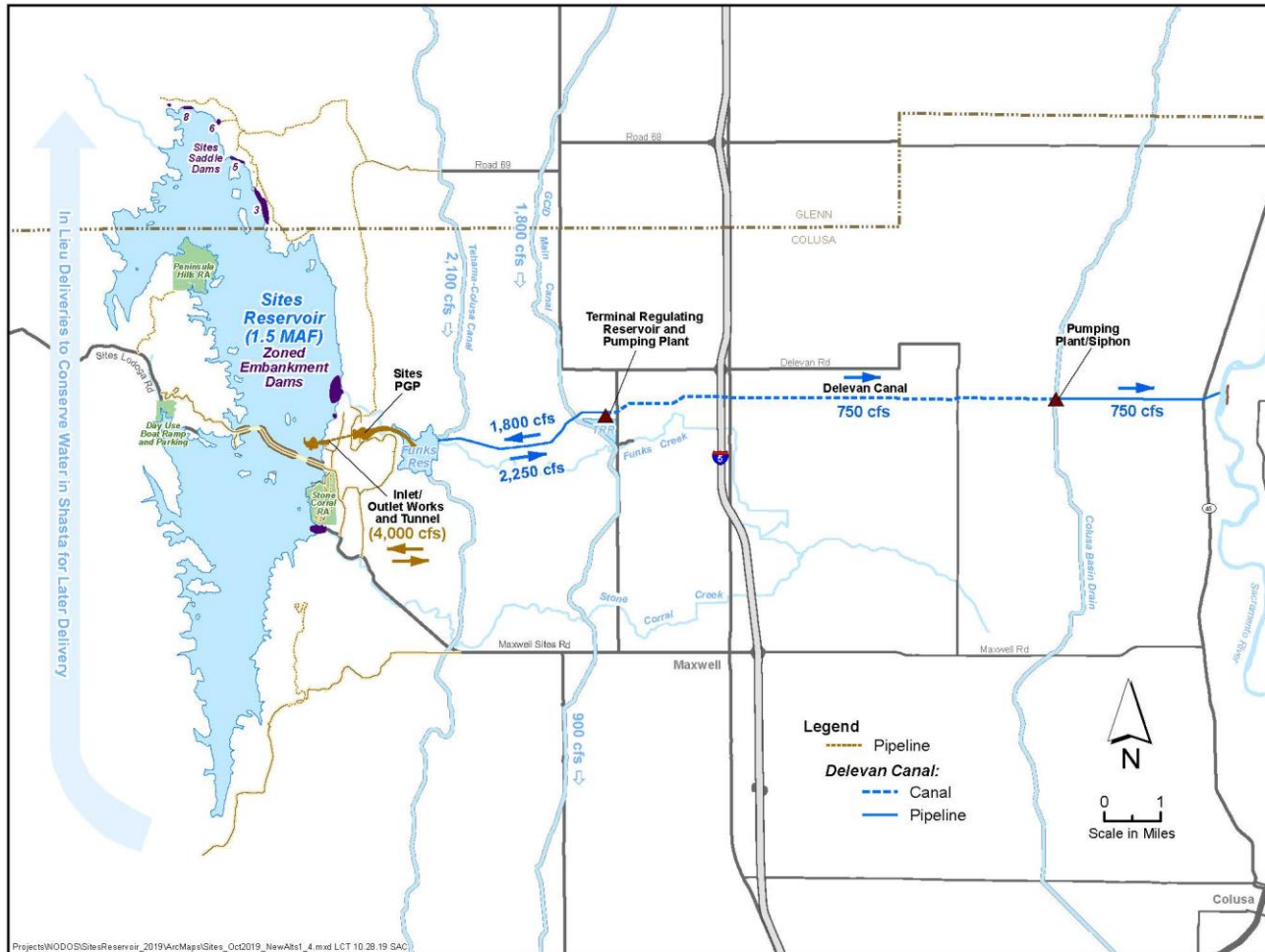


Figure 1

Alternative 2 – Similar to Alternative 1 but uses the southern road alignment to Lodoga in place of the bridge - \$4.0B

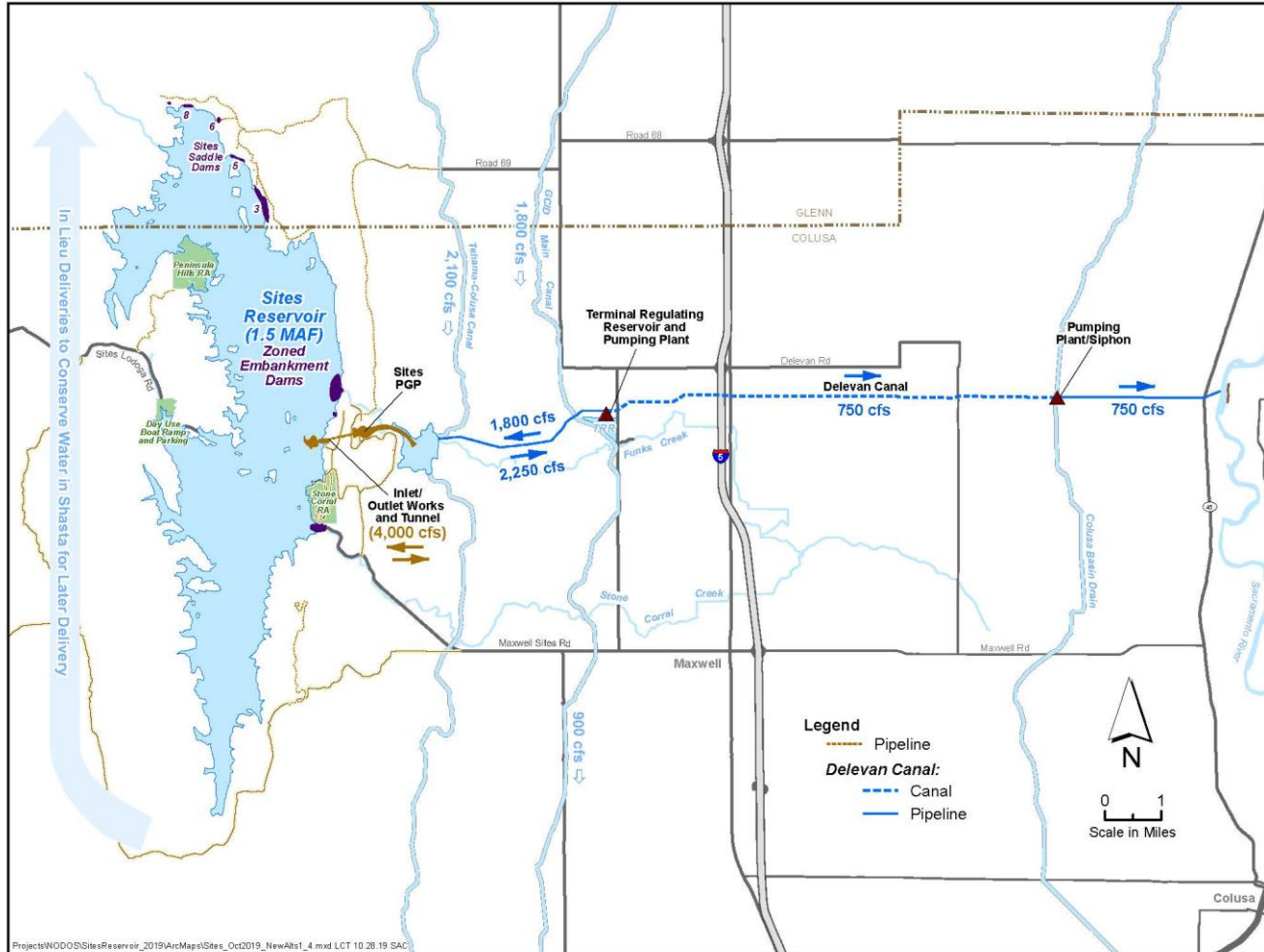


Figure 2

Alternative 3 – Similar to Alternative 1, but replaces Sites PGP with the Tehama-Colusa Regulating Reservoir and PP and modified TRR - \$3.9B

