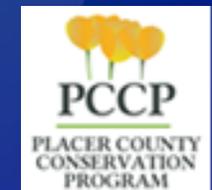




# Summary of DWR Component 2 Recharge Feasibility Study



July 2, 2025



# Raccoon Creek Groundwater Recharge Project Goals and Team

- **Team developed to build sustainability and long-term partnership**
  - Project Management Expertise
  - Regional Technical leadership
  - Willing Conservation Landowners
- **Region/Team is ideal for recharge in the Sacramento area**
  - WPGSA leading direct recharge development
  - Geologic conditions & recharge flow is beneficial for multiple stakeholders
  - Multiple water source potential
- **First of many direct recharge projects for WPGSA**
  - Ten viable sites documented

# Proposed Study Raccoon Creek Recharge Feasibility

**Recharge Basin Investigation Planning**  
**Recharge Basin Investigation**  
**Water Conveyance Assessment**  
**Preliminary Design (30%) Drawings**

- Conduct planning and investigative activities associated with the recharge basin subsurface investigation
- Perform electromagnetic surveys, drilling of eight hollow stem auger boreholes, and permeability testing
- Technical Memorandum documenting permeability testing and estimates of the amount of water that could be recharged

**Project Management and Coordination**  
**Temporary Diversion Permit Application**  
**Stakeholder Engagement and Community Outreach**

- Project and contractor management, budgets, coordination, and reports
- Prepare a draft Temporary Diversion Permit Application
- Engage interested parties and stakeholders and share the findings of the investigation in public meetings
- Provide stakeholder notifications via website updates, social media, and/or direct mail as appropriate

# Work Performed

## Towed Transient Electromagnetic (tTEM)

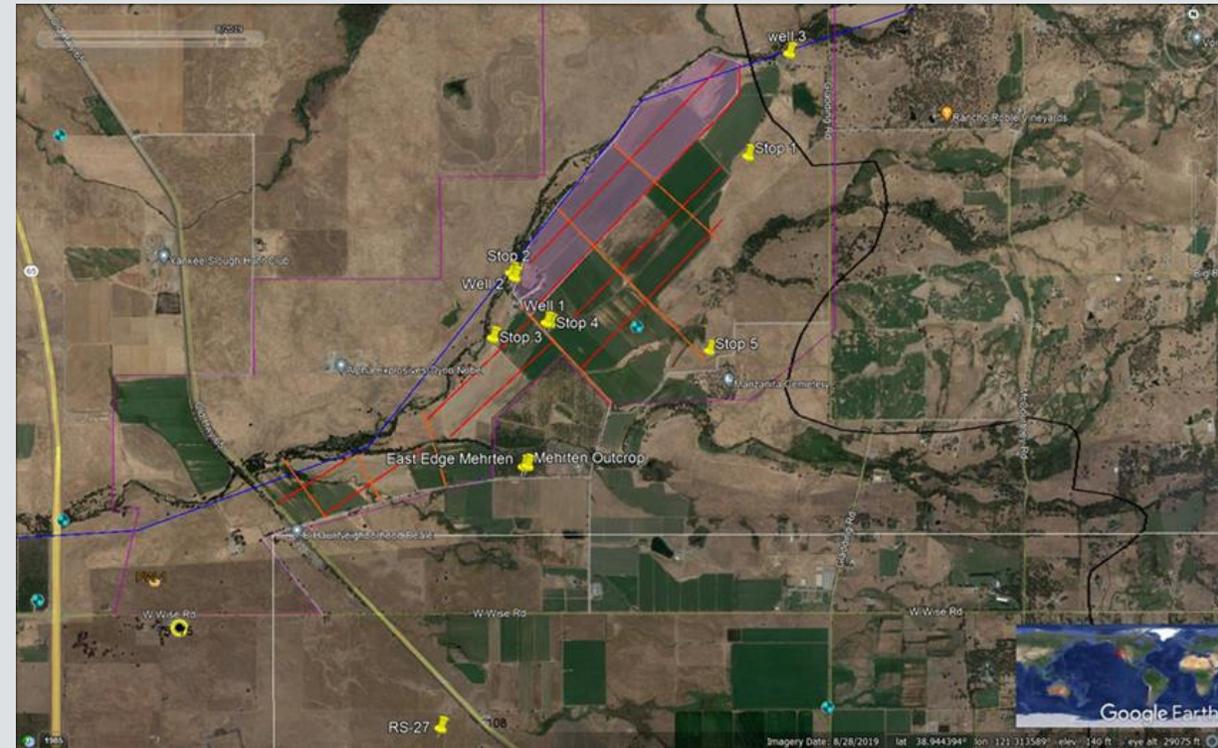
- Conducted a geophysical survey using tTEM
- tTEM uses electromagnetics to understand the ability to convey and store water

