



# Groundwater Recharge Services Short Term Project Identification

PRESENTED BY: Geosyntec Consultants and Water and Land Solutions

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**Geosyntec**   
consultants

engineers | scientists | innovators

# Agenda

1. Introductions
2. Project Objectives
3. Short Term Project Identification and Assessment
  - a) Jasper Property
  - b) Van Tol Property
  - c) California Olive Ranch
4. Discussion
5. Next Steps

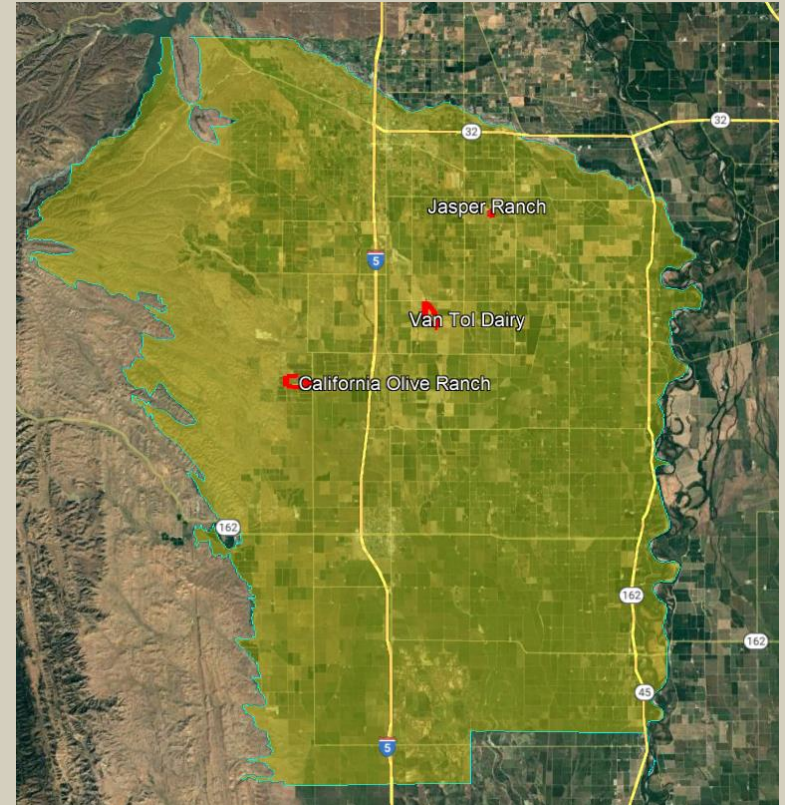
# Introductions

Joseph Turner – Project Manager/Lead Hydrogeologist

Jennifer Scheer – Project Liaison/Ag Water Specialist

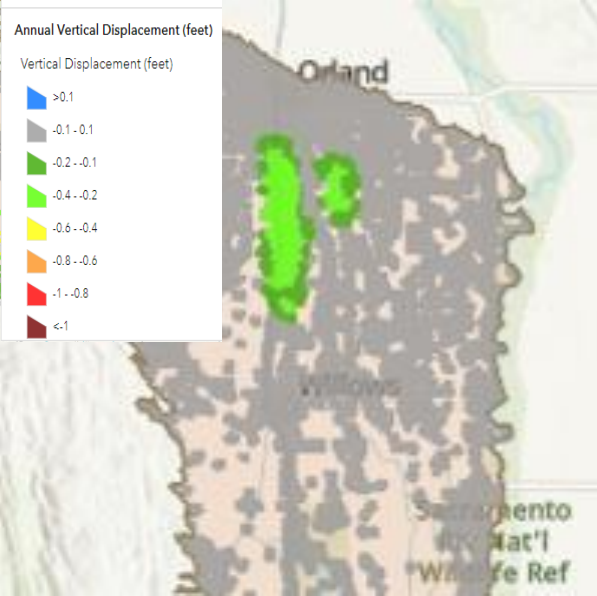
# Project Objectives

- Prioritize at least one project that can be implemented during the 2022-2023 Water Year
  - ✓ Available Water Supply and Conveyance
  - ✓ Suitable Soils
  - ✓ Minimal Environmental Review and Permitting
  - ✓ Costs/Funding
  - ✓ Legal
- **Sites Assessed**
  - ✓ Orland Unit Water Users Association
    - ✓ Eliminated for short-term – Potential long-term opportunity
  - ✓ Jasper Property
  - ✓ Van Tol Property
  - ✓ California Olive Ranch
- **Planning Project – Does not include implementation**