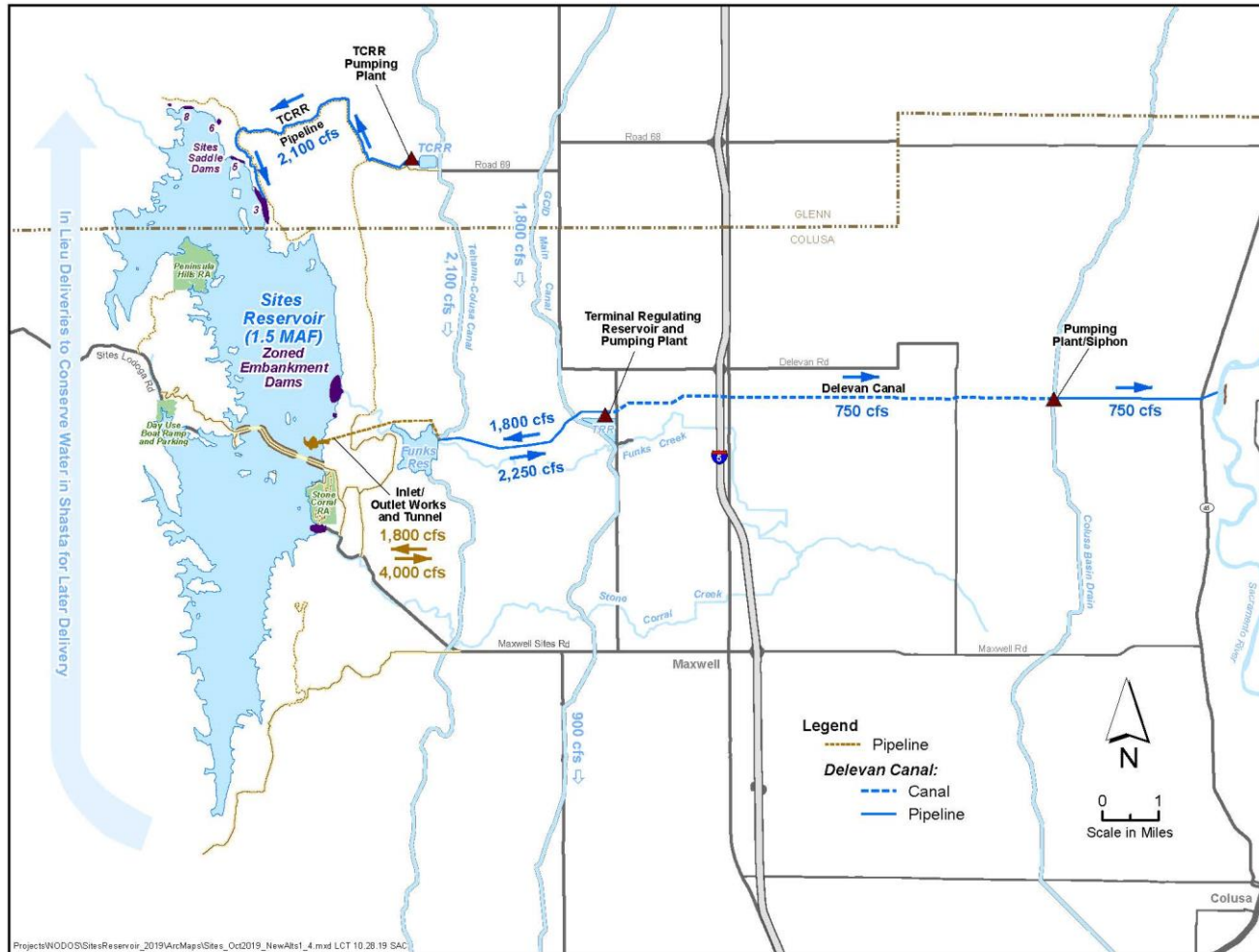


Figure 3

Alternative 4a – Same as Alternative 1 but replaces the zoned rockfill embankment dam with an earthfill dam – \$3.8B

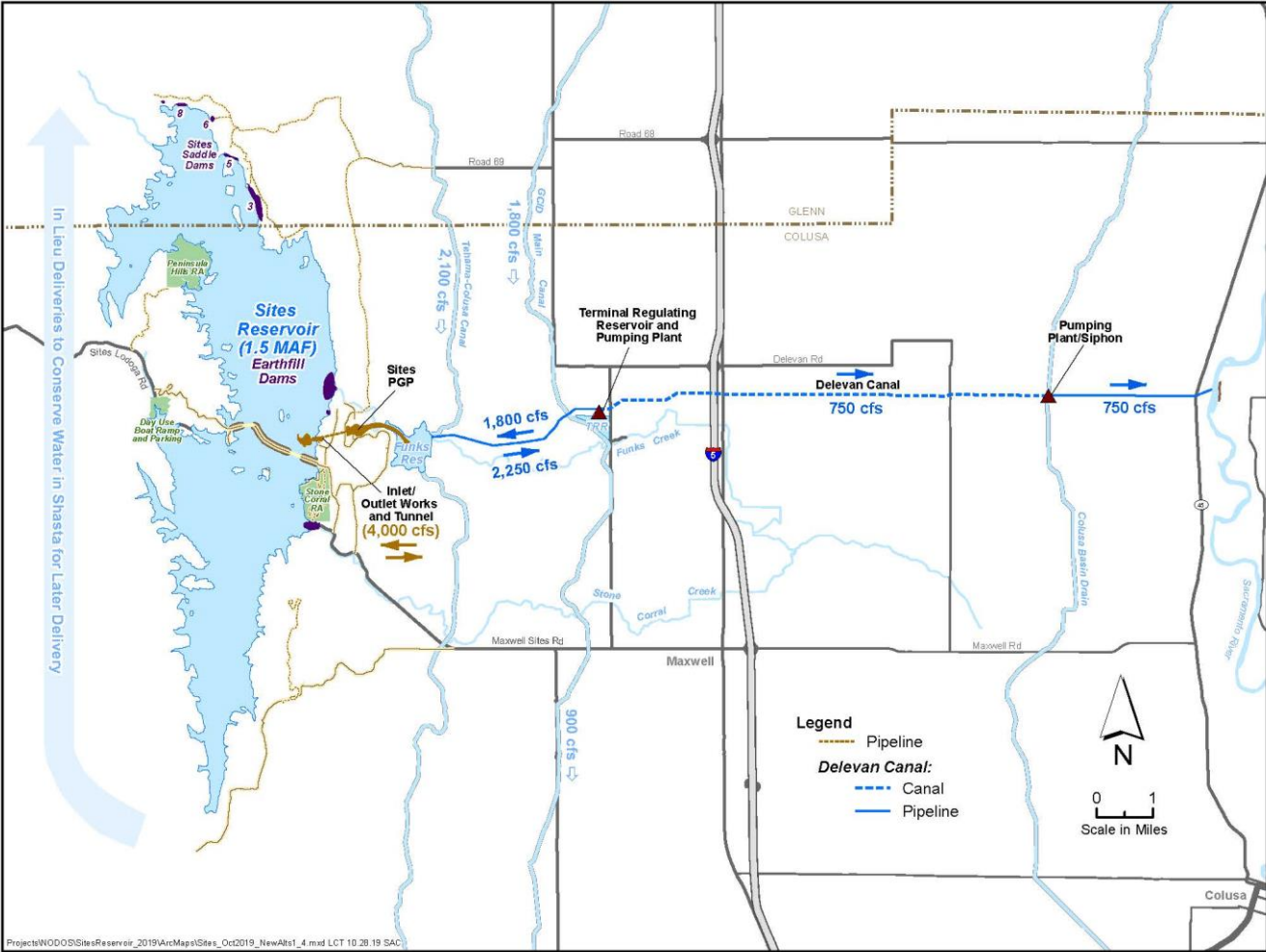


Figure 4a

Alternative 4b – Same as Alternative 1 but replaces the zoned rockfill embankment dam with a hardfill dam – \$3.9B