## Drilling/Hand Auguring

- Drilled 6 boreholes to confirm the results of the tTEM survey
- Hand-auguring was completed at 20 locations across the site, collecting soil samples
- Ground-truthing revealed results different than the tTEM data

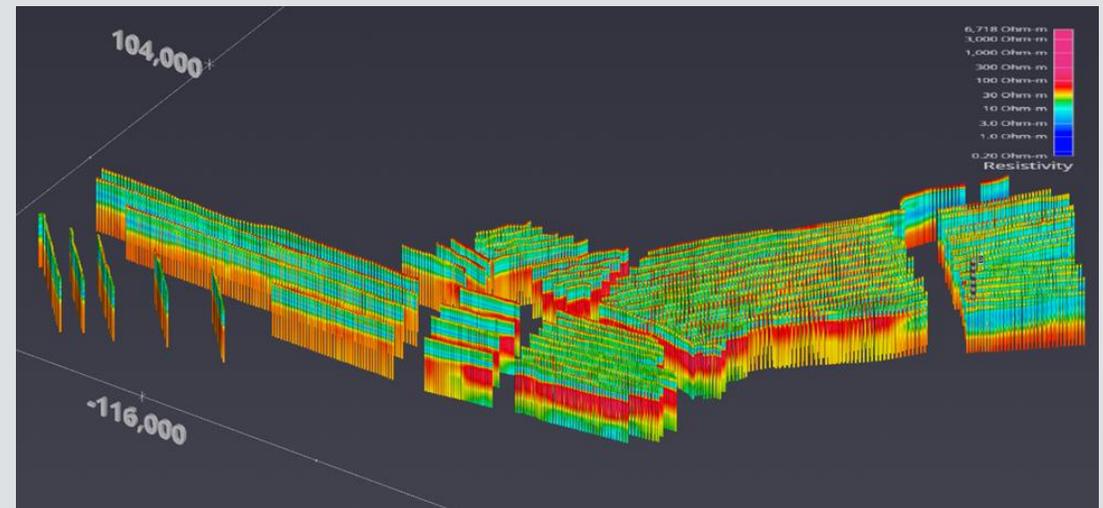
## Cost/Benefit Analyses

- Due to the geologic information on the site a decision to evaluate three alternatives for groundwater recharge on the site was performed