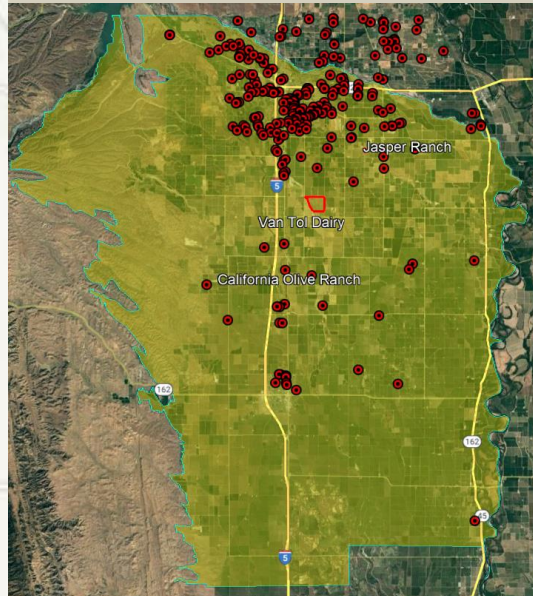




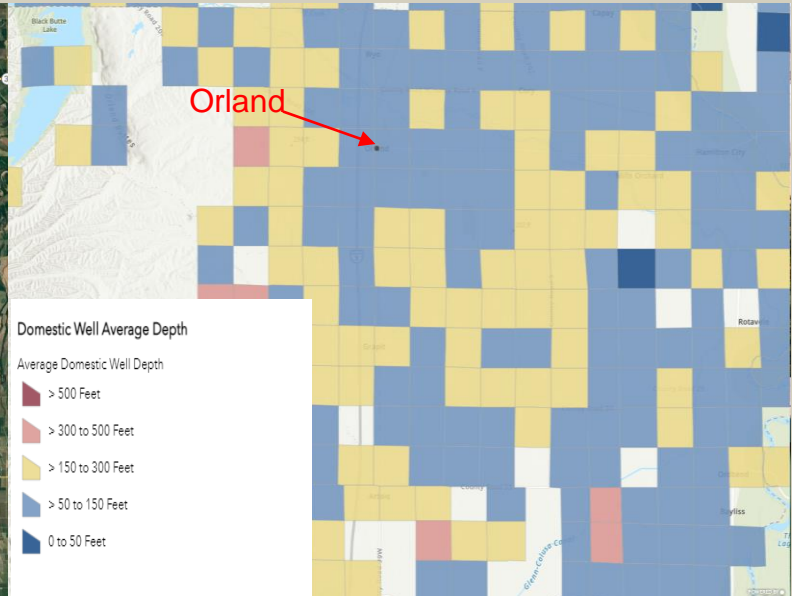
# Project Goals



Subsidence



Reported Dry Wells



Average Domestic Well Depth

# Commonalities

All three sites

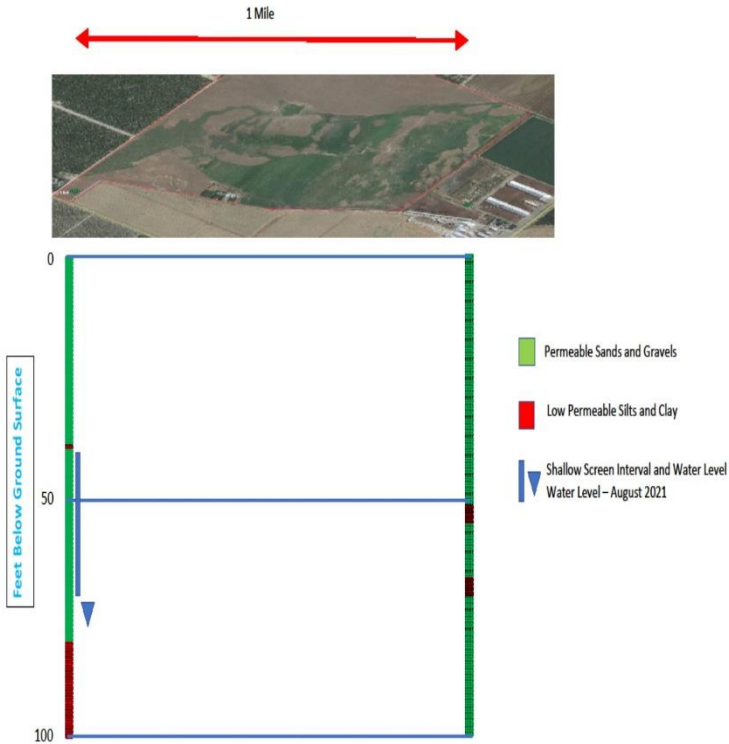
- Are in the Orland-Artois Water District
  - ✓ Contract water = \$56/acre-foot
  - ✓ Section 215 water = \$20/acre-foot
- Have metered OAWD turnouts on-site
- Have existing DWR monitoring wells in close proximity
- Involve willing landowners/tenant
- Needs Legal Review