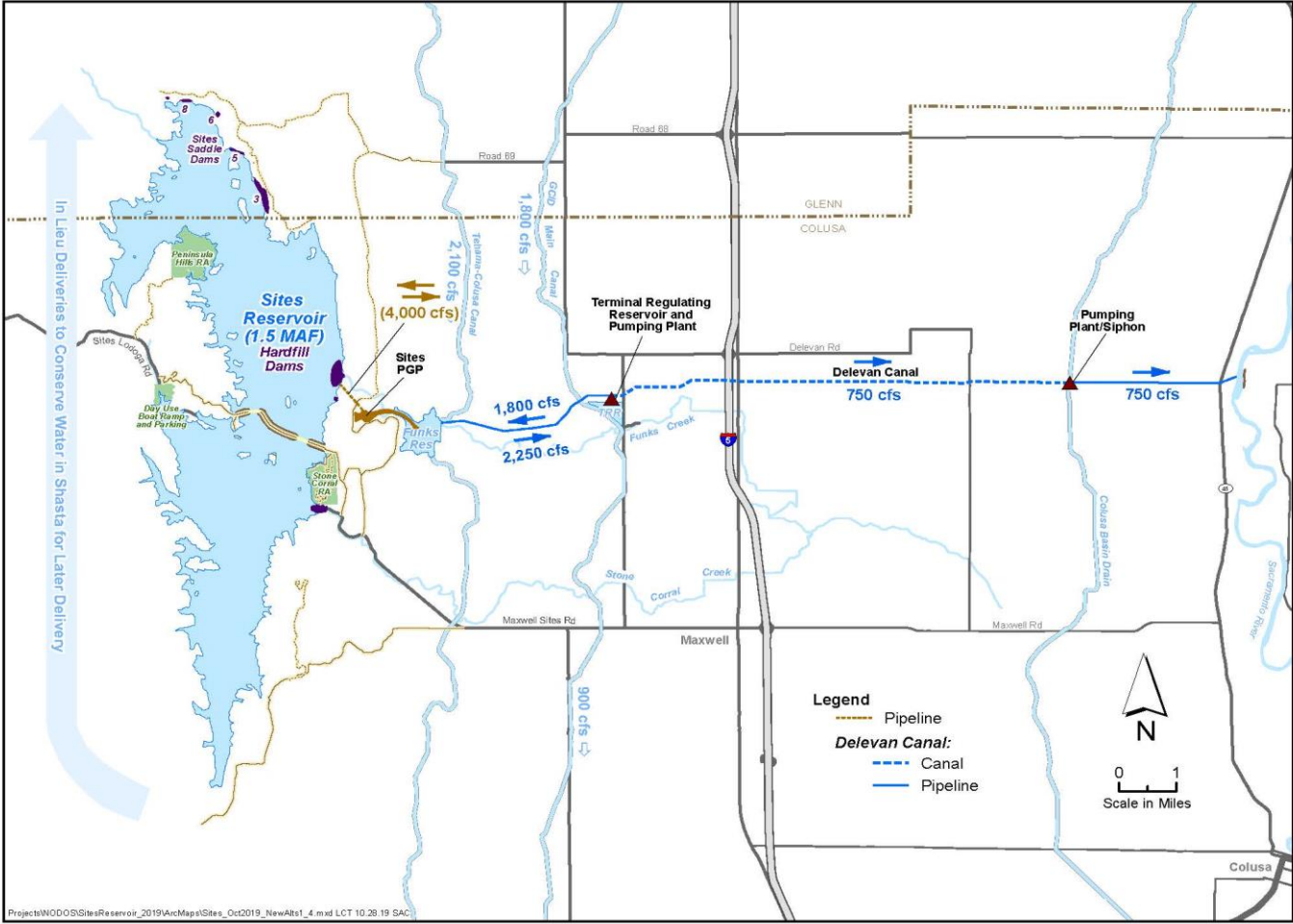


Figure 4b

Alternative 5a – Similar to Alt 1, but replaces Delevan Canal/ Pipeline with pipeline/canal release from the Dunnigan Canal to the Colusa Basin Drain, thence through the lower portion of the Colusa Basis Drain to the Sacramento River - \$3.5B

