Public Workshop #8
Projects and Management Actions Implementation Plan

August 16, 2023

CARPINTERIA GSA
GROUNDWATER SUSTAINABILITY AGENCY

GSI Water Solutions, Inc.

PUEBLO water resources

Presentation Outline

Pathway to Sustainability

Projects and Management Actions

- CAPP Project Predictive Modeling Simulations
- Brief review of other P&MA

Implementation Plan

- 5-year
- 20-year

Draft GSP Release Schedule and Public Comment Outreach

CAPP Project Future Modeling Simulations

Groundwater Modeling of CAPP

Presentation Outline

1. Review Projected Water Budget and Groundwater Model Scenario
2. Description of Modeling of CAPP
3. Summarize CAPP Modeling Results:
   a) Water Level Impacts
   b) Water Budget Impacts
4. Basin Sustainable Yield Calculations

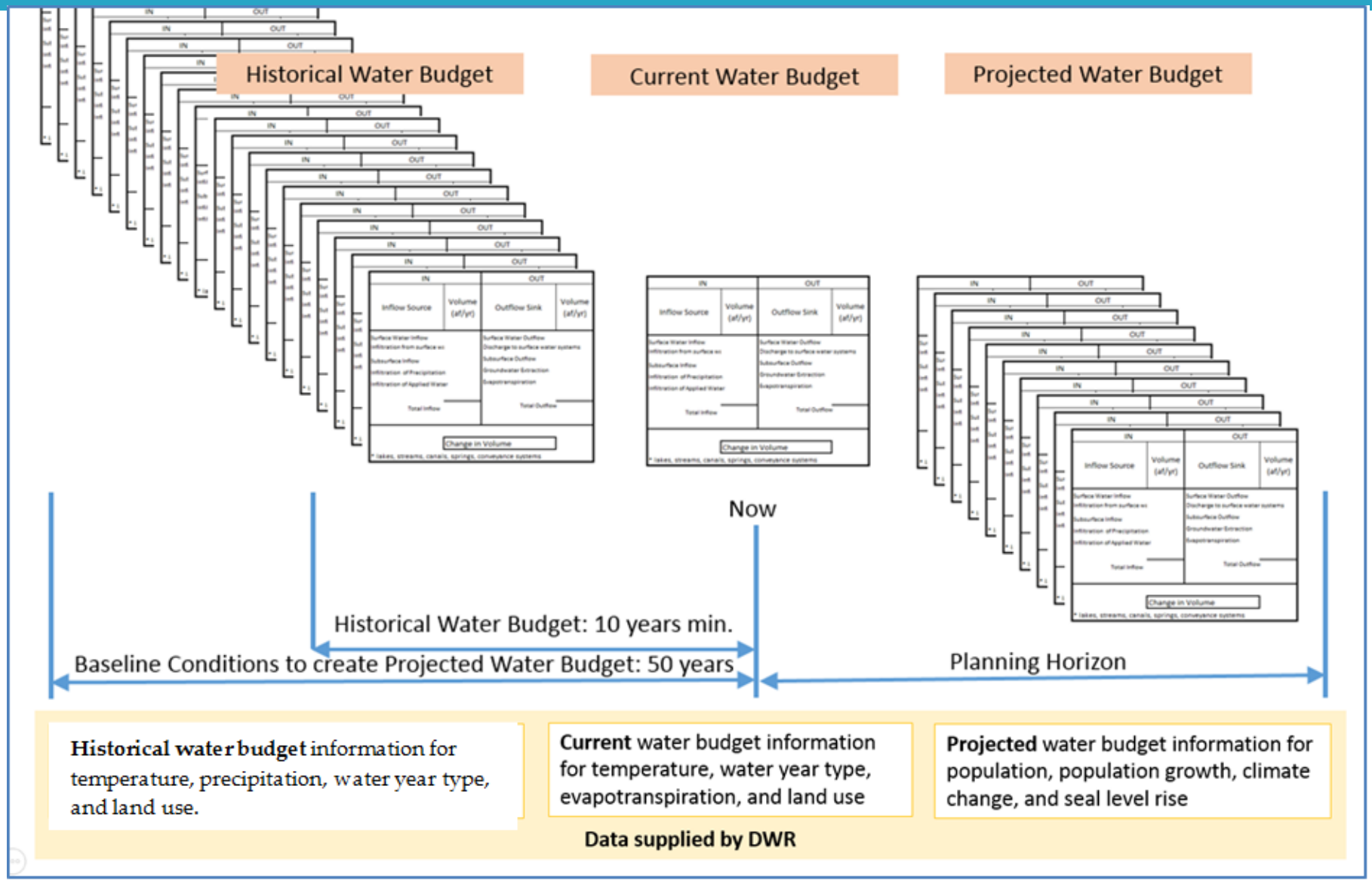
Review of Projected Water Budget and Groundwater Model Scenario

Projected Water Budget Review

- Previously presented at February 15, 2023 Workshop
- Uses 50 years of historical precipitation, evapotranspiration, and stream flow information as the future baseline hydrology conditions, while taking into consideration:

1. Estimated climate change projections for:
    - Precipitation
    - Evapotranspiration
    - Stream Flows
    - SWP Deliveries
    - Sea level rise projections.
2. Projected water demands:
    - Municipal
    - Agricultural

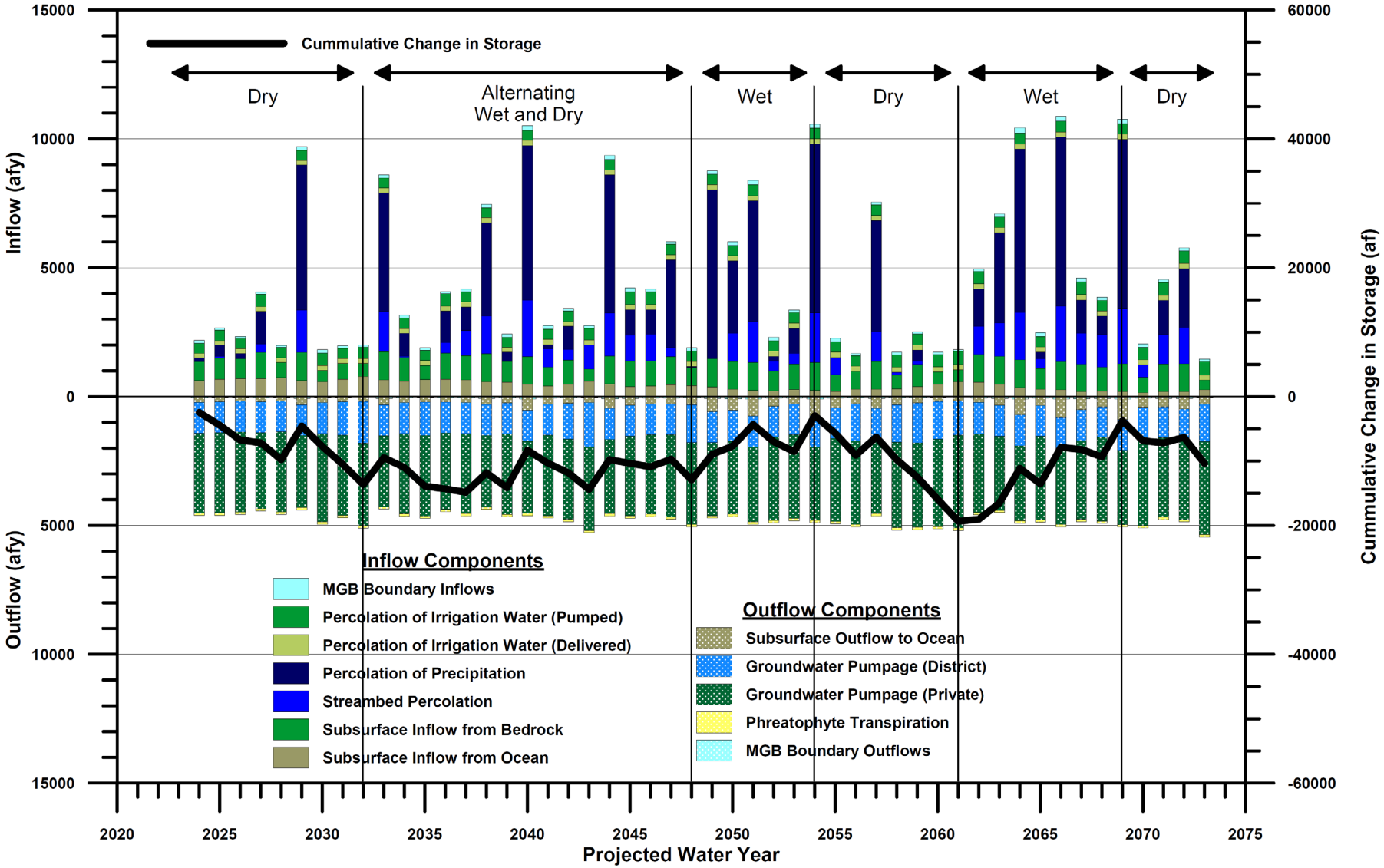
GSP Water Budget Timelines



DWR Climate Change Data Sets

- Precipitation
- Evapotranspiration
- Streamflow
- Sea Level Rise
- SWP Contractor Deliveries