# Van Tol Property

- ❖ Available Area – > 350 Acres near Road M and 30
- ❖ Upper Soils – Gravels and Sands
  - ❑ Assume 1-2 Feet per day Infiltration
- ❖ Existing Conveyance System
  - ❑ Assumed delivery of 17 Acre-Feet/day
  - ❑ Delivered 102 Acre-feet in 13 days in 2017
- ❖ Could Conduct with No Pre-work
  - ❑ Limits ability to monitor
  - ❑ Minimal costs to construct berms
    - \$2,000 to \$6,000
- ❖ Monitoring
  - ❑ DWR Well with Transducers at Site
  - ❑ Infiltration Monitoring/Assessment/Reporting
    - \$5,000 to \$9,000
- ❖ Permitting – None anticipated
- ❖ Pilots performed in 2002 and 2017
- ❖ Potential for collaboration with The Nature Conservancy



# Van Tol Property



Soil Texture, Type	Infiltration Rate (Inches per Hour)	Infiltration Rate (Feet per Day)
Coarse Sand	1.25	2.50
Medium Sand	1.06	2.12
Silt	0.44	0.88
Sandy Clay	0.31	0.62
Clay Loam	0.25	0.50
Silty Clay	0.19	0.38
Clay	0.13	0.26

Source: Title 14 Sacramento County Code of Regulations

Infiltration Rate (Feet per Day)	Potential Infiltration – 100 Acre Facility (Acre-Feet)		
	1 Days	30 Days	60 days
1	100	3,000	6,000
2.5	250	7,500	15,000
8	800	24,000	48,000

- Current conveyance can only deliver about 17 acre-feet per day.

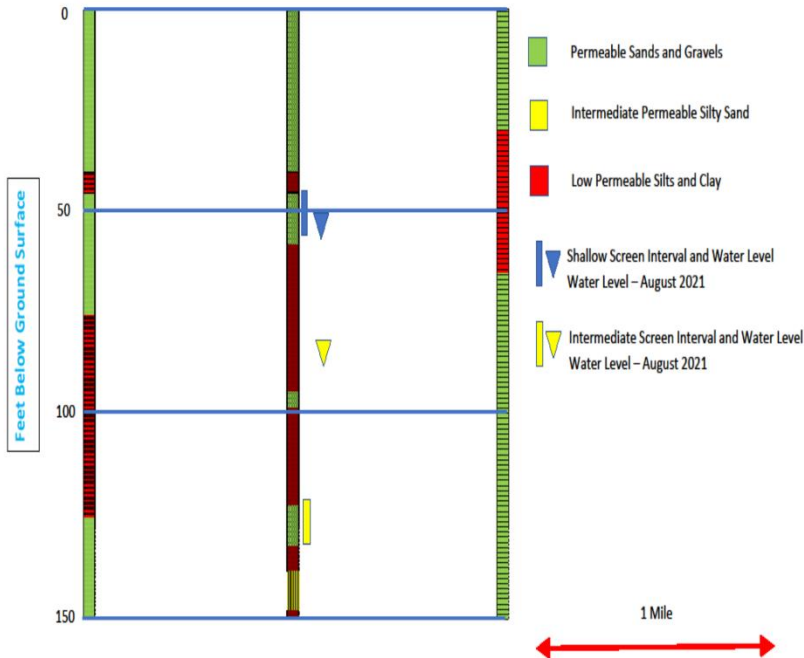


# Jasper Property

- ❖ Available Area – 11.5 Acres near Road 25 and Qq
  - ❑ Owner has long-term plans for site
- ❖ Upper Soils – Gravels and Sands
  - ❑ Assume > 2 Feet per day Infiltration
- ❖ Minimal Cost for Conveyance Modifications
  - ❑ \$1,000 to \$3,000
  - ❑ Assumed delivery of 9 Acre-Feet/day
- ❖ Minimal Costs for Excavation
  - ❑ \$2,000 to \$6,000
- ❖ Monitoring
  - ❑ DWR Well with Transducers at Site
  - ❑ Infiltration Monitoring/Assessment
    - \$5,000 to \$9,000
- ❖ Permitting – None anticipated



# Jasper Property



Soil Texture, Type	Infiltration Rate (Inches per Hour)	Infiltration Rate (Feet per Day)
Coarse Sand	1.25	2.50
Medium Sand	1.06	2.12
Silt	0.44	0.88
Sandy Clay	0.31	0.62
Clay Loam	0.25	0.50
Silty Clay	0.19	0.38
Clay	0.13	0.26

Source: Title 14 Sacramento County Code of Regulations

Infiltration Rate (Feet per Day)	Potential Infiltration - 5 Acre Facility (Acre-Feet)		
	1 Day	30 Days	60 days
1	5	150	300
<b>2.5</b>	<b>12.5</b>	<b>375</b>	<b>750</b>
8	40	1,200	2,400

- Current conveyance can only deliver about 9 acre-feet per day.

