



— BUREAU OF —  
RECLAMATION

# Kern Fan Groundwater Storage Project

Design, Estimating, and Construction Review

June 8 to June 12, 2020

# DEC Review Process

- Independent oversight
- Ensures products related to Design, Cost Estimating, and Construction are:
  - Technically sound
  - Provide a credible basis for decision making
- Cost estimates are appropriate for their intended purpose
  - Identify fatal flaws
  - Major risk and uncertainties have been fully addressed in the design and estimates
- Reviews conducted with a broad corporate perspective
- Sustain Reclamation's credibility
- Not a substitute for conducting technical or peer reviews



# DEC Review Team (Team)

- **Jason Wager, PE, DEC Team Leader, Reclamation – Technical Service Center, Denver, Colorado**
- **Kenneth Brockman, PE, Construction Management Team Member, Reclamation – Technical Service Center, Denver, Colorado**
- **John Fleming, PhD, PGp, Hydrology Team Member, Reclamation - Yuma Area Office, Yuma, AZ**
- **Derek Nelson, Cost Estimating Team Member, Army Corps of Engineer, Walla Walla, WA**
- **Michelle Norris, PE, Water Conveyance Team Member, Reclamation – Technical Service Center, Denver, Colorado**
- **Mark Vandenberg, Geology Team Member, Reclamation – Technical Service Center, Denver, Colorado**



# DEC Review

- Virtual Kickoff Project Briefing and Site Visit
  - Tuesday, June 2, 2020;
  - DEC Team, Regional Project Manager, Design Team
- Deliberation and Draft Report
  - Monday, June 8 to Friday, June 12, 2020
  - DEC Team
- DEC Outbriefing
  - Friday, June 12



# Kern Fan Groundwater Storage Project

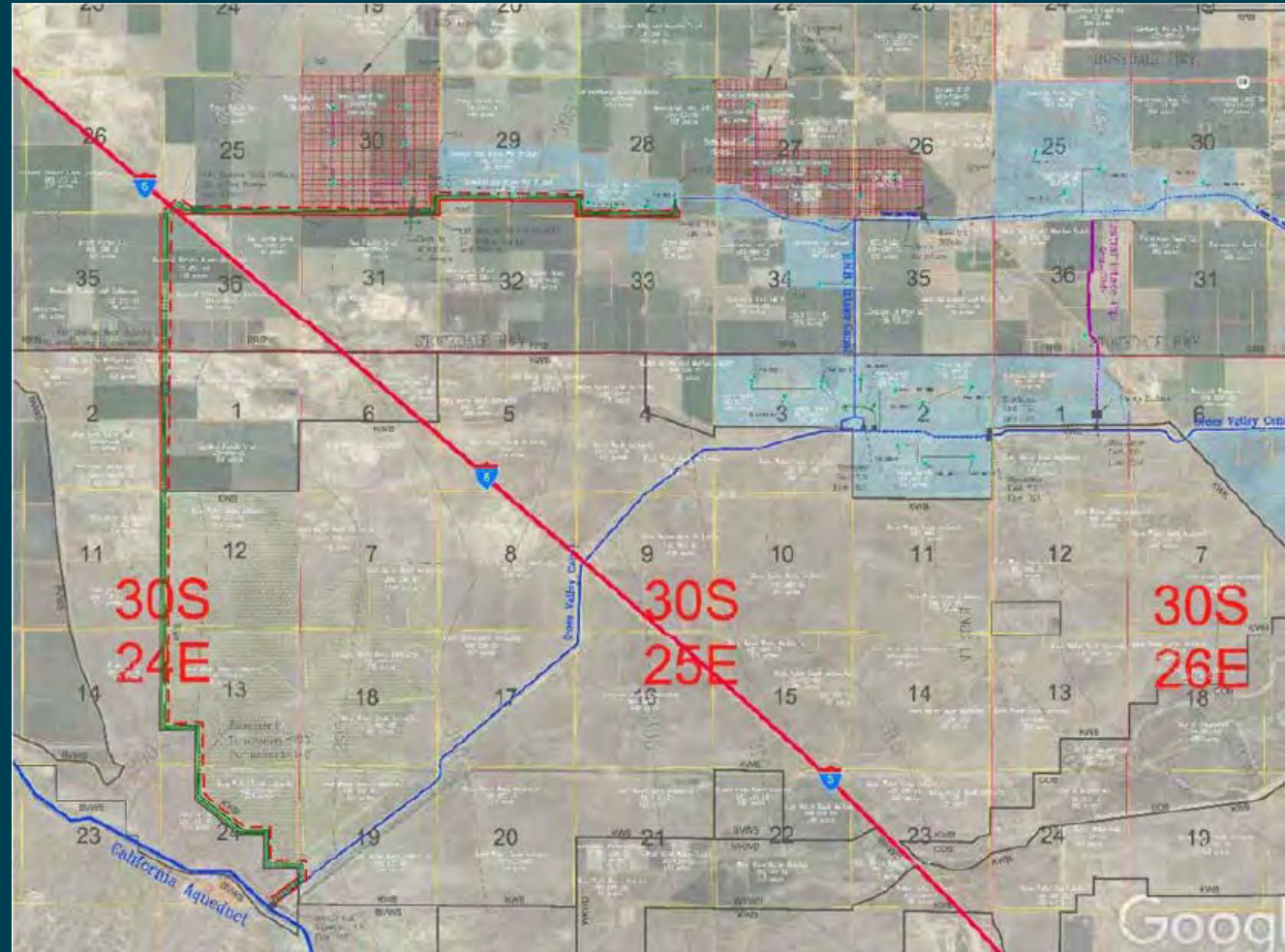
The Kern Fan Groundwater Storage Project (Project) consists of a regional water bank in the Kern County Groundwater Sub-basin of the San Joaquin Groundwater Basin in Kern County, California that will provide water supply, groundwater and ecosystem benefits.