Projected Water Budget Results

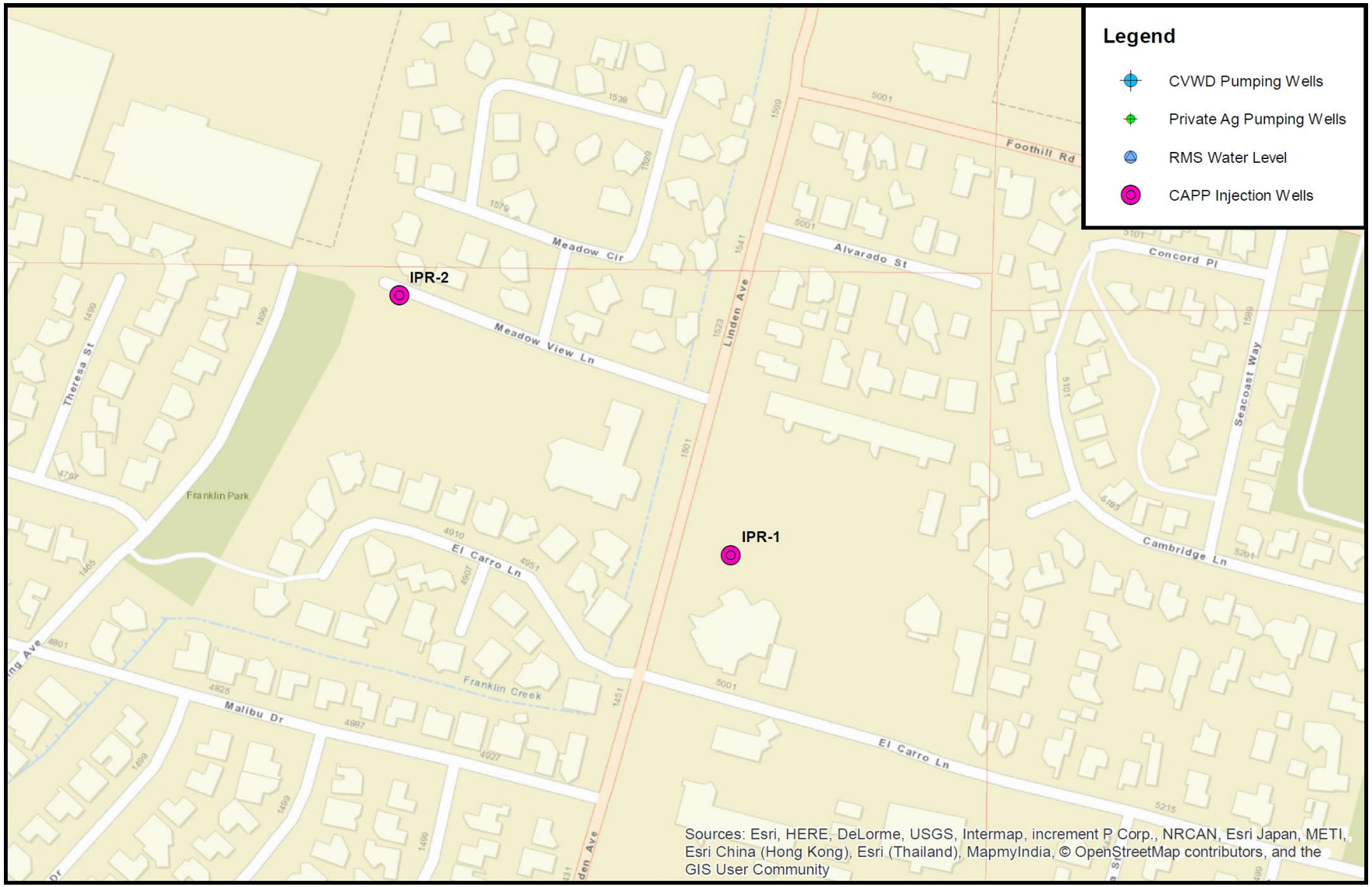


Groundwater Modeling of CAPP

CAPP Project Details

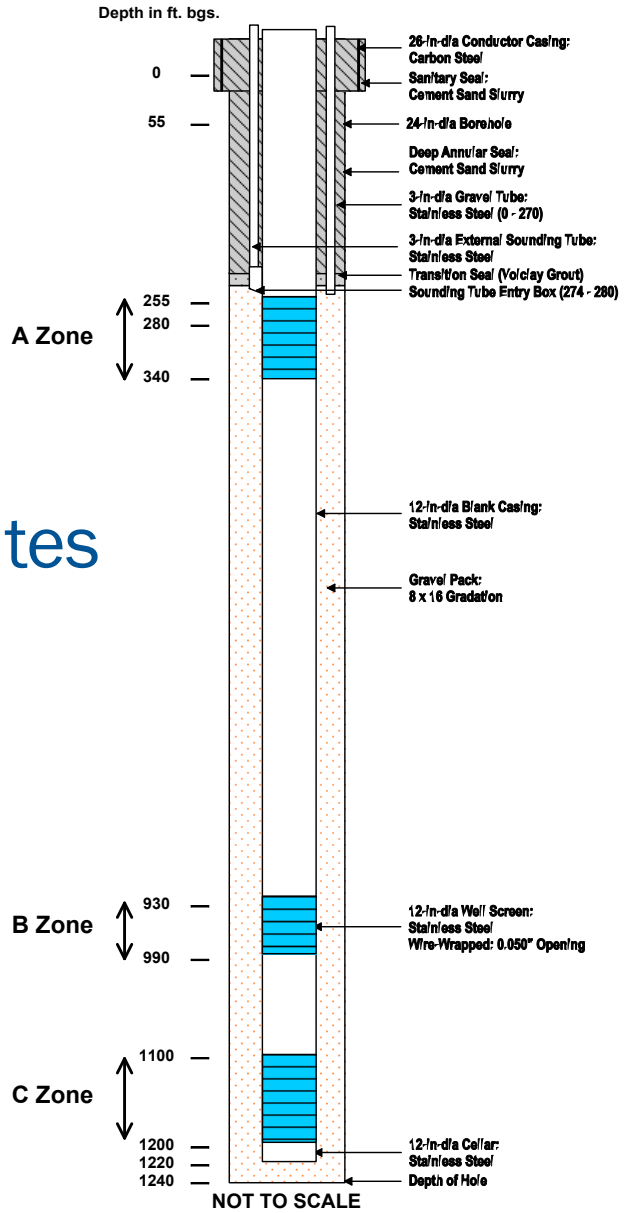
- 1.0 MGD Capacity (~1,100 AFY)
- Advanced Water Purification Facility (AWPF)
- Booster Pump Station
- Ocean Outfall Modifications
- 1.3 miles of Conveyance Pipelines
- Two Injection Wells
- Four Monitoring Wells

CAPP Injection Well Sites



CAPP IPR Injection Well Details and Schematic

- Screened in A, B and C Zones
- Total Depths of ~1,200 ft
- 0.5 MGD (~350 gpm) Injection Rates

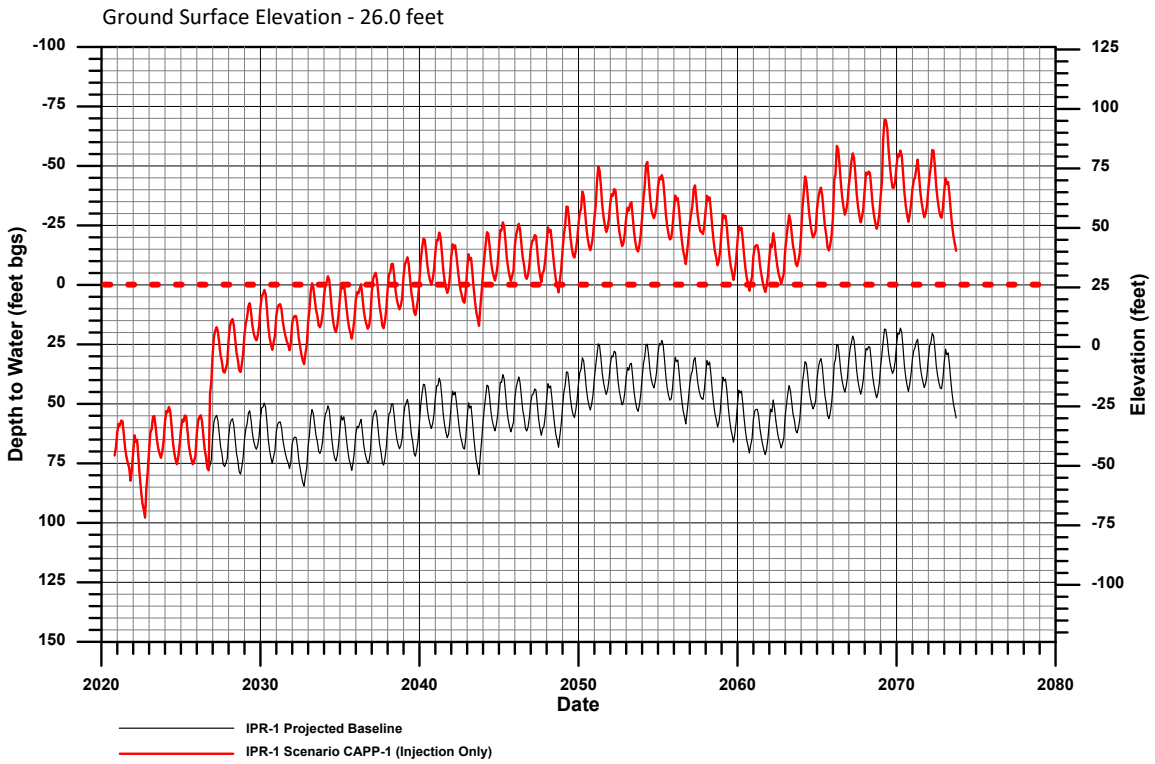


CAPP Groundwater Modeling Scenarios

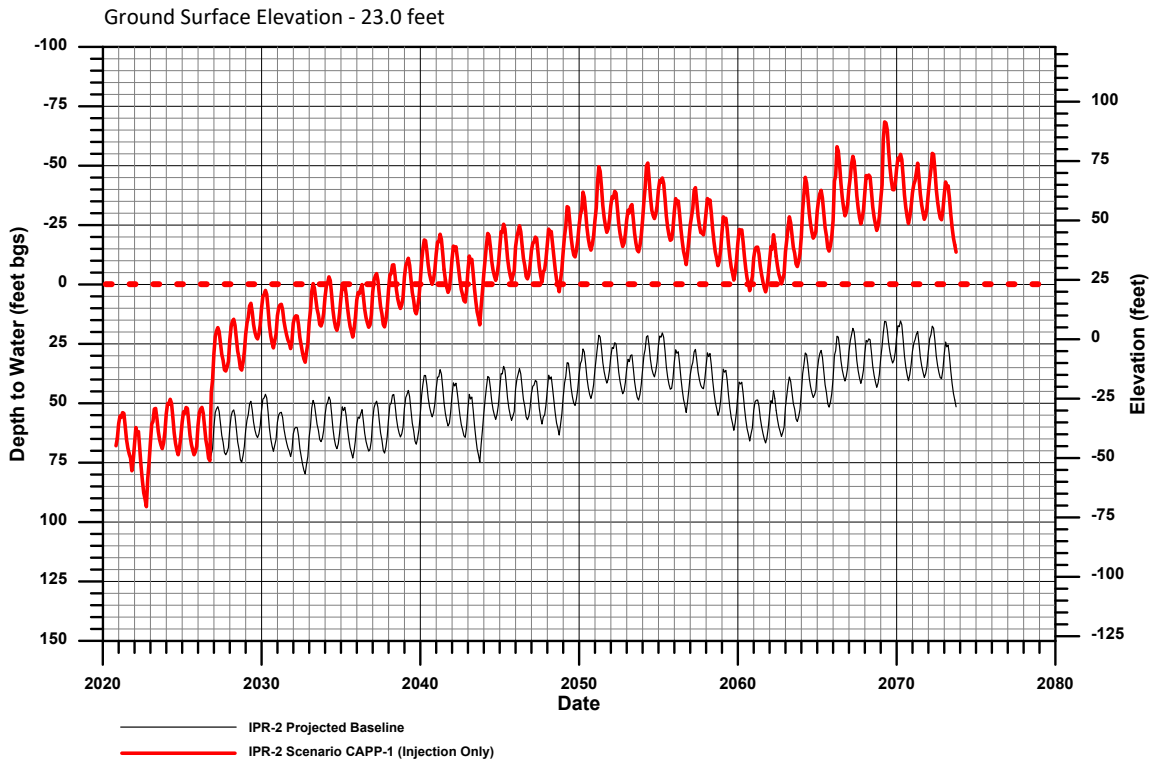
1. Injection Only
2. Simultaneous “Put and Take”
3. Water-Level Management