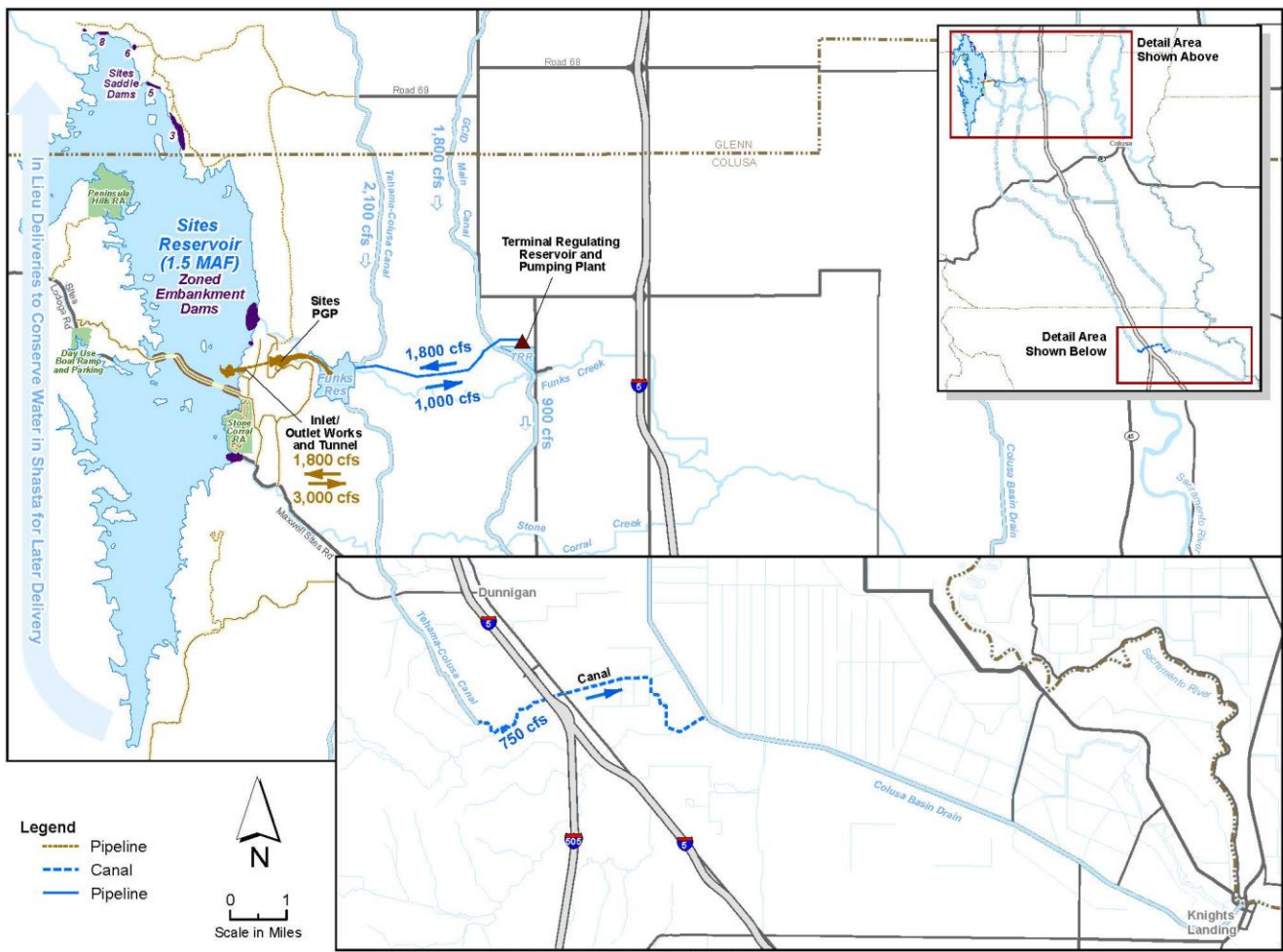


Figure 5a

Alternative 5b - Similar to Alternative 5a but releases water from Dunnigan Canal to the Sacramento River via a canal, siphon and pumping plant - \$3.9B

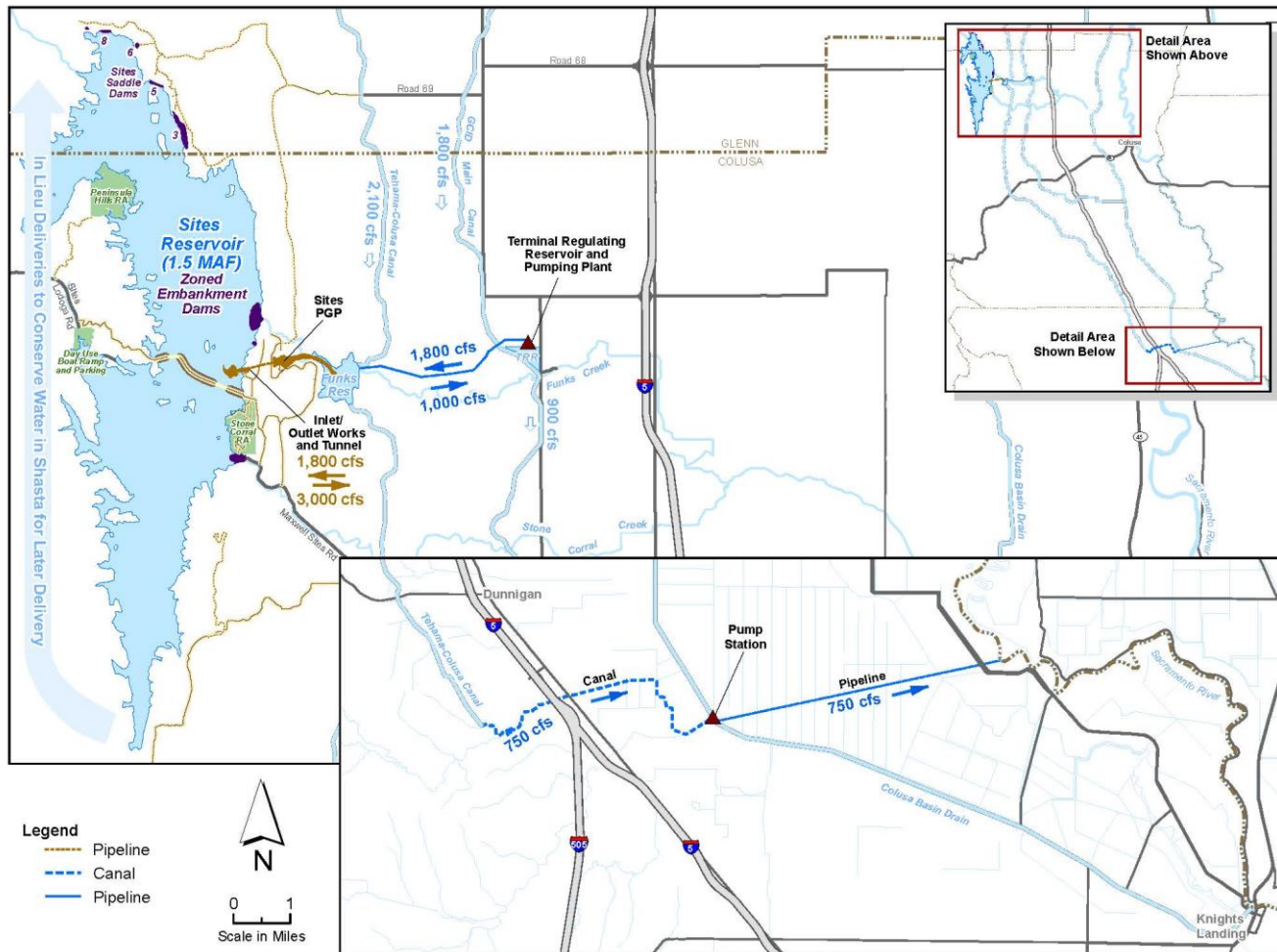


Figure 5b

Alternative 6a – Lowest cost combination of Alt 3, 4 and 5a – replace Sites PGP with 2 smaller facilities, Dunnigan release to the CBD, and an earthfill dam - \$3.4B