The Project concept, sizing, location, features and operations are based on the experience and knowledge gained from IRWD's and RRBWSD's existing water banking projects.



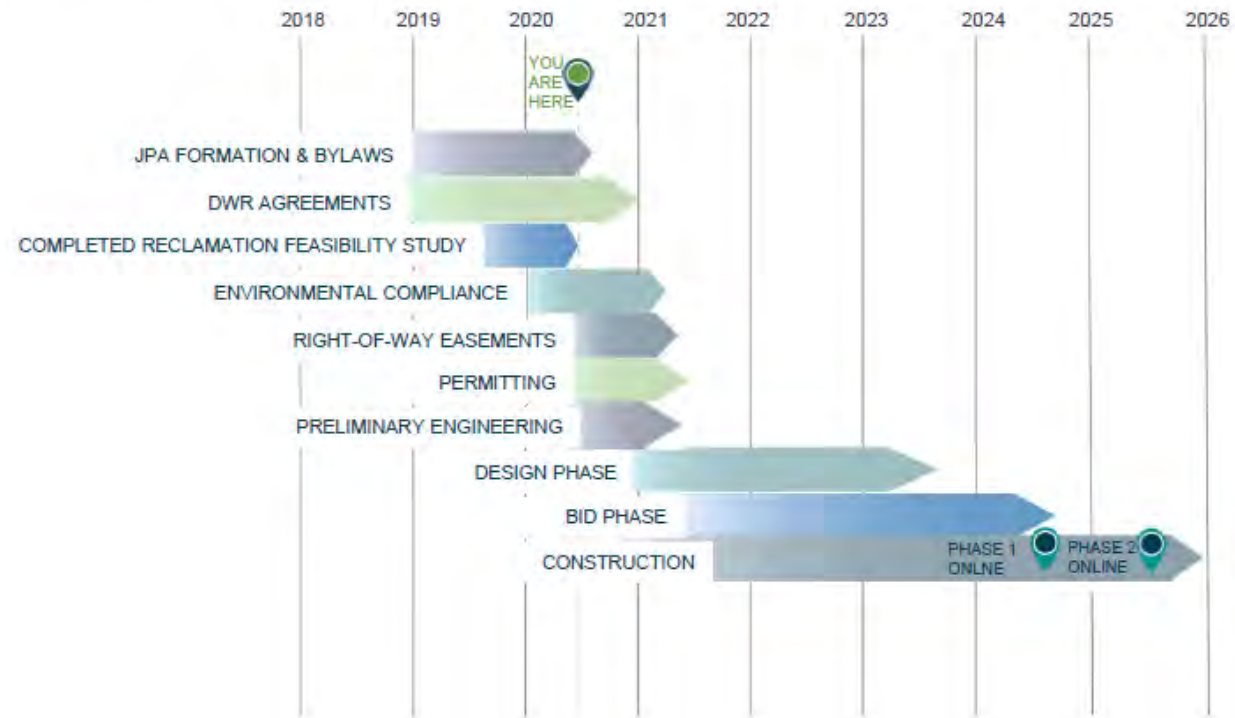
# Kern Fan Groundwater Storage Project

Premise is to capture Article 21 water from the California Aqueduct and create a water bank for use during drier conditions.