CAPP Groundwater Modeling Results
Injection Only Scenario

IPR-1

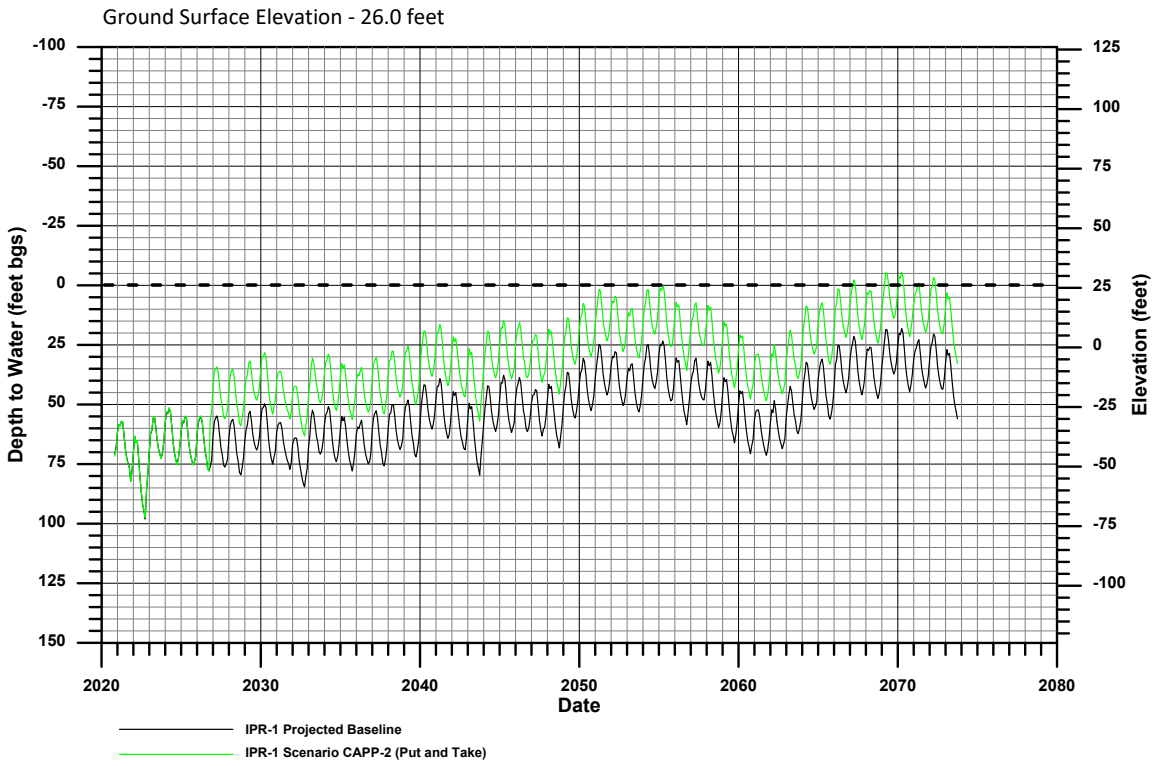


IPR-2

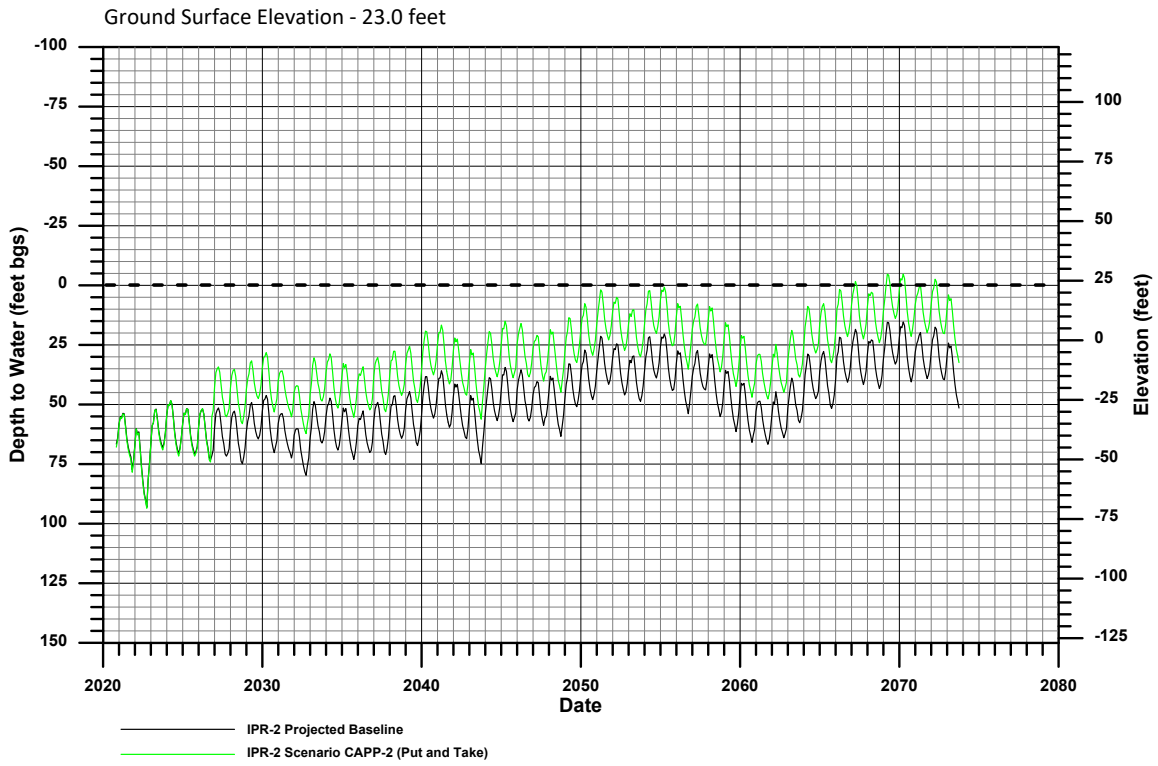


CAPP Groundwater Modeling Results
Simultaneous "Put and Take" Scenario

IPR-1

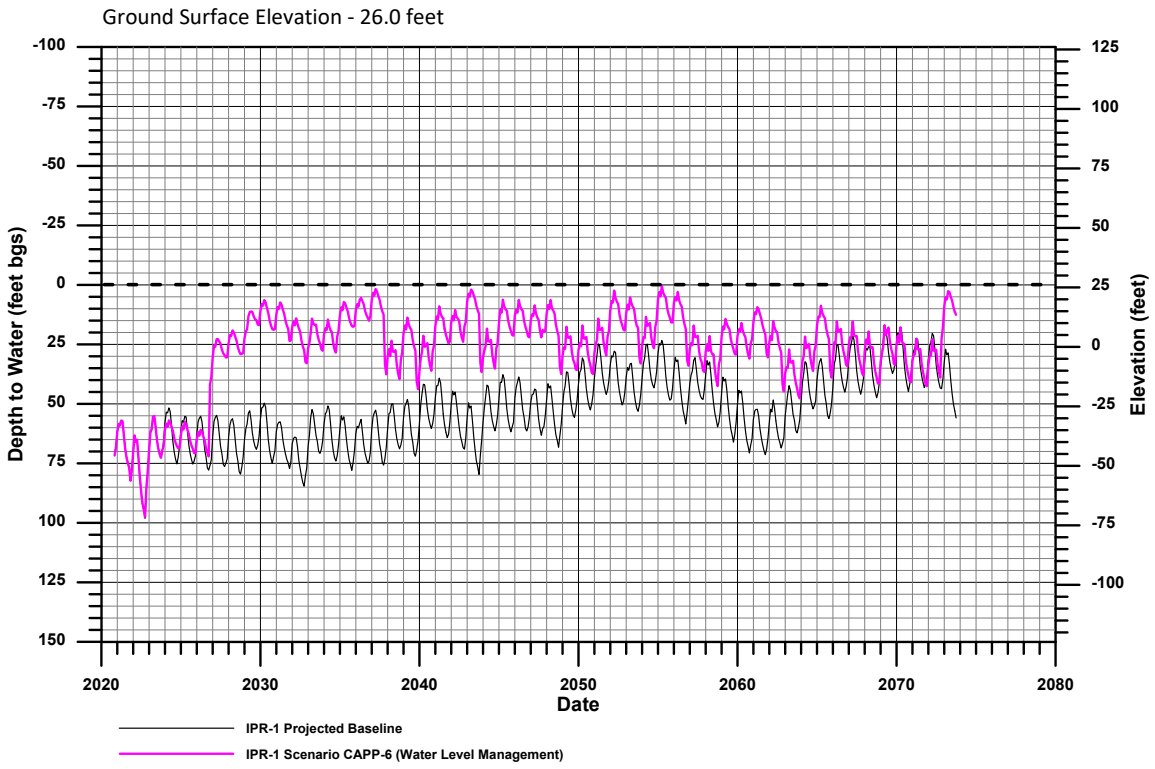


IPR-2

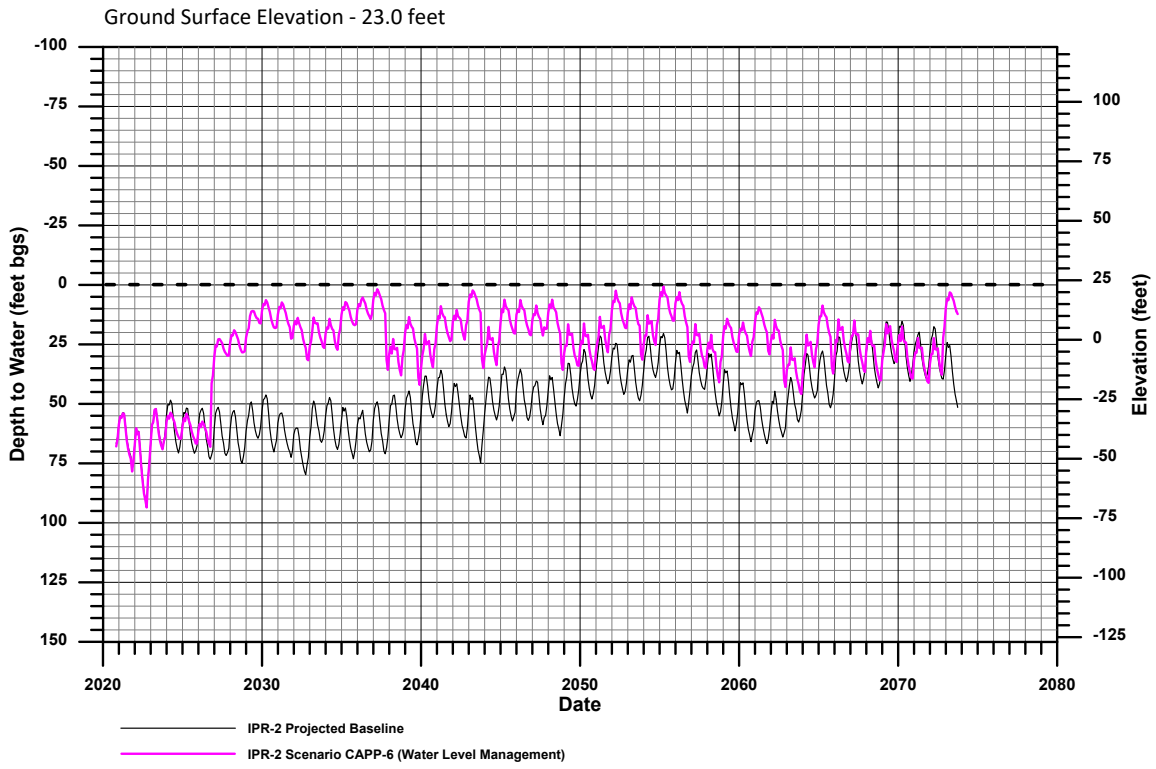


CAPP Groundwater Modeling Results
Water-Level Management Scenario (CAPP-6)