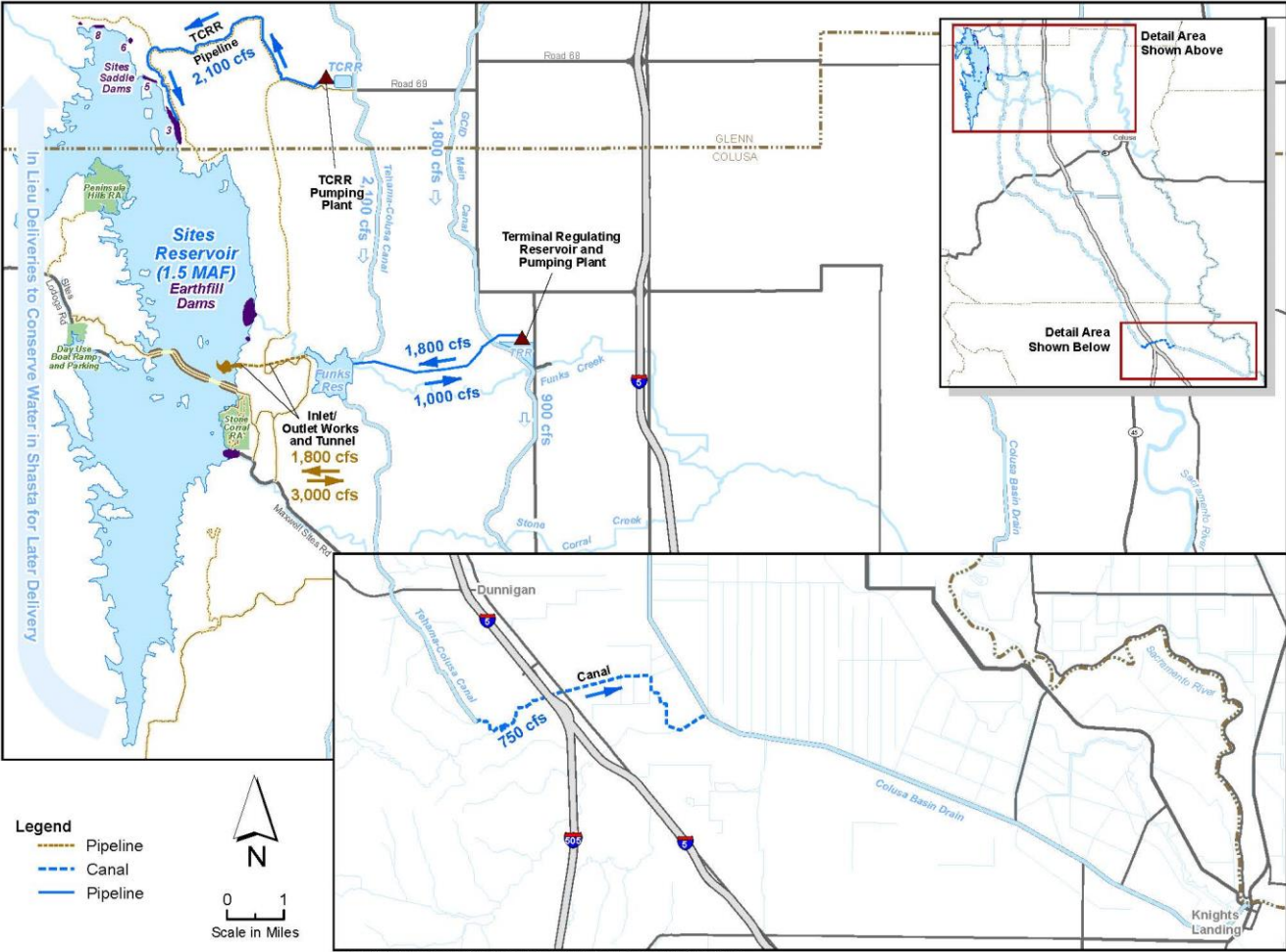


Figure 6a

Alternative 6b – Similar to Alternative 6a, but reduces Reservoir to 1.3MAF and releases water from the Dunnigan Canal to the CBD - \$3.6B

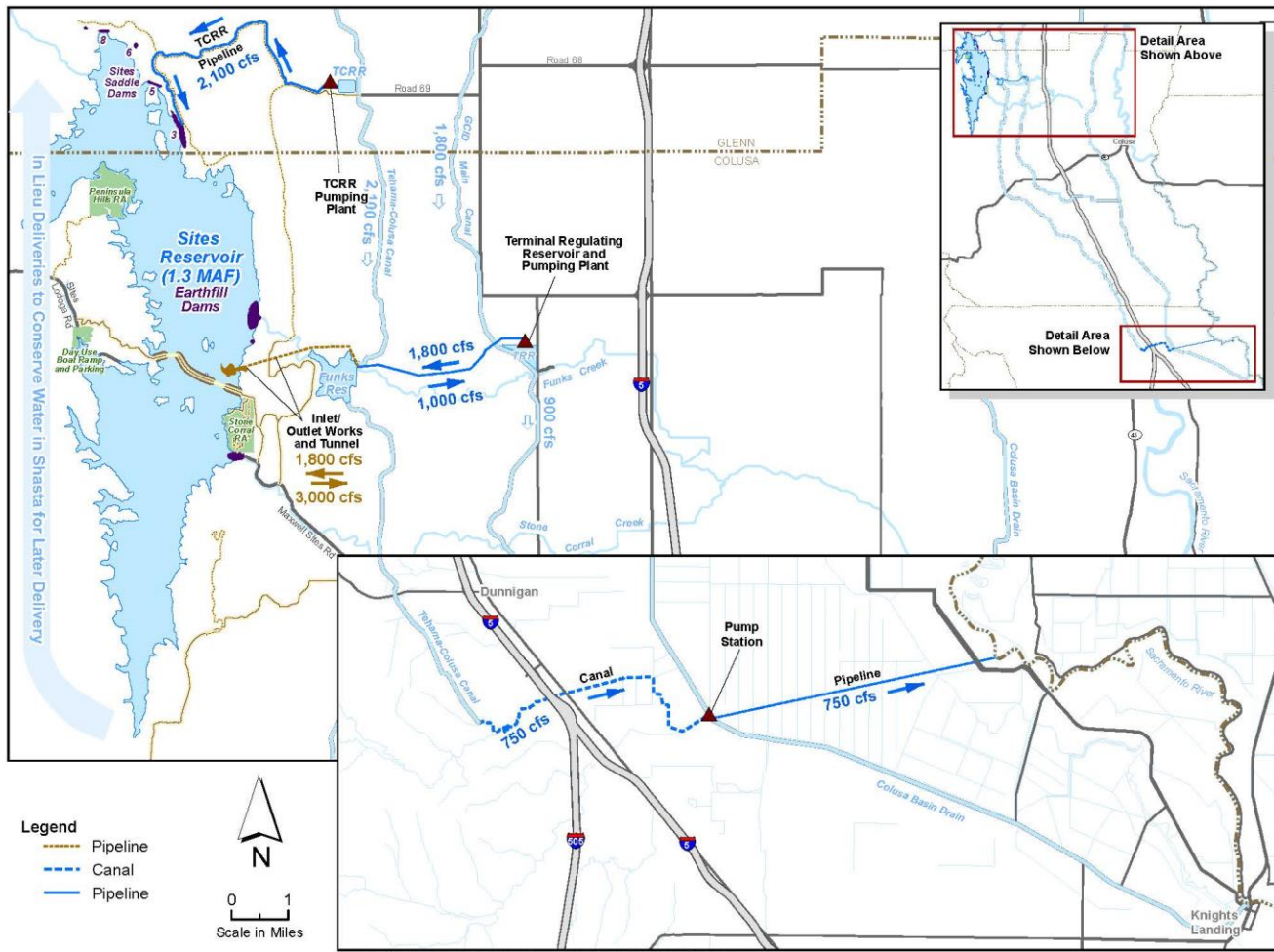


Figure 6b

Estimated Project Costs

Alternative	Estimated Costs (\$2018) (financing cost not included)	Cost Reduction from Alternative D
Alternative D	\$5,235 million	0%
Alternative 1	\$3,970 million	24%
Alternative 2	\$3,988 million	24%
Alternative 3	\$3,868 million	26%
Alternative 4a	\$3,828 million	27%
Alternative 4b	\$3,861 million	26%
Alternative 5a	\$3,548 million	32%
Alternative 5b	\$3,876 million	26%
Alternative 6a	\$3,417 million	35%
Alternative 6b	\$3,584 million	32%

- Alternative Project Costs Range from \$3.4 to \$4.0B versus \$5.2B for Alternative D
- Alternative D includes \$218M of Risk (4.2%) from the February 2018 Risk Analysis. Value Planning estimates do not include risk adjustment or analysis.

Value Planning Uncertainties

- Screening-level cost estimates have an expected variation range of (Association for Advancement of Cost Engineering):
 - Low range: -20% to +30%
 - High range: -50% to +100%
- But some facilities (especially the dams) have far more cost certainty than -50% to +100%. The higher percentages DO APPLY to facilities not included in Alternative D (e.g., a new regulating reservoir for the T-C Canal and a southern conveyance from Dunnigan).
- The entire project does NOT have a -50% to +100% estimate level. We don't have an \$8B project.
- Final project features and costs will vary from those presented.