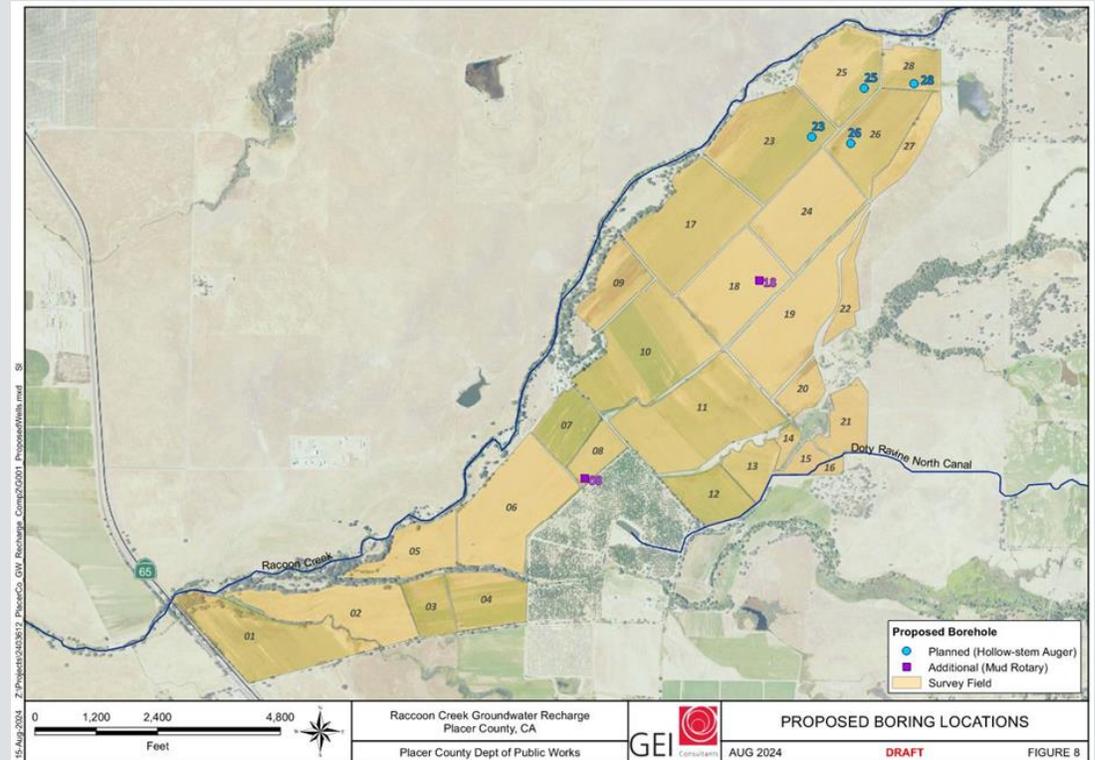
# Towed Transient Electromagnetic (tTEM)

- The tTEM results, presented as mean resistivity plan-view maps and vertical resistivity sections, revealed several key findings:
- The shallow soils (within the first 16 feet) showed medium to high resistivity, indicating the potential for more permeable soils
- Resistivity generally decreased with depth
- Very high resistivities were found at the surface in the northeastern portion of the site
- A cohesive low-resistivity layer was found at depth, indicating finer soils that may restrict the flow of groundwater and separate upper aquifers from deeper layers
- The findings showed good agreement with the DWR AEM survey data in the area



# Drilling/Hand Auguring

- The tTEM data provided a general understanding of the potential sediments in an area
  - ground-truthing (on-site verification) necessary
  - Locations for boreholes were selected based on geologic information
  - Due to the less-than-ideal results of the boreholes another 20 sites were selected to perform hand-auguring
  - Significant amounts of clay and depth of clay were found
  - Decision to conduct a Cost/Benefit analyses was warranted



# Cost/Benefit Analyses

- The cost-benefit analysis evaluated three alternatives for groundwater recharge on the Site
- Cost estimates based on previous project estimates and construction bids from 2024
- All options were not ideal and deemed unsuitable to continue due to costs, recharge estimates and key challenges
- ***Surface Spreading***
  - Estimated cost: **\$7 million**
  - Estimated recharge: **3,000 afy**
  - Cost per acre-foot: **\$2,400/afy**
- ***Subsurface Recharge – Reverse Tile Drains***
  - Estimated cost: **\$4.2 million**
  - Estimated recharge: **600 afy**
  - Cost per acre-foot: **\$7,000/afy**
- ***Expanding Existing Drainage Swale***
  - Estimated cost: **\$1.8 million**
  - Estimated recharge: **250 afy**
  - Cost per acre-foot: **\$7,200/afy**

# Conclusions & Next Steps

## Results

- Geophysical survey indicated favorable recharge potential
- Borehole drilling and hand-augering revealed conditions that contradicted the tTEM findings
- The Site unsuitable for recharge
  - shallow clays,
  - shallow water table
  - land use restrictions prohibiting the removal of the clay soils

## *Lessons Learned*

- Integrate early, low-cost subsurface investigations
- Optimize tTEM application
- Prioritize shallow-surface borings
- Assess conservation lands' compatibility for MAR

## Moving Forward

- Developing an improved Process
- Performing long-term permitting alterations to SWB process
- Planning next Feasibility Study
  - 10 possible sites identified
- Seeking grant funding for next project