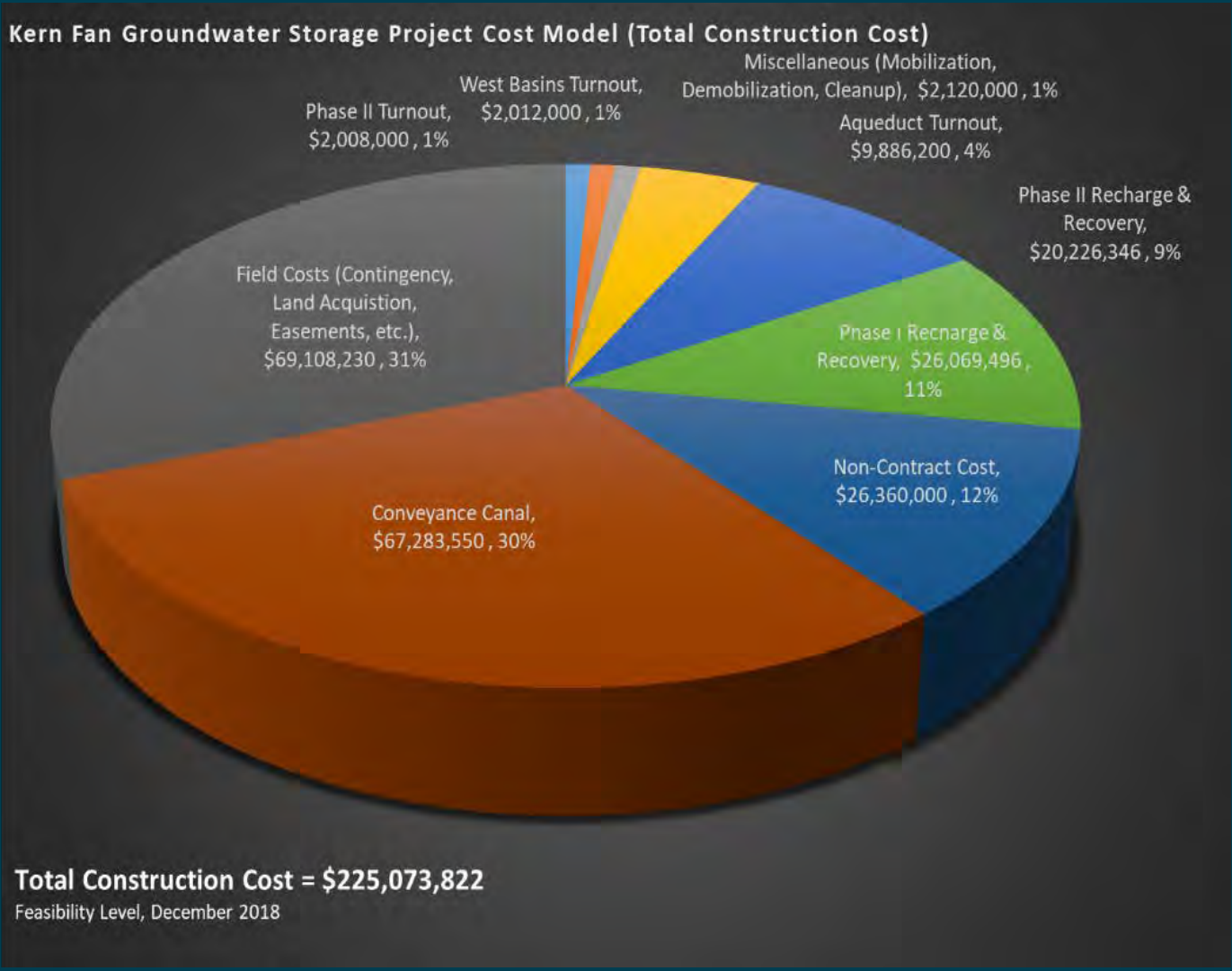


# Project Schedule

## Project Schedule

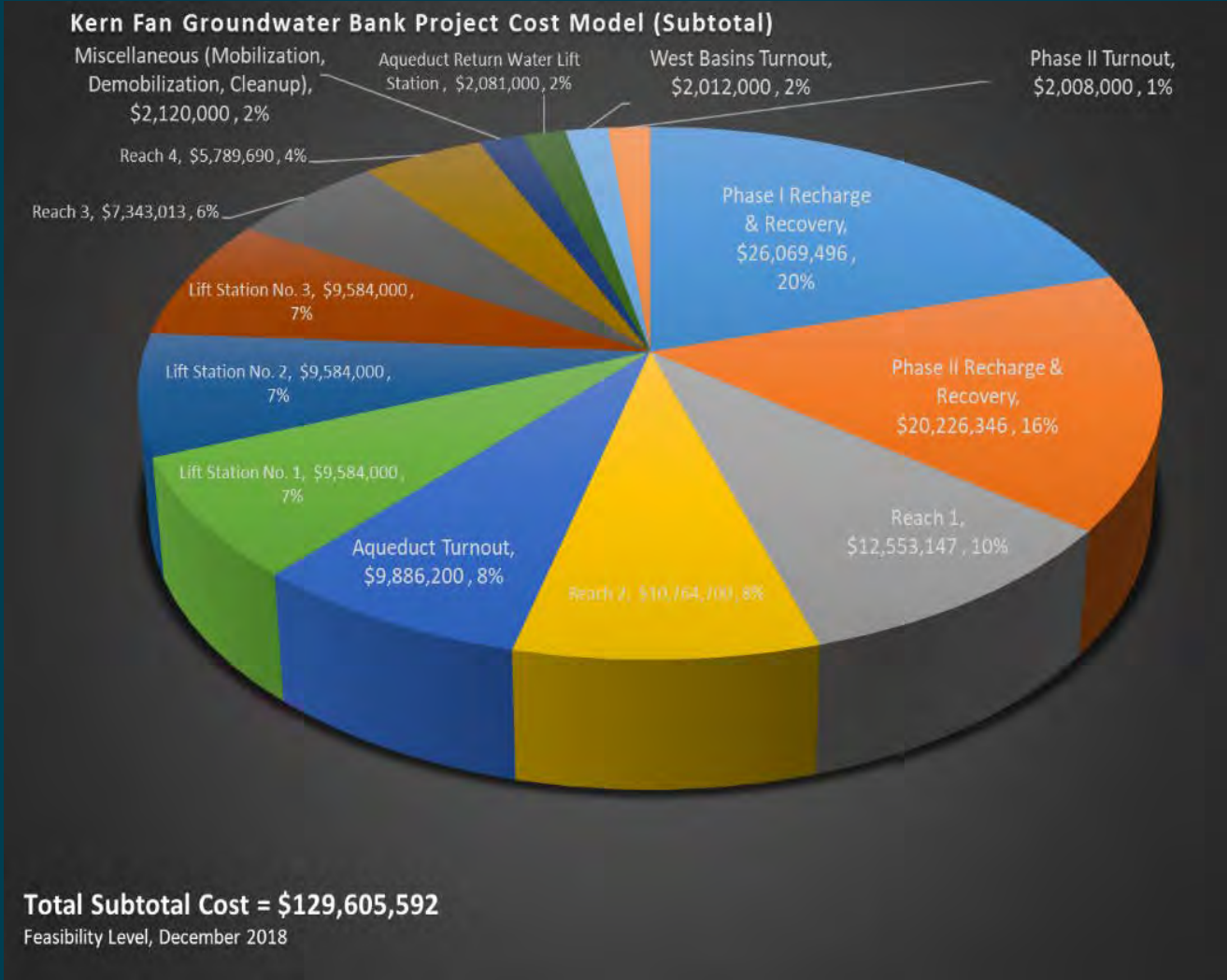


# Total Project Cost





# Subtotal Cost



# Findings and Recommendations

- The DEC Team acknowledges that considerable effort has been invested by the Regional Project Team and the designers to bring the project to its current Feasibility Level.
- The DEC Team has identified four Findings and Recommendations (F&Rs), which can improve the final product.
- Additionally, the DEC Team has identified other issues that do not rise to the level of a formal F&R. These are described further in the “General Discussion” section of the DEC Review Report.



# DECKERN-01

## Finding:

There are no operational plans or contingencies to mitigate high arsenic levels during system startup, in the event that arsenic levels increase over time, or arsenic MCL levels are reduced.