Key Elements of Success for Value Planning

- Permitting - identify the reasonable range of CDFW permitting outcomes
- Shasta Exchange - in cooperation with Reclamation, develop parameters and quantities for drier year exchanging Sites water into Shasta so that the Sites release facilities can be downsized / relocated
- Operations Plan – update the operations assumed for the WSIP application to reflect the above and current conditions
- Project Description – revise (if necessary) to reflect Value Planning outcomes

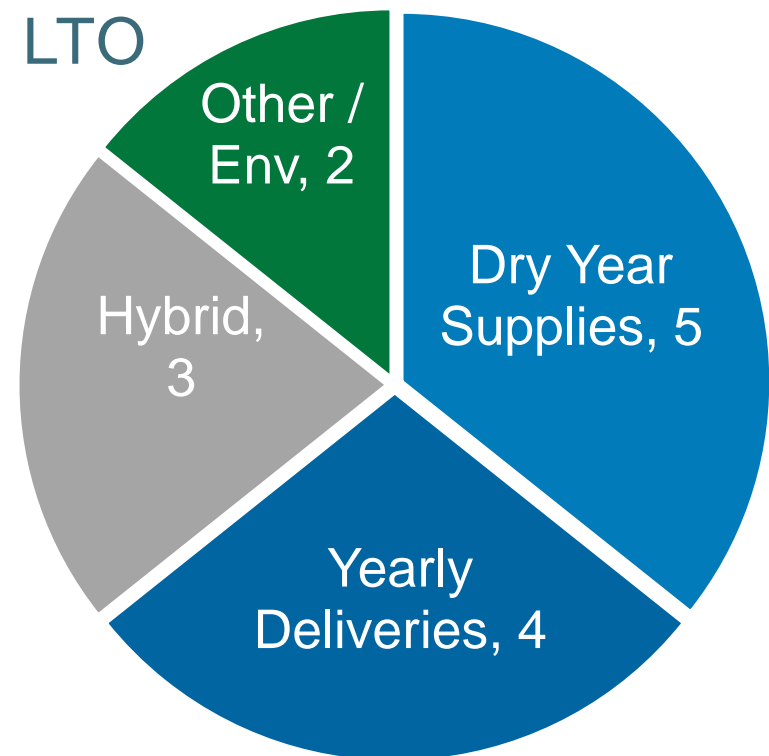
OPERATIONS AND REPAYMENT STATUS



Informal Survey Results

(2019 August)

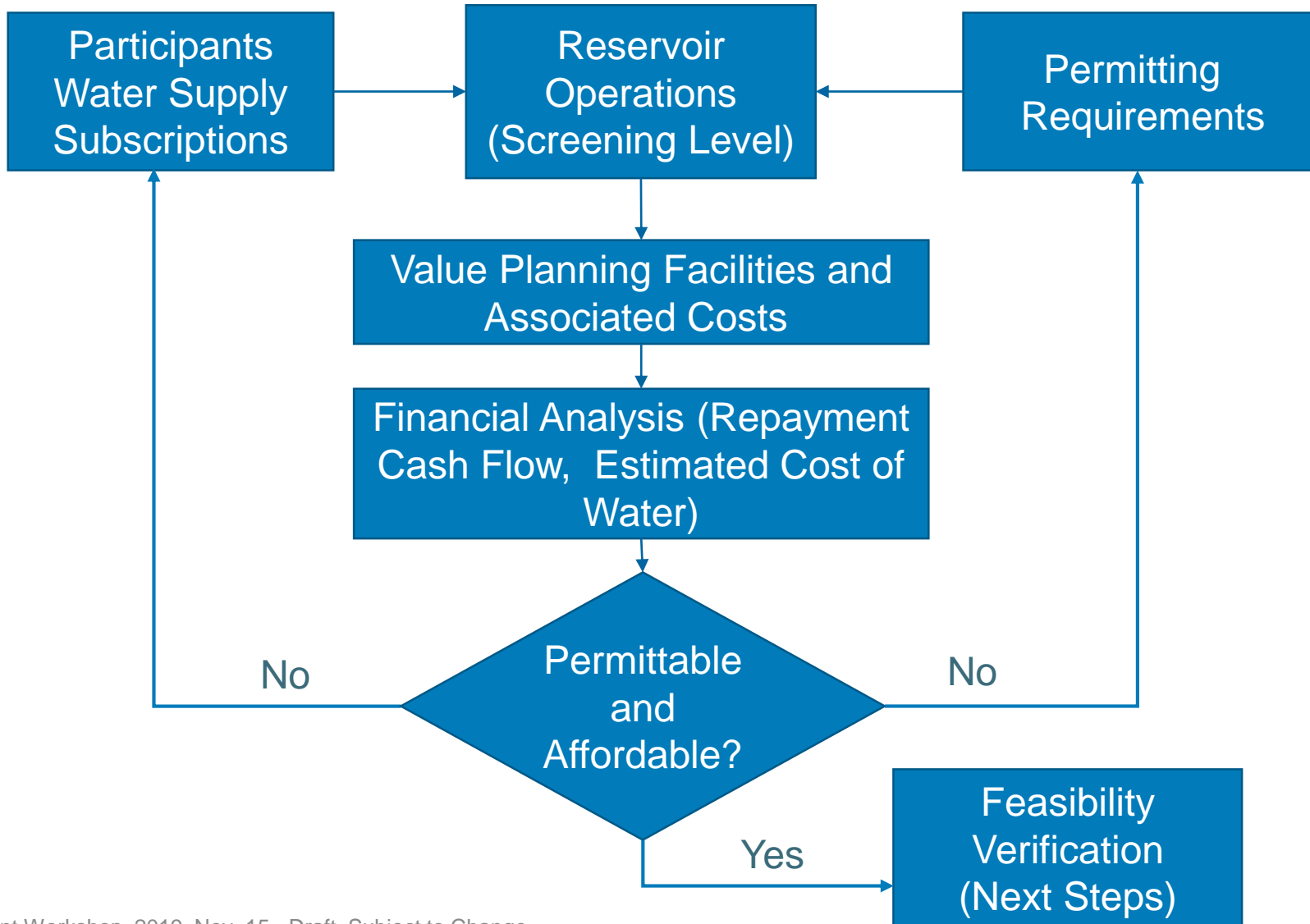
- Responses: 14 of 21
(108,442 AF of Participation = 56%)
- Diverse set of drivers
(Cost, permitting, ROC on LTO
CVP/SWP, VA's)
- Participation increases as
costs decrease,
particularly below
\$750/AF



Purpose of the Operations and Repayment Analysis

- Provide information regarding the potential range of cost of water in terms of annual repayment and operational costs
- Provide information regarding the potential range of annual cash flow requirements

Operations and Repayment Analysis Process (Background)