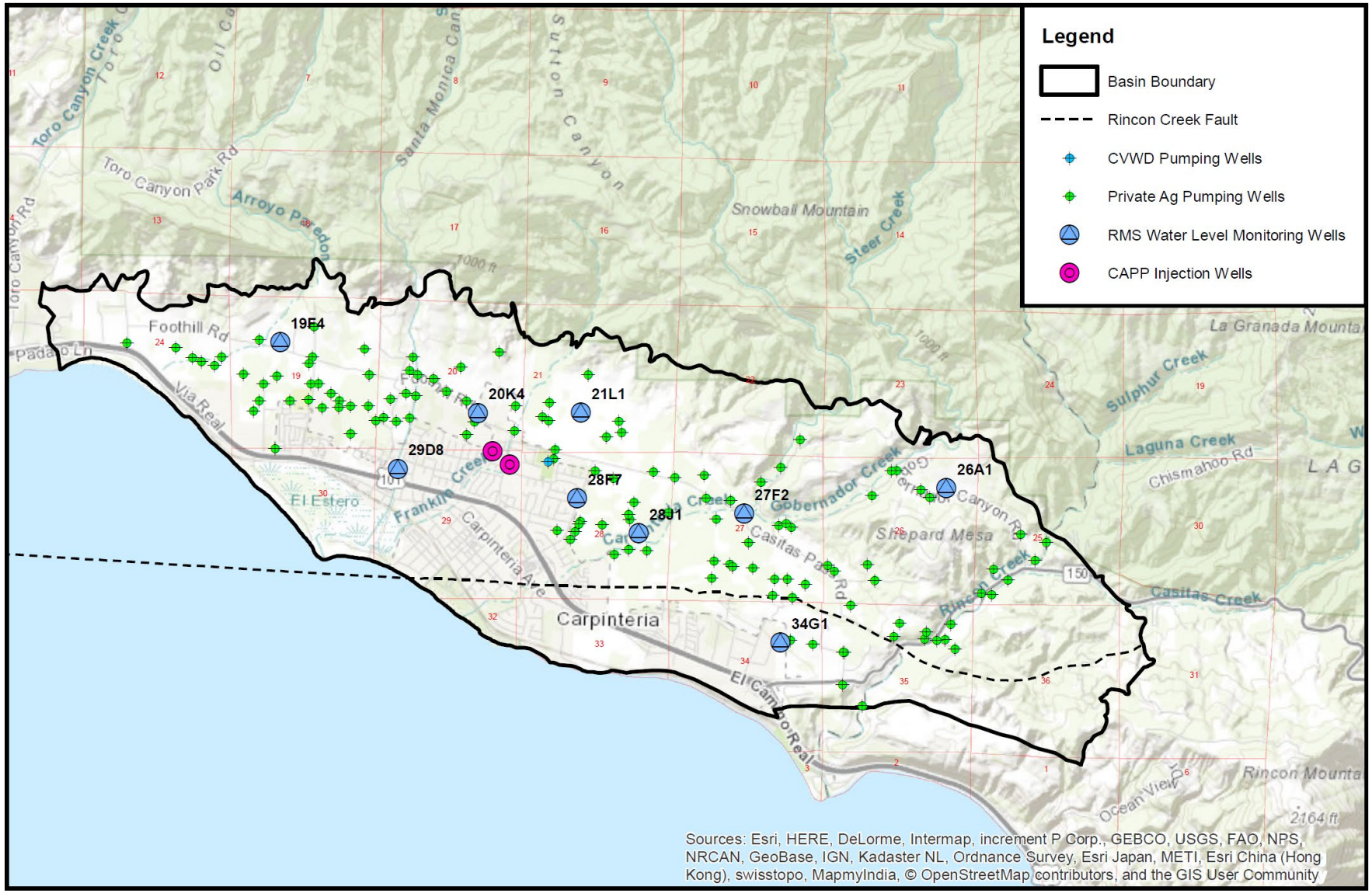
IPR-1



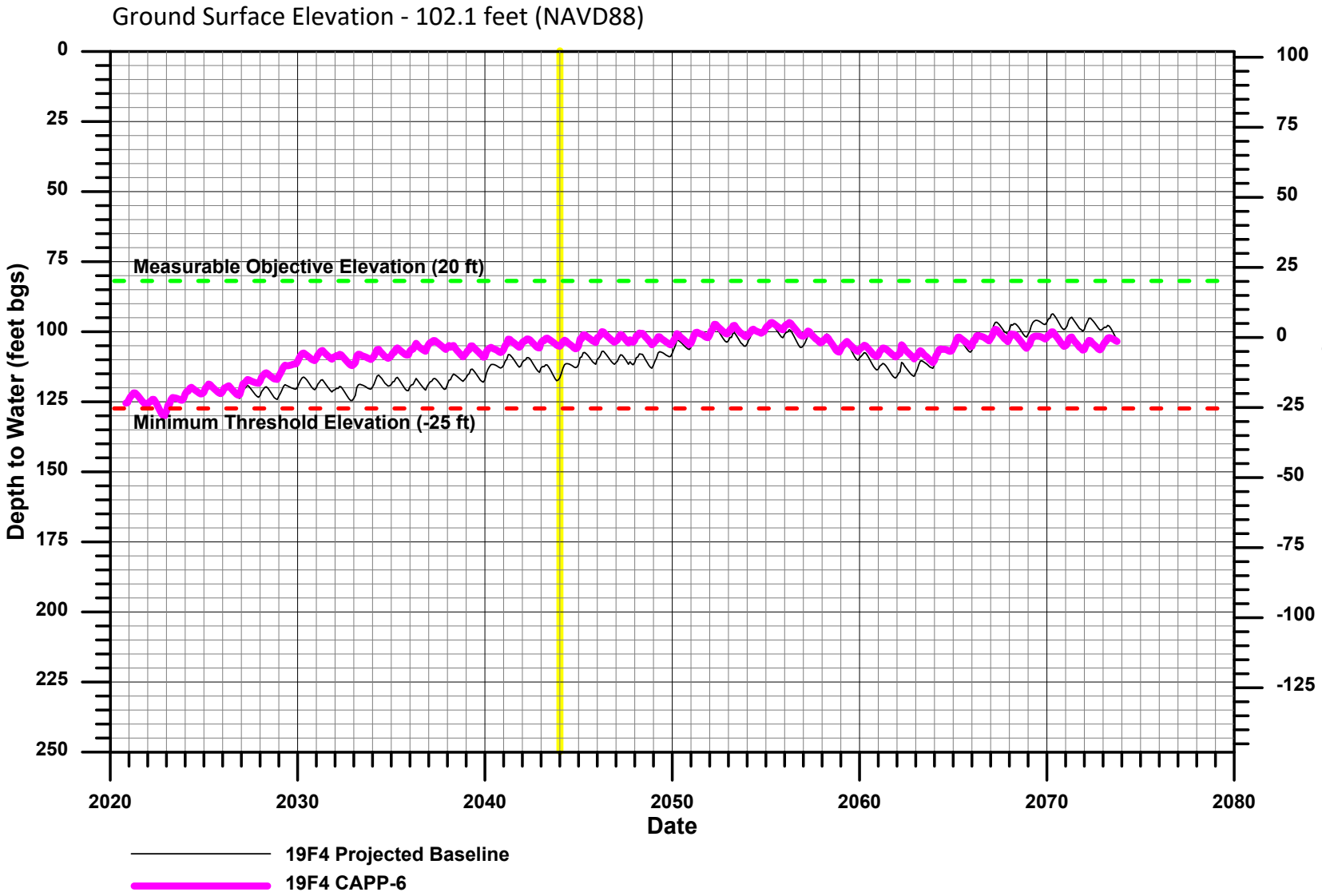
IPR-2

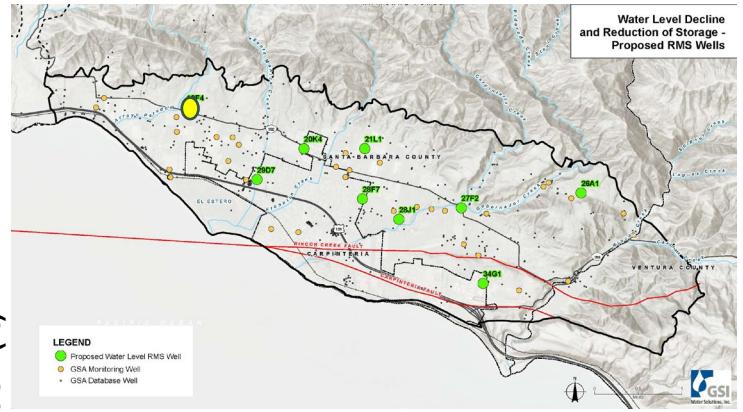


CAPP Groundwater Modeling Results
Water Levels – RMS Well Locations

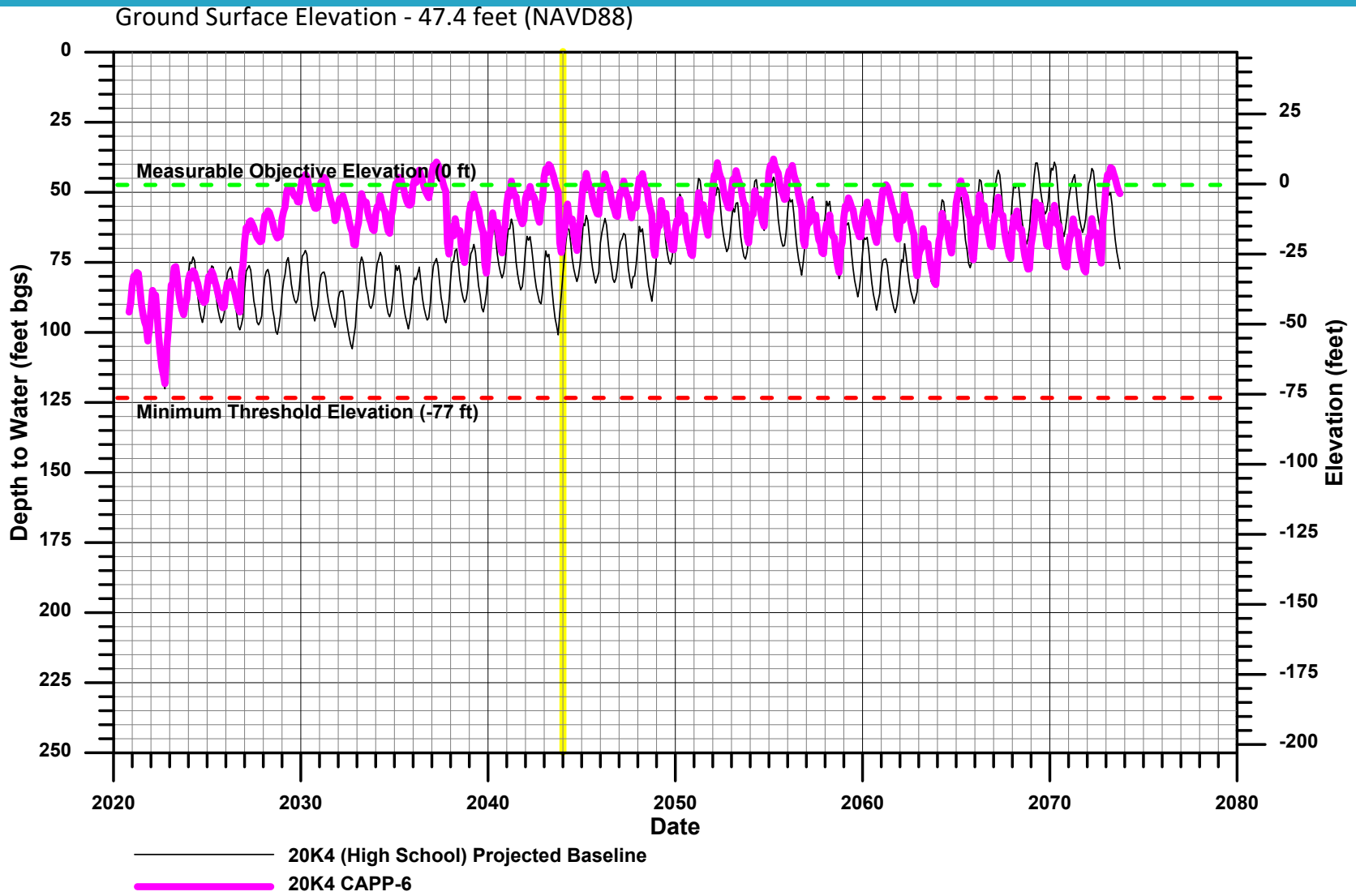


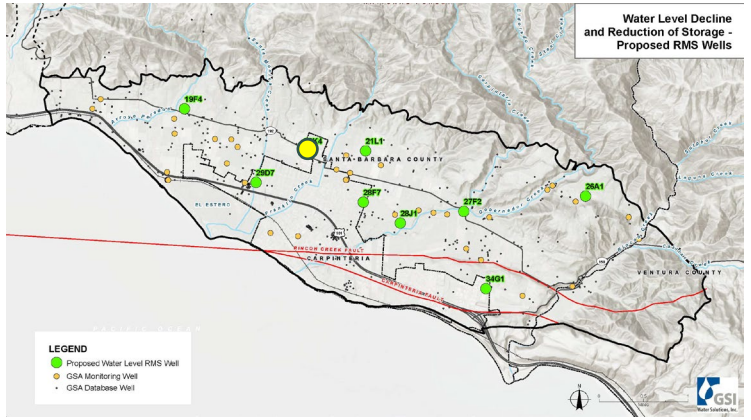
CAPP Groundwater Modeling Results
Water Levels – 19F4