## Recommendation:

Develop operational plans with contingencies to handle startup conditions, potential increases in arsenic concentrations, or lower MCLs.



# DECKERN-01, cont.

## Discussion:

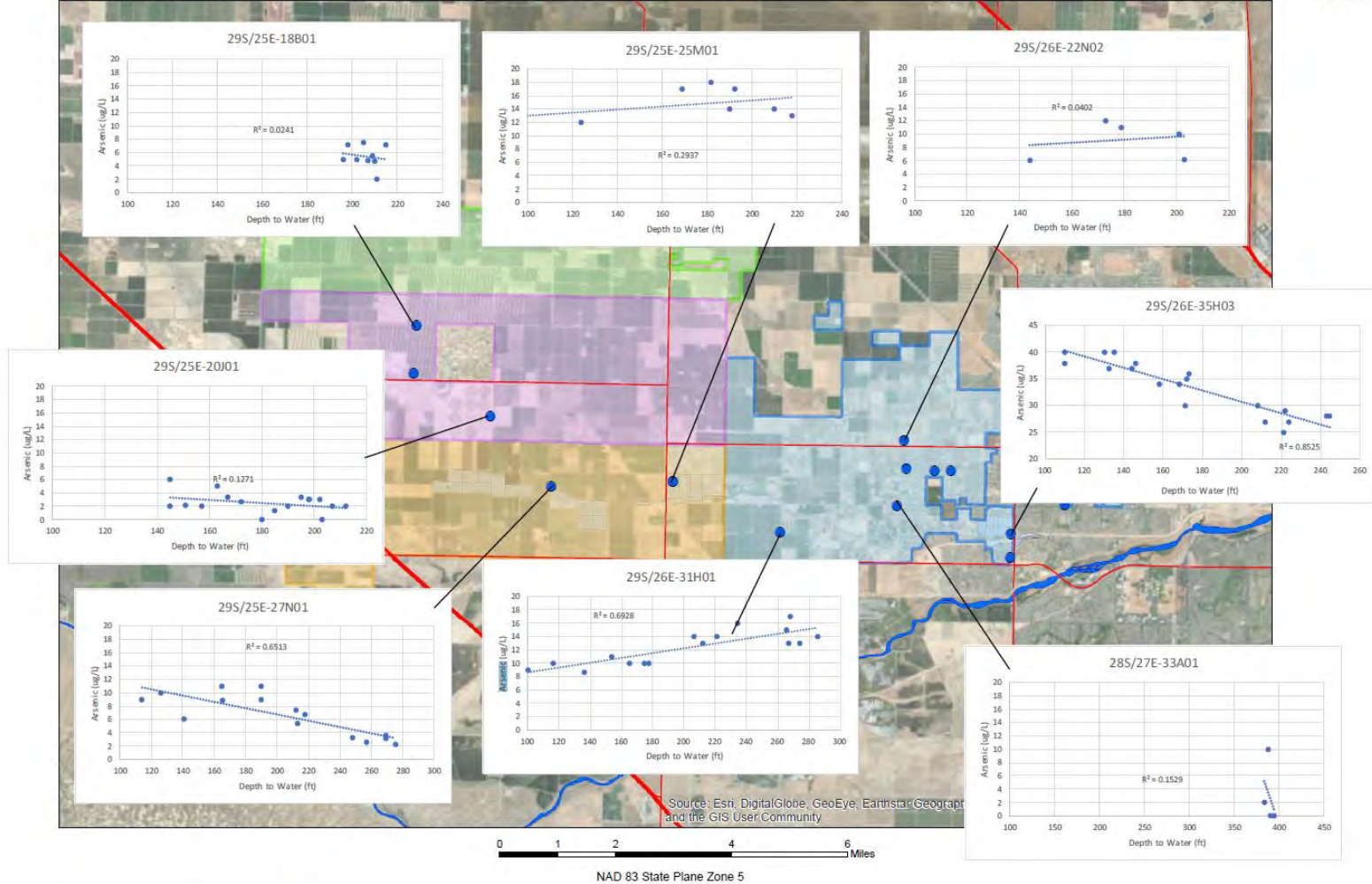
- Arsenic is present in the project area, and local ASR recovery water. An operational plan should be developed to monitor well discharge at startup and adjust as necessary to assure that discharges do not exceed the MCL for arsenic.
- There is a potential for arsenic levels to increase over time as water is infiltrated from the basins.
- Many jurisdictions are considering reducing MCL levels, and there is a possibility that the MCL for arsenic may be lowered during the life of this project.