Participation Assumptions

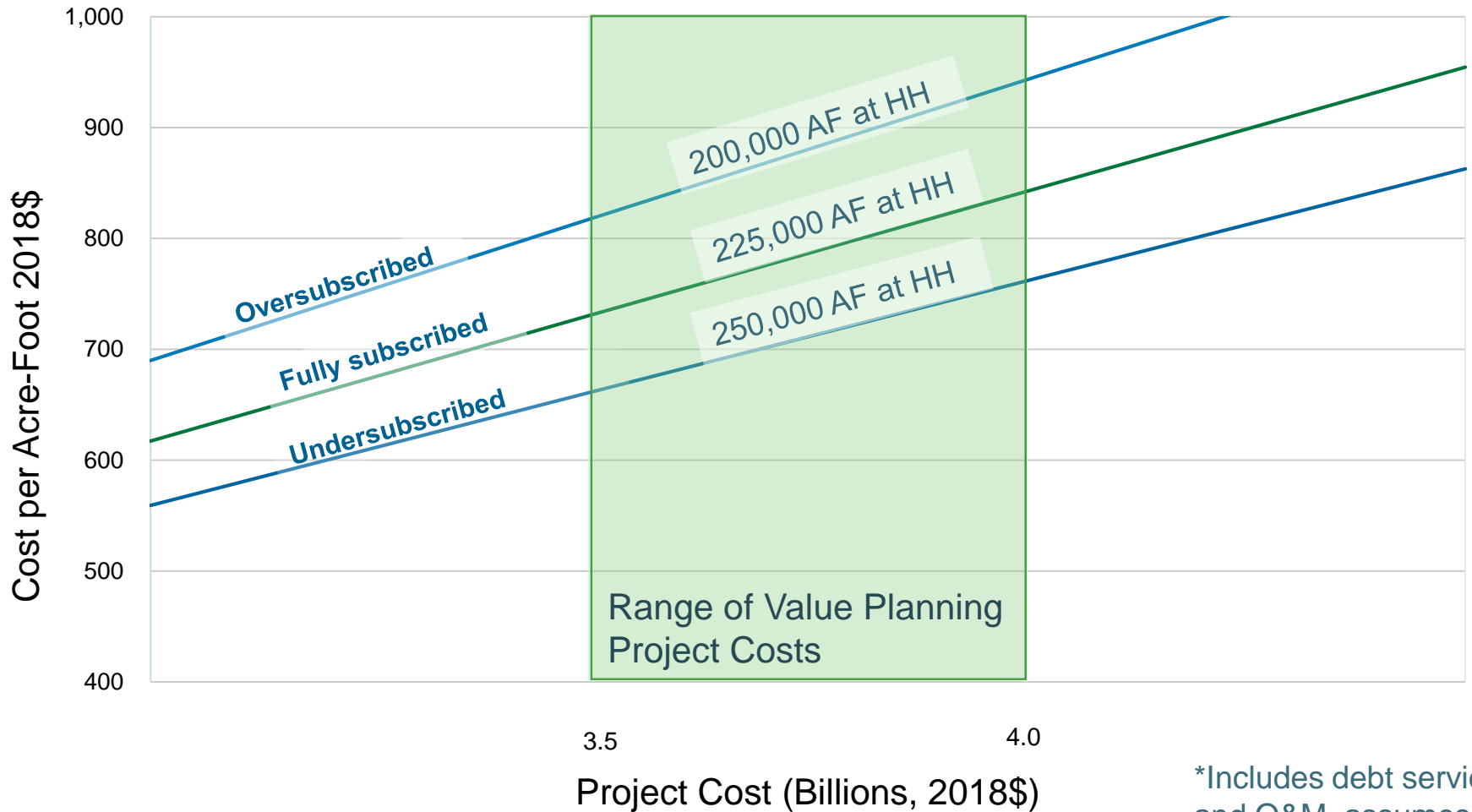
- Participant current subscription level = 192,812 AFY
- State based on Proposition 1 WSIP funding:
 - Total funding is \$816M
 - Deduct \$241.8M flood control and recreation benefits
 - Portion for environmental water supply is ~16,000 to 35,000 AFY
 - Assumes a separate storage account is used to cover O&M for environmental water

Financial Working Assumptions

Item	Value
Interim Loan	
Interest Rate	3.00%
Unutilized Rate	0.75%
Revenue Bonds	
Interest Rate	5.00%
DSRF% of Maximum Annual Debt Service	50%
DSRF Earnings Rate	4.00%
Bond Fund Interest Earnings Rate	2.00%
First Maturity	12/1/2032
Final Maturity	6/1/2066
USDA Loan	
Interest Rate	3.875%
WIFIA Loan	
Interest Rate	3.500%
Construction Risk Mitigation Percentage	4.20%
Inflation Escalators	
Pre-Construction Escalation/year	1.50%
Construction Escalation/year	2.02%
Labor Inflation Rate/year	2.00%
Non-Labor inflation rate/year	2.00%
Electrical Generation Price Escalation/year	2.00%
Months for Generation post COD	24

Annualized Cost per AF Delivered at Holthouse (HH)

Reservoir Committee Annualized Cost per AF



*Includes debt service and O&M, assumes WIFIA loan

Operations and Repayment Matrix – With WIFIA Loan

Value Planning Range of Costs

		Reservoir Cost (2018\$, billions)			
		3	3.5	4	4.5
Water Deliveries (AF)	Estimated cost per AF Released*				
250,000	560	660	760	860	
225,000	620	730	840	950	
200,000	690	820	940	1,070	
*Includes O&M, in 2018 dollars					

Rounded to the nearest \$10.

Operations and Repayment Matrix – Without WIFIA Loan

Value Planning Range of Costs

		Reservoir Cost (2018\$, billions)			
		3	3.5	4	4.5
Water Deliveries (AF)	Estimated cost per AF Released*				
250,000	610	710	810	910	
225,000	670	780	890	1,000	
200,000	750	870	1,000	1,120	
*Includes O&M, in 2018 dollars					

Rounded to the nearest \$10.