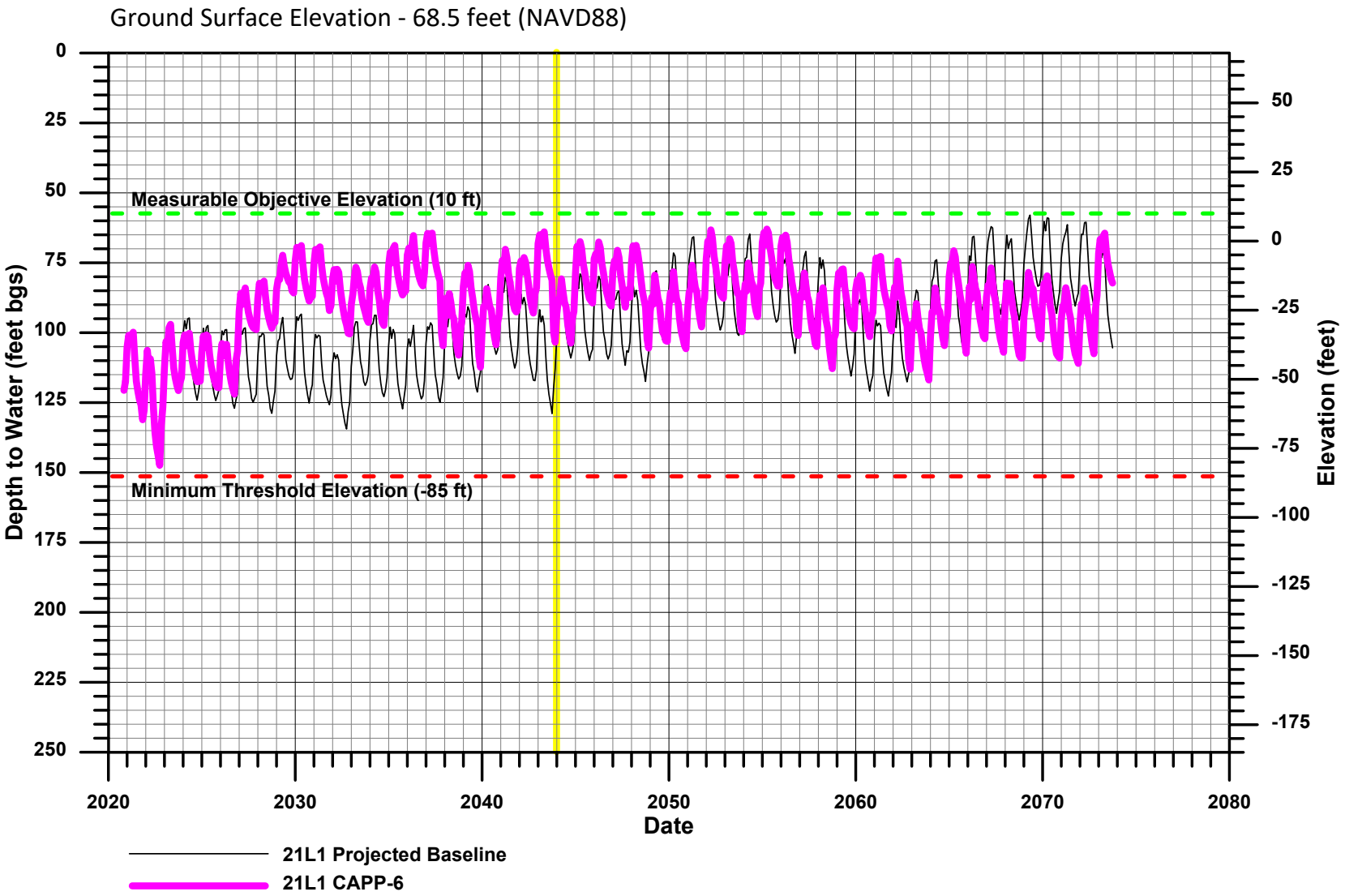


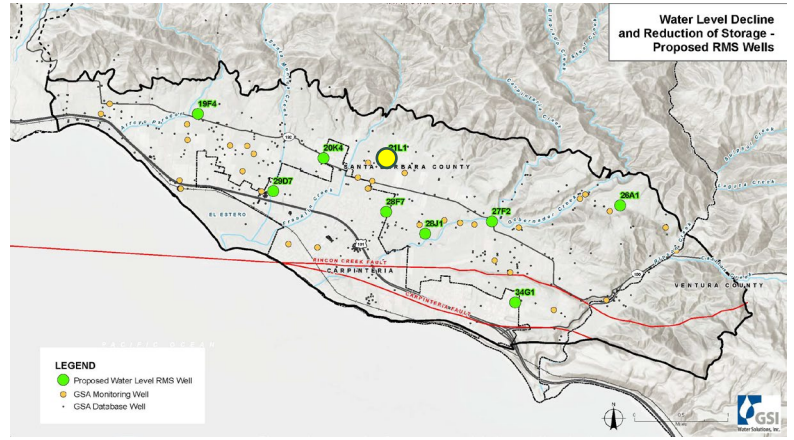
CAPP Groundwater Modeling Results
Water Levels – 20K4 (High School)



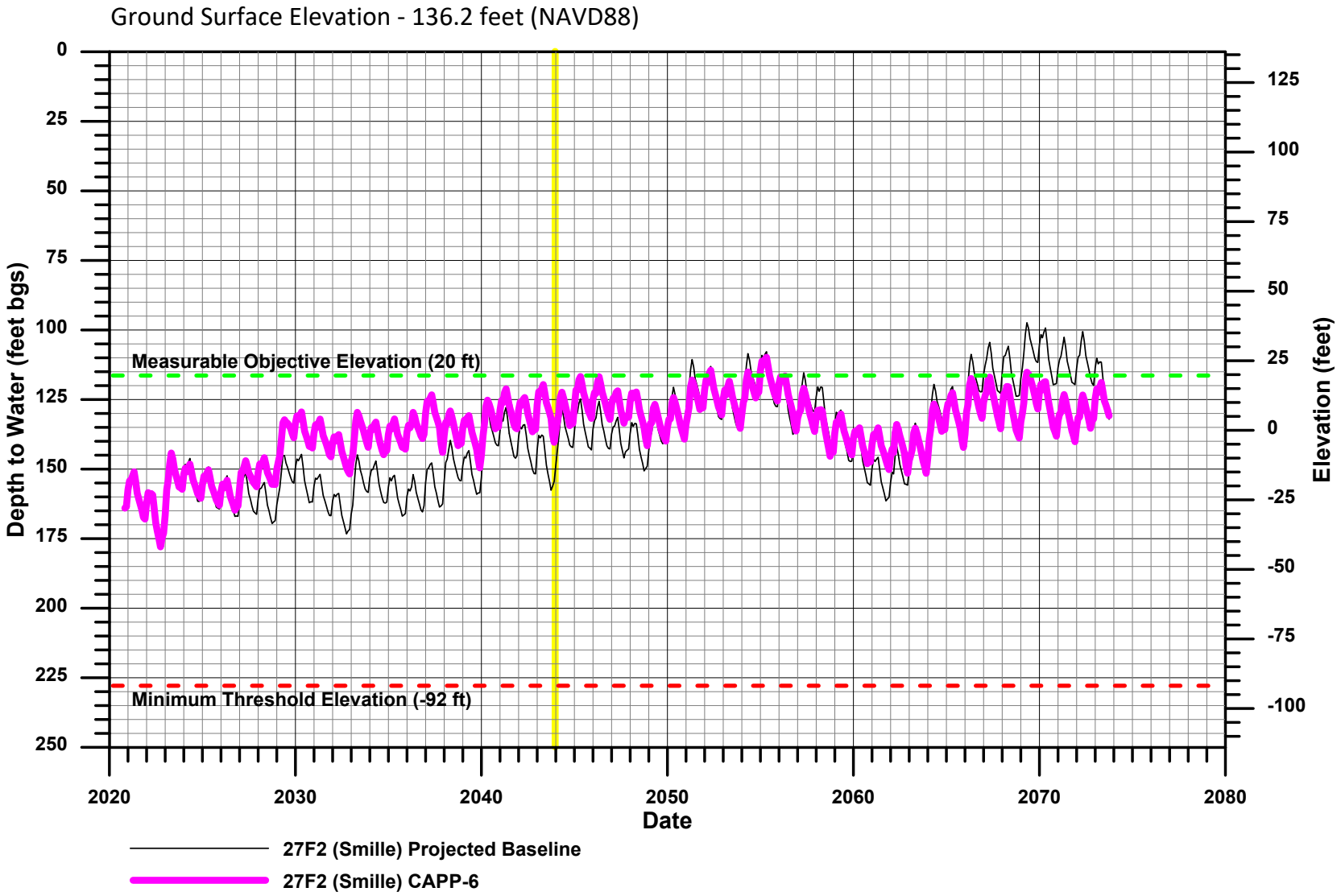


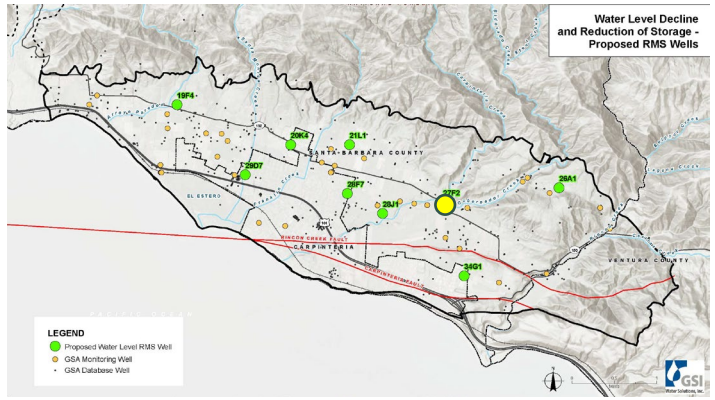
CAPP Groundwater Modeling Results
Water Levels – 21L1



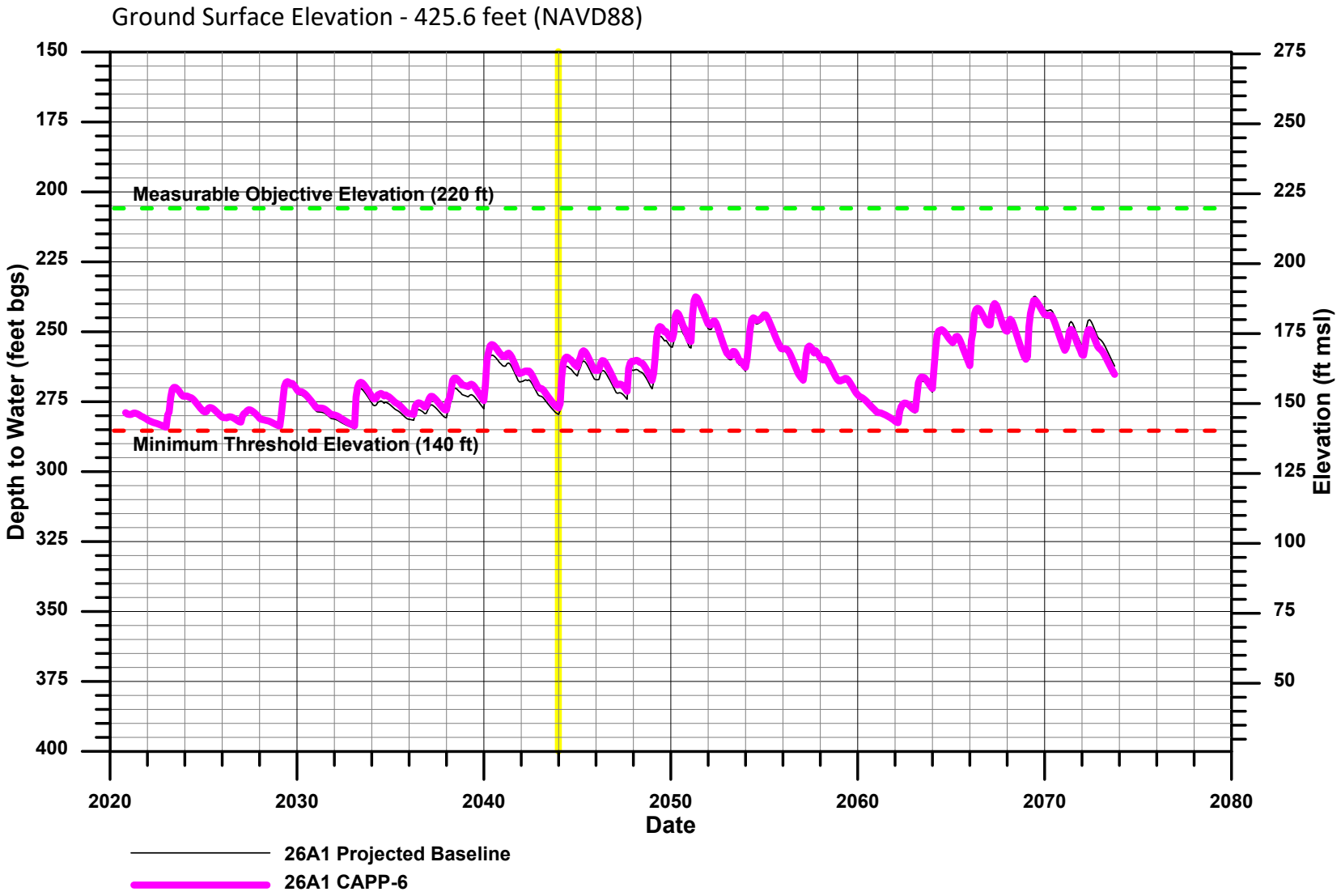


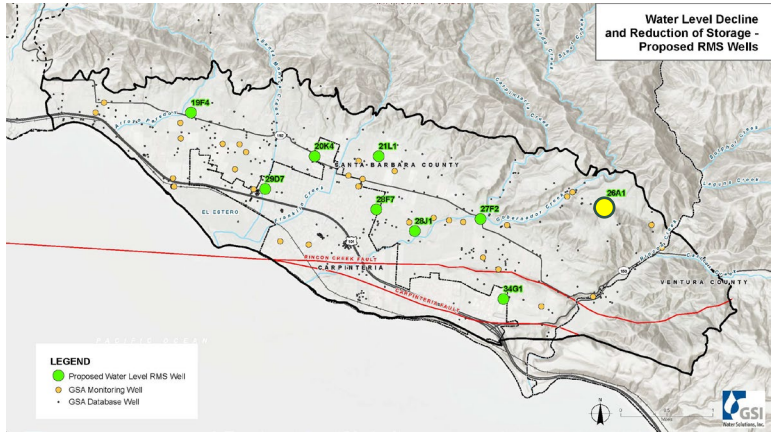
CAPP Groundwater Modeling Results
Water Levels – 27F2 (Smille)