# California Olive Ranch (COR)

- ❖ Available Area – 11.5 Acres near Road 35 and D
  - ❑ COR is the tenant
  - ❑ Landowner has not been contacted
  - ❑ Downstream neighbor potentially interested
- ❖ Upper Soils – Fine
  - ❑ Assume < 0.5 Feet per day Infiltration
- ❖ Cost for Conveyance Modifications
  - ❑ Need excavation for pipeline
  - ❑ \$5,000 to \$10,000
  - ❑ Assumed delivery of 24 Acre-Feet/day
- ❖ Monitoring
  - ❑ DWR Well with Transducers at Site
  - ❑ Infiltration Monitoring/Assessment
    - \$5,000 to \$9,000
- ❖ Permitting – Potentially required, consult legal counsel




Sheep Corral Creek In-Stream Recharge

# California Olive Ranch (COR)



 Low permeability silts and clays

 Permeable sands and gravels

0

Feet Below Ground Surface

150

Soil Texture, Type	Infiltration Rate (Inches per Hour)	Infiltration Rate (Feet per Day)
Coarse Sand	1.25	2.50
Medium Sand	1.06	2.12
Silt	0.44	0.88
Sandy Clay	0.31	0.62
Clay Loam	0.25	0.50
Silty Clay	0.19	0.38
Clay	0.13	0.26

Source: Title 14 Sacramento County Code of Regulations

Infiltration Rate (Feet per Day)	Potential Infiltration - 12 Acre Facility		
	1 Day	30 Days	60 days
0.26	3	94	187
0.50	6	180	3,000
0.88	11	317	5,280

➤ Current conveyance delivers about 24 acre-feet per day.

# Pros and Cons

## Van Tol Property

### ❖ Pros

- ✓ Can begin ASAP
- ✓ Large area
- ✓ Soils good for recharge
- ✓ Close to Artois
- ✓ Potential for collaboration with TNC

### ❖ Cons

- ✓ Jasper project closer to Orland

## Jasper

### ❖ Pros

- ✓ Can begin with minimal work
- ✓ Soils very good for recharge
- ✓ Closest to Orland

### ❖ Cons

- ✓ Landowner has long term plans for area
- ✓ Small area

## COR

### ❖ Pros

- ✓ Neighboring landowner(s) may be willing to participate
- ✓ Pilot an in-stream recharge project

### ❖ Cons

- ✓ Potential legal challenges
- ✓ Soils very poor for recharge
- ✓ Still need approval from landowner
- ✓ Small Area



# Summary of Costs

Site	Van Tol	Jasper	California Olive Ranch
Excavator and Operator	\$0 to \$10,000	\$0 to \$10,000	\$0
Conveyance Modifications	\$0	\$3,000 to \$5,000	\$5,000 to \$10,000
Monitoring Equipment and Installation	\$4,000 to \$7,000	\$4,000 to \$7,000	\$4,000 to \$7,000
Data Assessment and Reporting	\$10,000 to \$15,000	\$10,000 to \$15,000	\$10,000 to \$15,000
Total Cost Range	\$14,000 to \$32,000	\$17,000 to \$37,000	\$19,000 to \$32,000
Cost of water for 5 days (given site constraints)	\$1,700 for 85 AF	\$900 for 45 AF	\$600 for 30 AF

# County Owned Basin Monitoring

County owns several basins in area

- ✓ Reported to receive storm water
- ✓ Request County to install monitoring equipment to record infiltration rate of the water
- ✓ For minimal cost would provide valuable information regarding infiltration potential throughout the area

Monitoring Equipment and Installation	Data Assessment and Reporting	Total Cost Range
\$2,000 to \$3,000	\$3,000 to \$5,000	\$5,000 to \$8,000

# Legal Review

- Confirm pilot project(s) can be implemented without permits or environmental review
- Develop landowner agreement
  - Payment of water costs
  - Indemnification
  - Monitoring responsibilities, etc.
- Develop agreement with OAWD
- Evaluate water rights