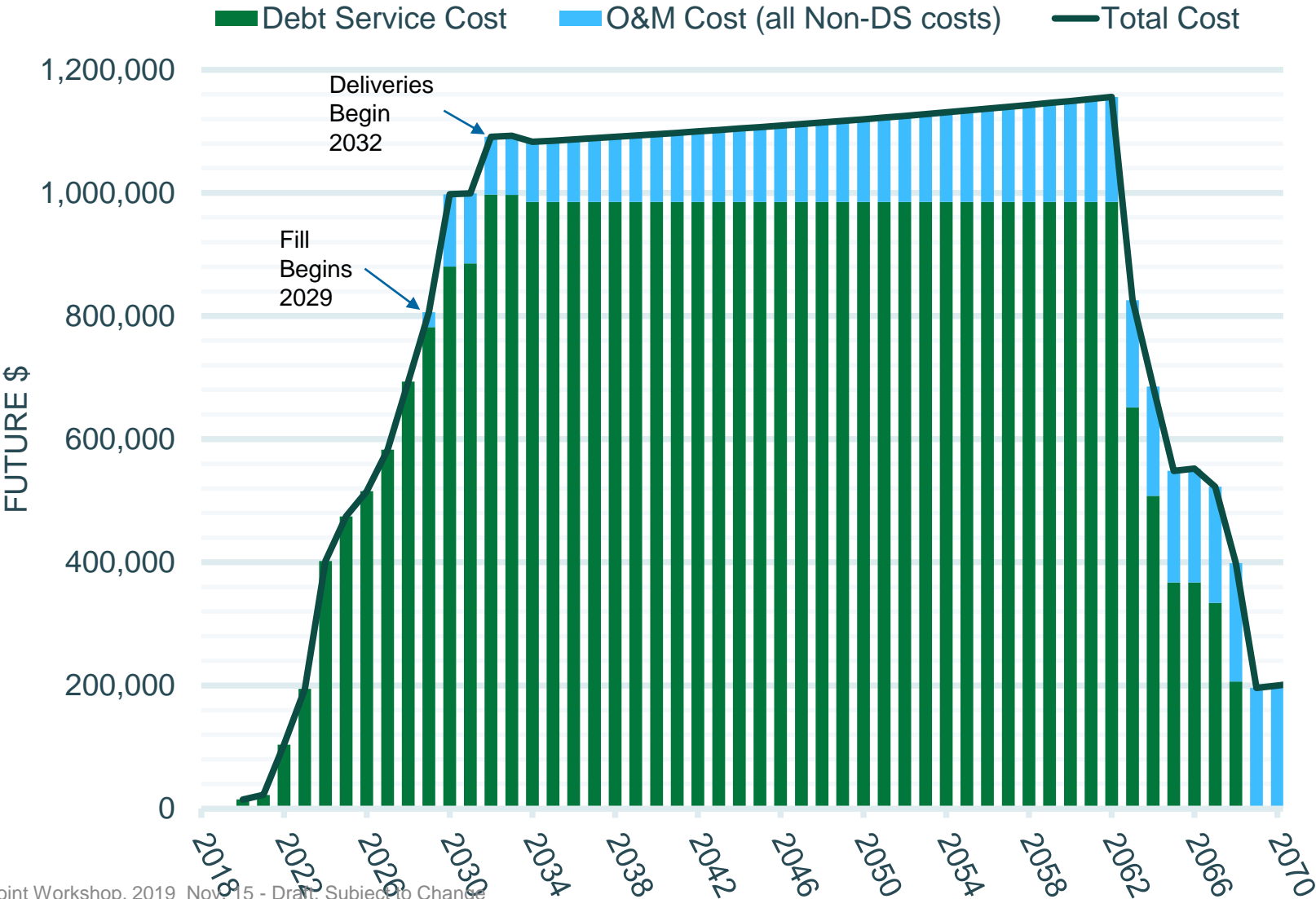
SIMPLIFIED REPAYMENT TOOL



Simplified Repayment Tool

- Input
 - Project Cost (\$3B-4.5B)
 - Deliveries at Holthouse (150-250 TAF)
 - Participation level (your agency, AF)
 - Include WIFIA financing (yes/no)
- Output (2018\$ and future \$)
 - Cash flow (from your agency)
 - Finance costs (debt service)
 - O&M costs
 - Annual average cost of water (\$/AF)

Annual Expenses for 1,000 AF of Participation \$3.5B Project, 225,000 AF/YR Operations



Simplified Repayment Tool Demonstration

Input in green cells	Reservoir Cost (\$billions, \$2018)				3.5
	AF Water Deliveries at Holthouse				225
	Include WIFIA (yes=1, no=0)?				1
	Participation Level				1,000
Water Deliveries (AF)	Reservoir Cost (\$2018, billions)				
	3.0	3.5	4.0	4.5	
	Total \$/AF Released (w/o WIFIA) (2018\$)				
250,000	605	705	805	905	
225,000	668	780	891	1,002	
200,000	747	873	998	1,123	
175,000	849	992	1,135	1,278	
150,000	984	1,152	1,318	1,485	
	Total \$/AF Released (w/ WIFIA) (2018\$) (\$/AF)				
250,000	559	661	762	863	
225,000	617	730	842	954	
200,000	690	817	943	1,069	
175,000	783	929	1,073	1,217	
150,000	908	1,077	1,246	1,414	

NEAR TERM IMPLEMENTATION



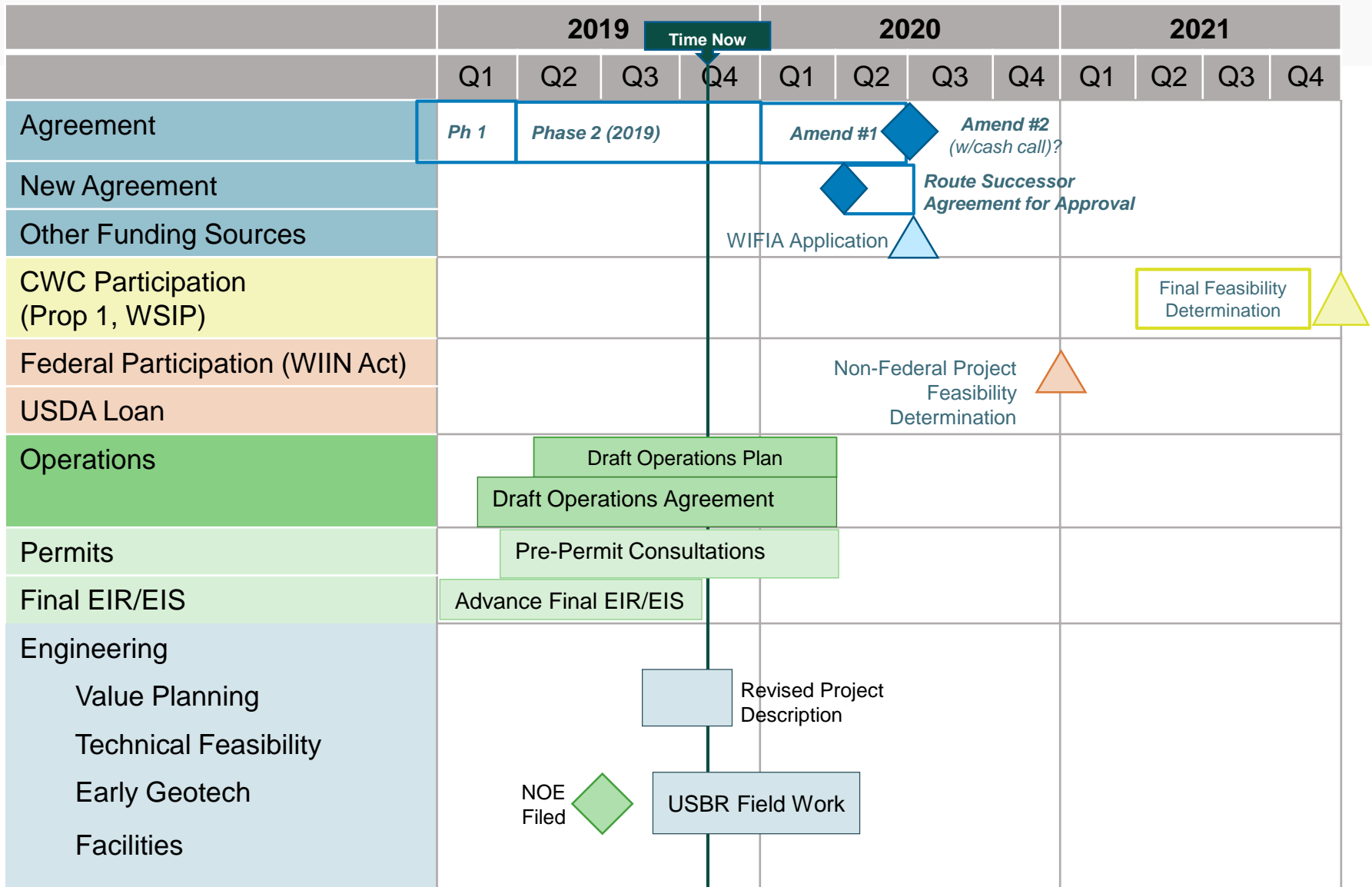
Where does the Project go from here? (1 of 3)

- Are Value Planning cost ranges adequate for the next Participant funding decision?
- Proceed with further Value Planning analyses (not currently budgeted)?
- Has permitting uncertainty been narrowed sufficiently for the next Participant funding decision?
- Proceed with detailed modeling to continue to make progress on addressing permitting, water rights, and operational uncertainty?

Where does the Project go from here? (2 of 3)

- Revise Work Plan accordingly?
- Continue discussions with Reclamation regarding Operations Principles and Sites/Shasta exchanges? Work to develop a Financial Assistance Agreement for funding via the WIIN Act?
- Determine if further Value Planning should run in series with or parallel to discussions with Reclamation regarding Sites/Shasta exchanges?
- Identify criteria for, and proceed to narrow, the Alternatives?
- Determine if the Project Description should be revised and what changes are needed to the EIR/EIS?
- Update or conduct a new risk analysis for the preferred Value Planning alternatives?

Where does the Project go from here? (3 of 3)



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