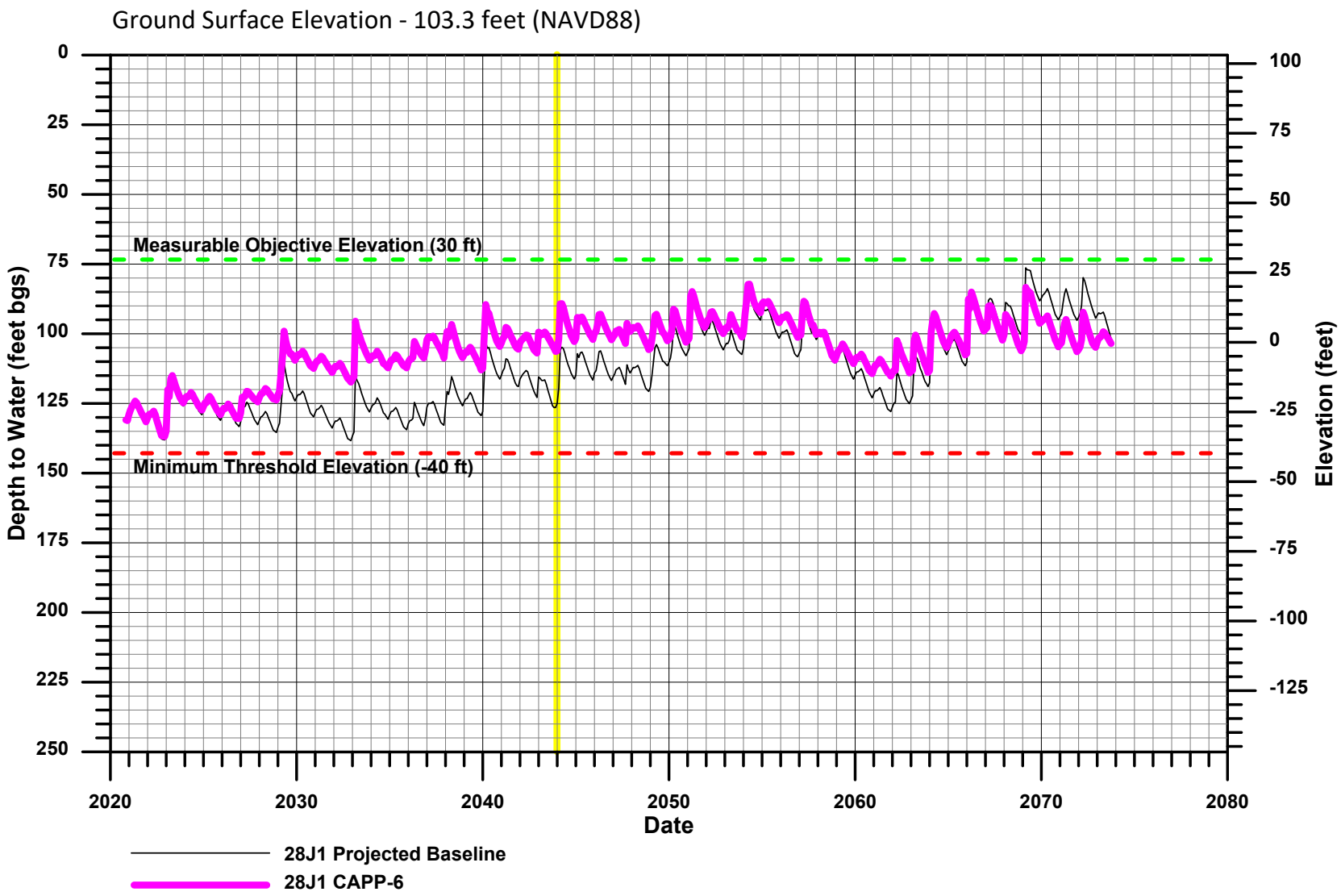


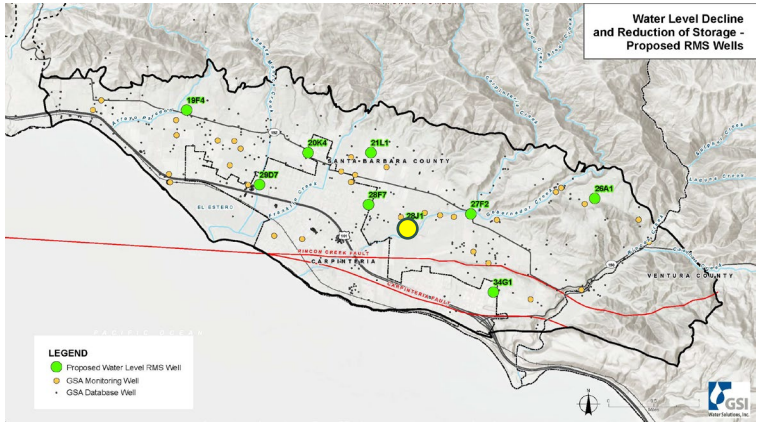
CAPP Groundwater Modeling Results
Water Levels – 26A1



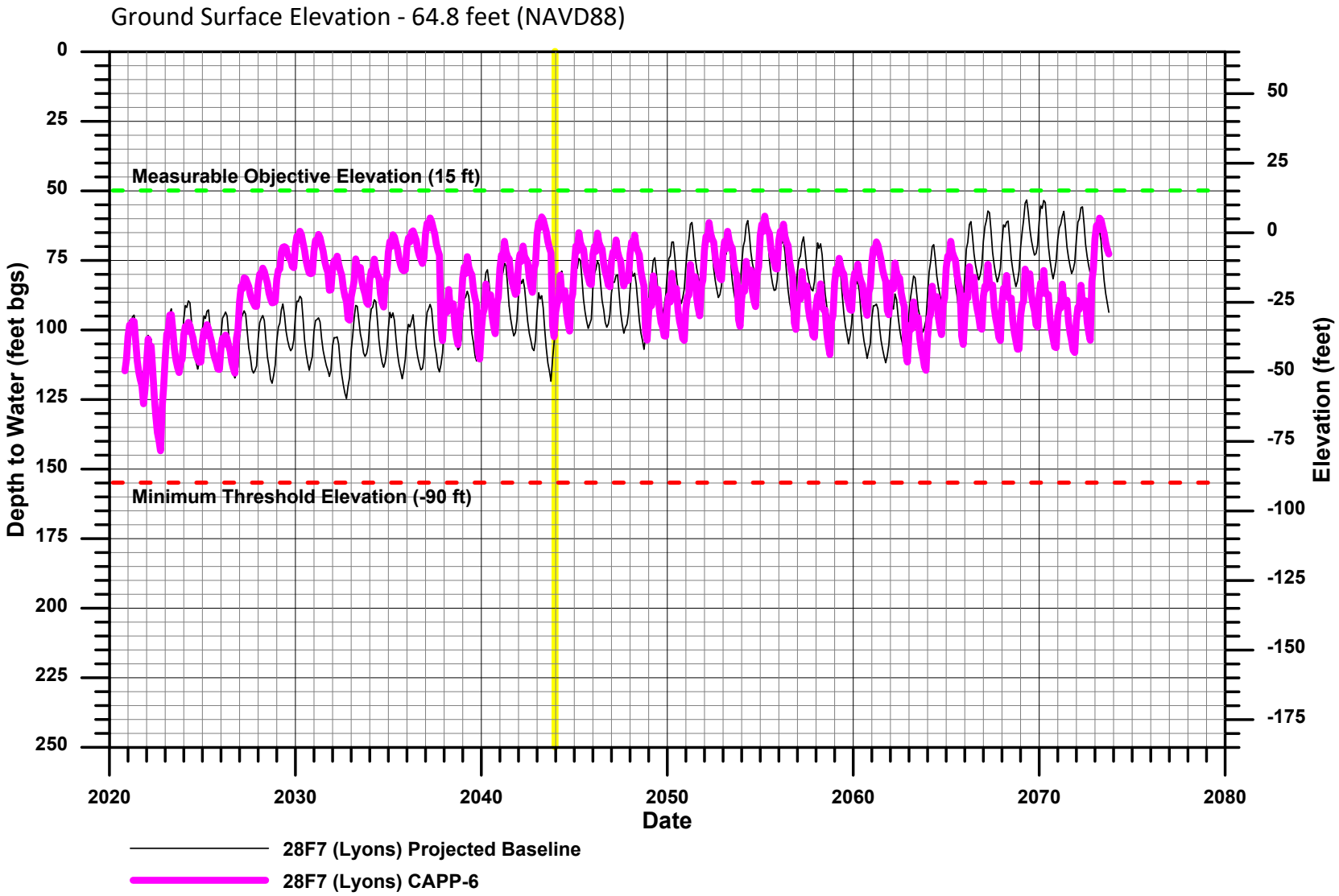


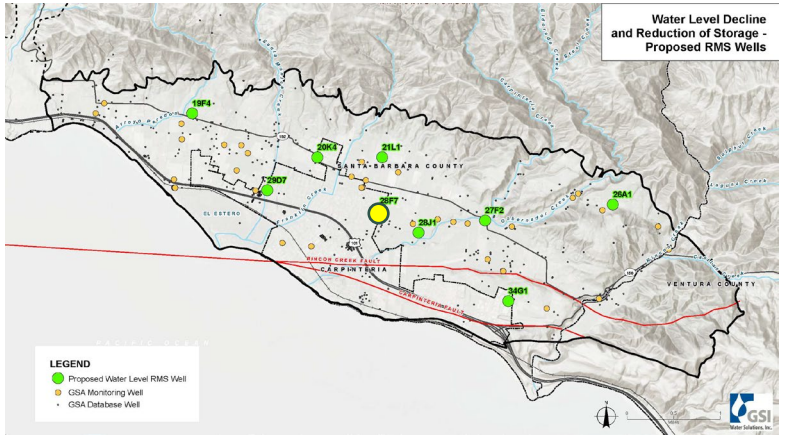
CAPP Groundwater Modeling Results
Water Levels – 28J1



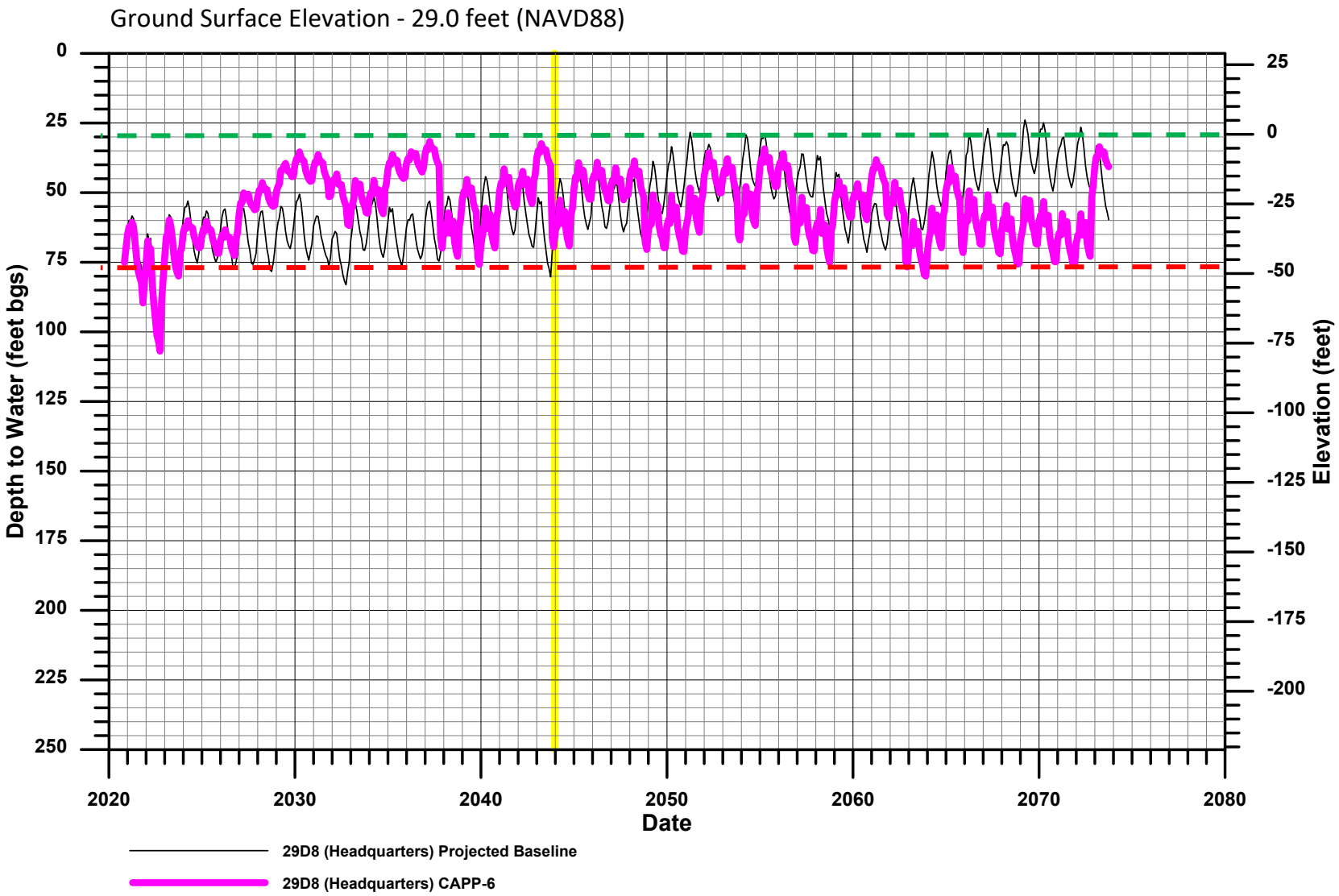


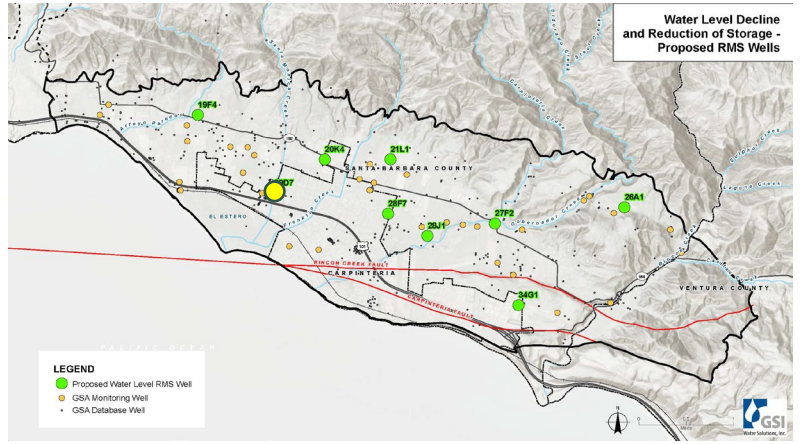
CAPP Groundwater Modeling Results
Water Levels – 28F7 (Lyons)