# Rosedale-Rio Bravo Water Storage District

# Rosedale-Rio Bravo Management Area Groundwater Sustainability Plan

11-Apr-19



**Map Features**

- Arsenic Trend Well
- Stockdale Recharge Basin
- Strand Ranch Recharge Basin
- RRBWS D Recharge Basin

**Monitoring Zones**

- North Zone
- Central Zone
- South Zone
- East Zone
- Highway/Road

Note:  $\mu\text{g/L}$  = micrograms/liter  
 gpm = gallons per minute  
 Arsenic Maximum  
 Contaminant Level =  $10 \mu\text{g/L}$

**Preliminary DRAFT**

**Arsenic and Depth to  
Groundwater Trends**  
 Figure 3



# DECKERN-02

## Finding:

As currently designed the recharge basins may not meet the requirements for classification as an intermittent wetland.

## Recommendation:

Determine requirements for creation of intermittent wetlands, and update design and cost estimate to include these features.



# DECKERN-02, cont.

## Discussion:

- For areas to be considered intermittent wetlands, certain design features and project conditions must be met. These can include sustainability, depth to groundwater, diversity of wetland plant species, transitional zones of vegetation based on available water, presence of hydric soils, and depth of open water. As designed, the ponds may not meet the requirements for intermittent wetlands.
- The addition of these features will increase the project cost.
- The cost estimate should also include the cost of wetland maintenance, as they may remain dry for long periods.



# DECKERN-03

## Finding:

The overall project cost contingency appears to be low for the current level of design.

## Recommendation:

An evaluation of cost risk should be undertaken to determine an adequate level of contingency. This should include risks to project delivery (land acquisition, design, environmental compliance, etc.) in addition to construction contingencies. Risks should be captured for both project dollars and project schedule.





# DECKERN-03, cont.

## Discussion:

- The current estimate on the preferred alternative includes a 20% contingency for construction. That is 20% contingency on \$129,605,592 or \$25,921,118.
- The Total Project Cost of \$225,073,822 carries no further contingency. This equates to total project contingency on the total project of 11.5%. Historically at the feasibility level and the current level of design and cost definition the total project contingency should be in the range of 20-50%.



# DECKERN-04

## Finding:

There are several deficiencies within the Feasibility Study that as a whole may result in higher project costs or reduced benefits.

## Recommendation:

Evaluate and document the items listed below.



# DECKERN-04, cont.

## Note:

- During the review, many additional documents were provided to the DEC Team. The Team had limited ability to review all these additional documents within time constraints.

## Discussion:

- The proposed lining is expensive, and other lining systems should be considered.
- The basis for the cut and fill quantities is unclear. Typical sections for cut, fill, and transition areas are presented. A Feasibility report should include cross sections at regular intervals along the canal to depict changing topography.



# DECKERN-04, cont.

## Discussion:

- The lifespan of facilities may be reduced due to their intermittent usage. It is not clear how this intermittent usage was accounted for in their cost estimates.
- Operation and Maintenance as it relates to wells, well pumps, screens and lift station pumps is unclear. Typical maintenance needs to be quantified.
- The recharge basin O&M is also unclear.
  - Accumulation of fines / windblown fines
  - Algal mats



# General Discussion

Additional Monitoring wells

Location of recharge ponds

Utility locations not shown on drawings

Shasta Dam Raise



# Conclusion

- By implementing the recommendations and suggestions in the DEC Review Report, the final product will have less risk, increased clarity, and a more common understanding of the project for the Regional Project Team.
- The DEC Review Report has more information than what is presented here.



# Next Steps

1. The DEC Office will transmit the Draft DEC Review Report to the Regional Project Team
2. The Regional Project Team will provide comments on the Draft DEC Review Report
3. The DEC Office will transmit the Final DEC Review Report to the **Interior Region 8 – Lower Colorado Basin**
4. A Joint Resolution Memo or similar between the DEC Office and **Interior Region 8 – Lower Colorado Basin**



# Questions





# Thank-Yous

- Project Owner and their consultants: Irvine Ranch Water District / Rosedale - Rio Bravo Water Storage District
- Reclamation Project Manager: Jack Simes
- DEC Team
- DEC Oversight and Value Program Office
  - Kristi Evans
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