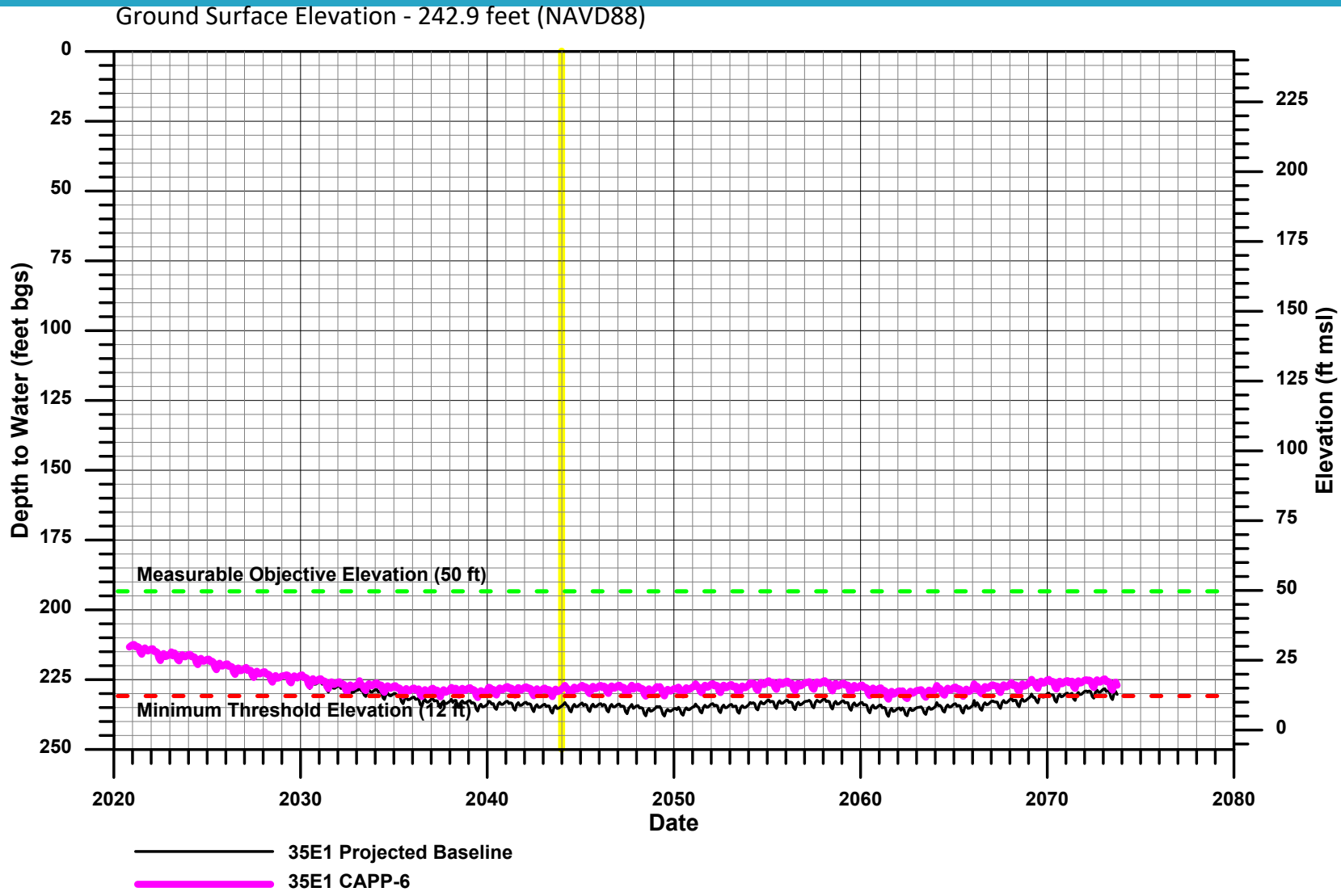


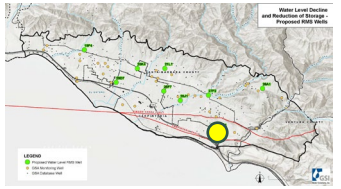
CAPP Groundwater Modeling Results
Water Levels – 29D8 (Headquarters)



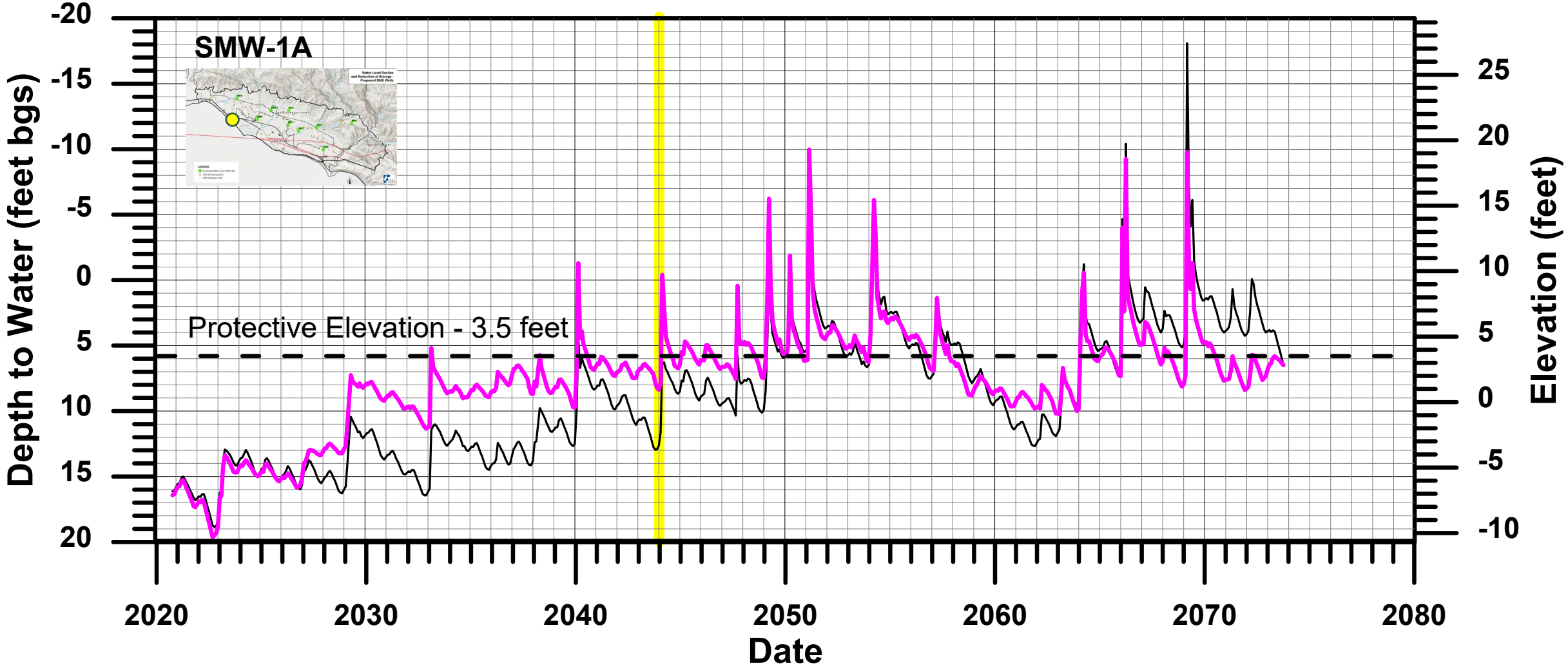


CAPP Groundwater Modeling Results
Water Levels – 35E1

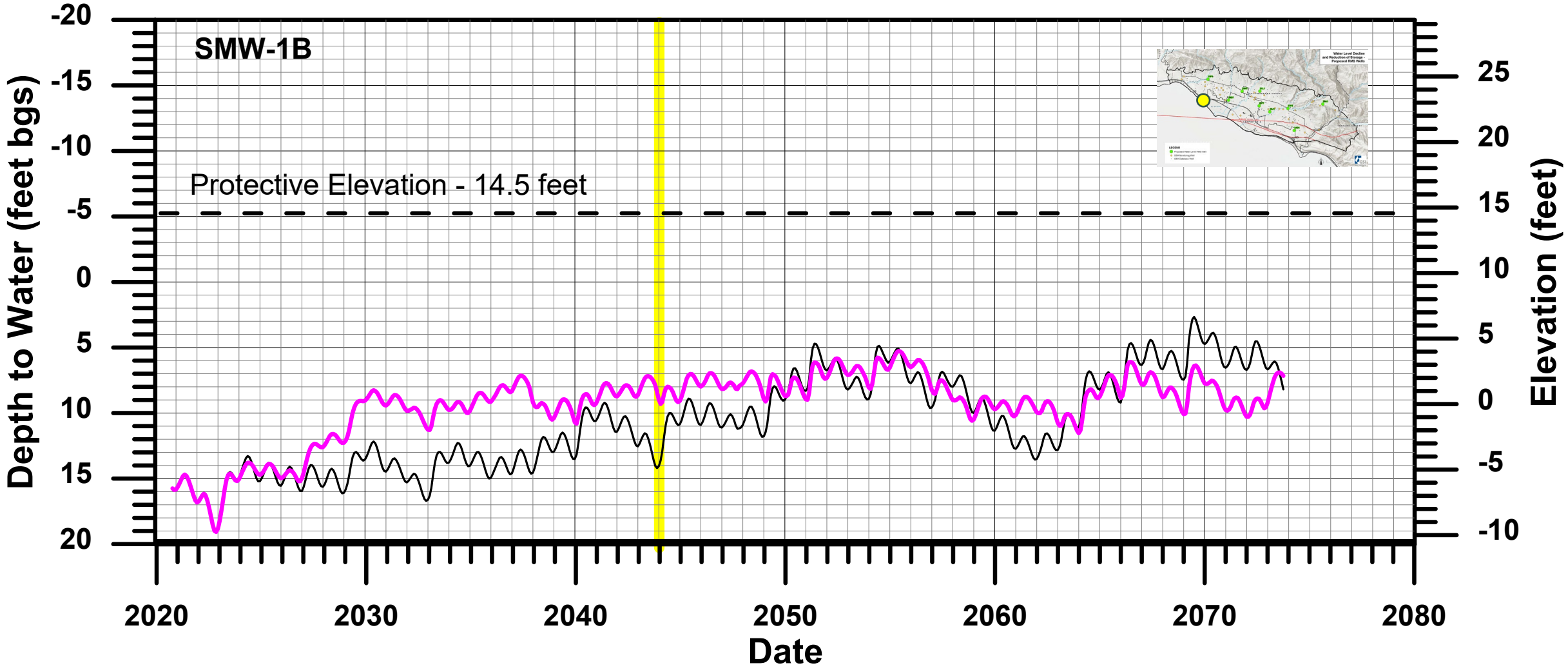




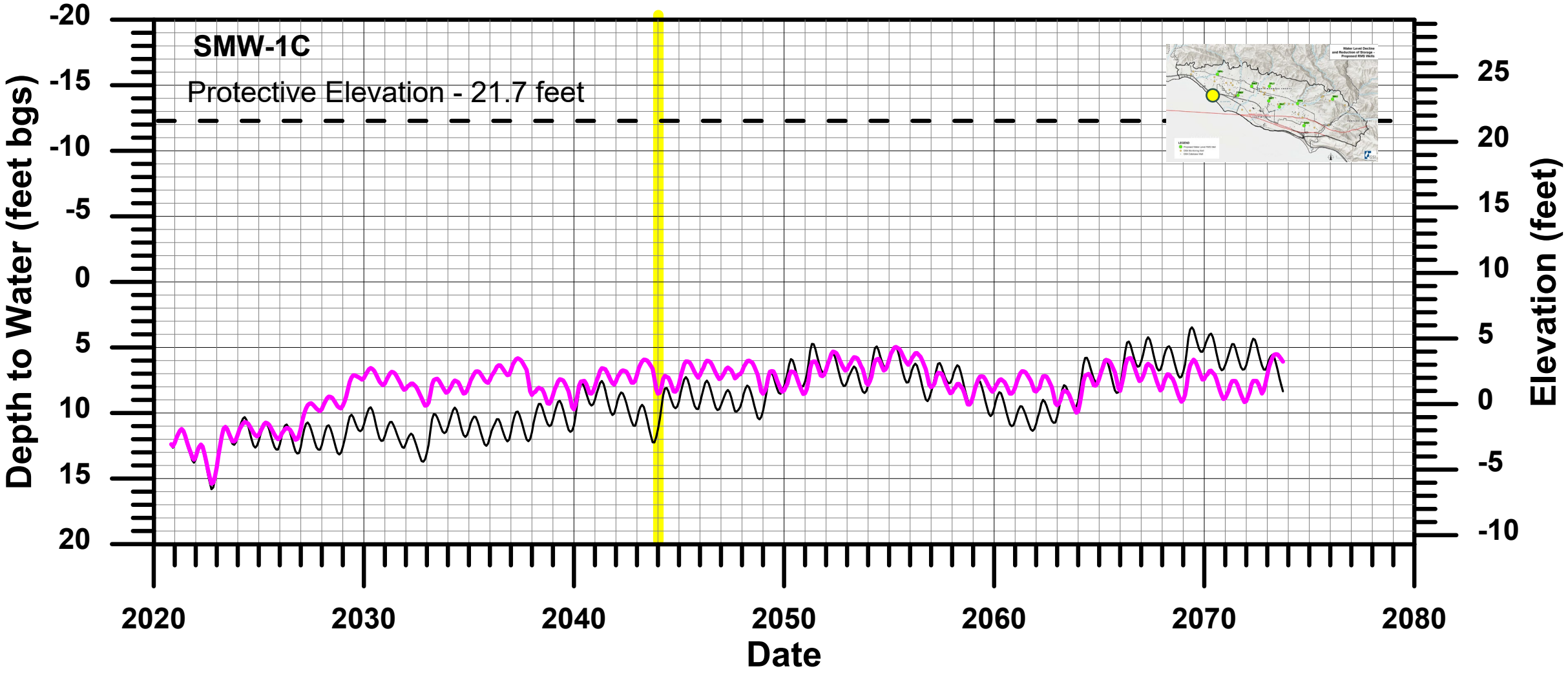
CAPP Groundwater Modeling Results
Water Levels – Sentinel MW 1A (A Zone)



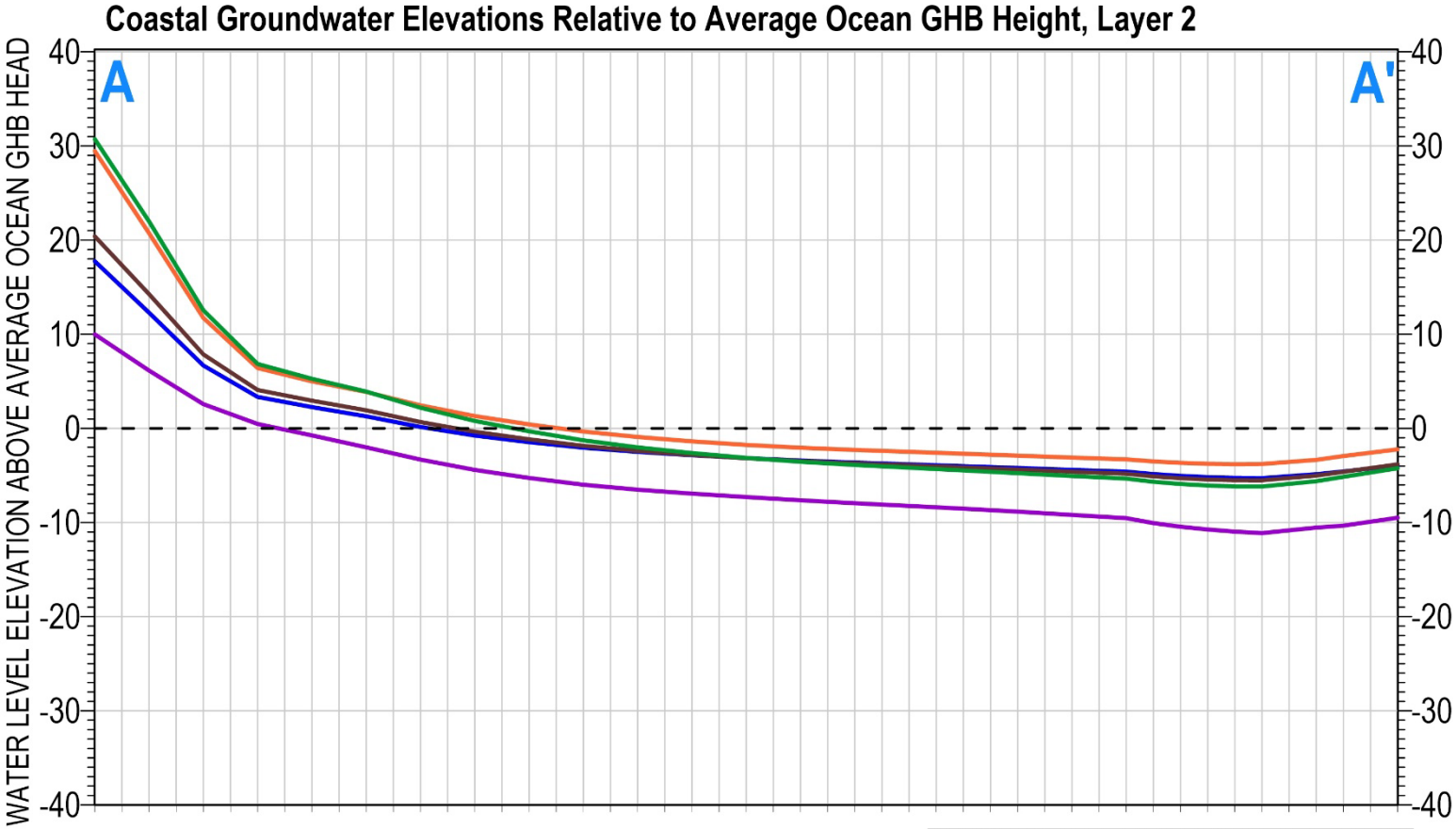
CAPP Groundwater Modeling Results
Water Levels – Sentinel MW-1B (B Zone)



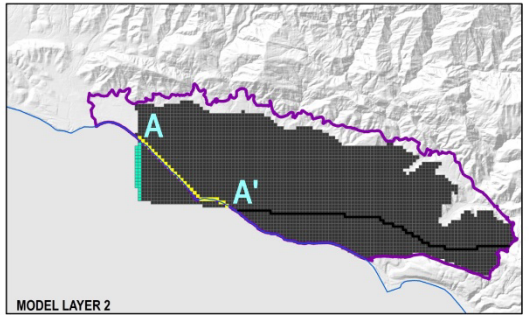
CAPP Groundwater Modeling Results
Water Levels – Sentinel MW-1C (C Zone)



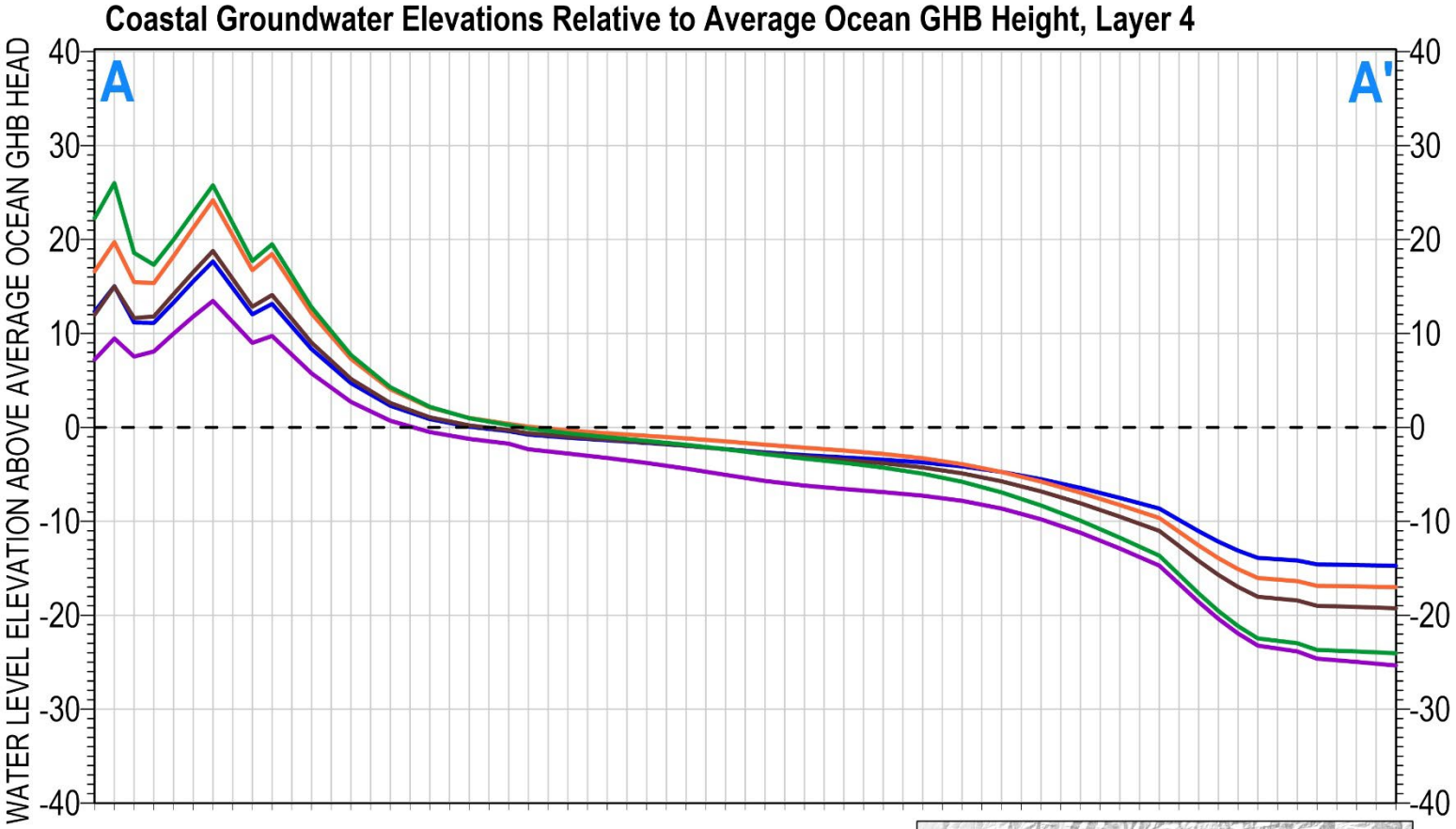
CAPP Groundwater Modeling Results
Water Levels – Coastal Cross-Section (A Zone)



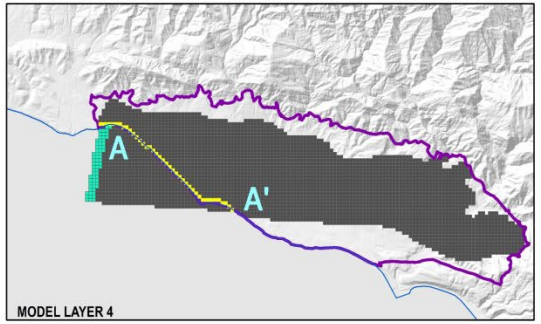
Period	Average GHB Height (NAVD88)
2020-2033	3.60
2034-2043	3.99
2044-2053	4.24
2054-2063	4.49
2063-2073	4.74



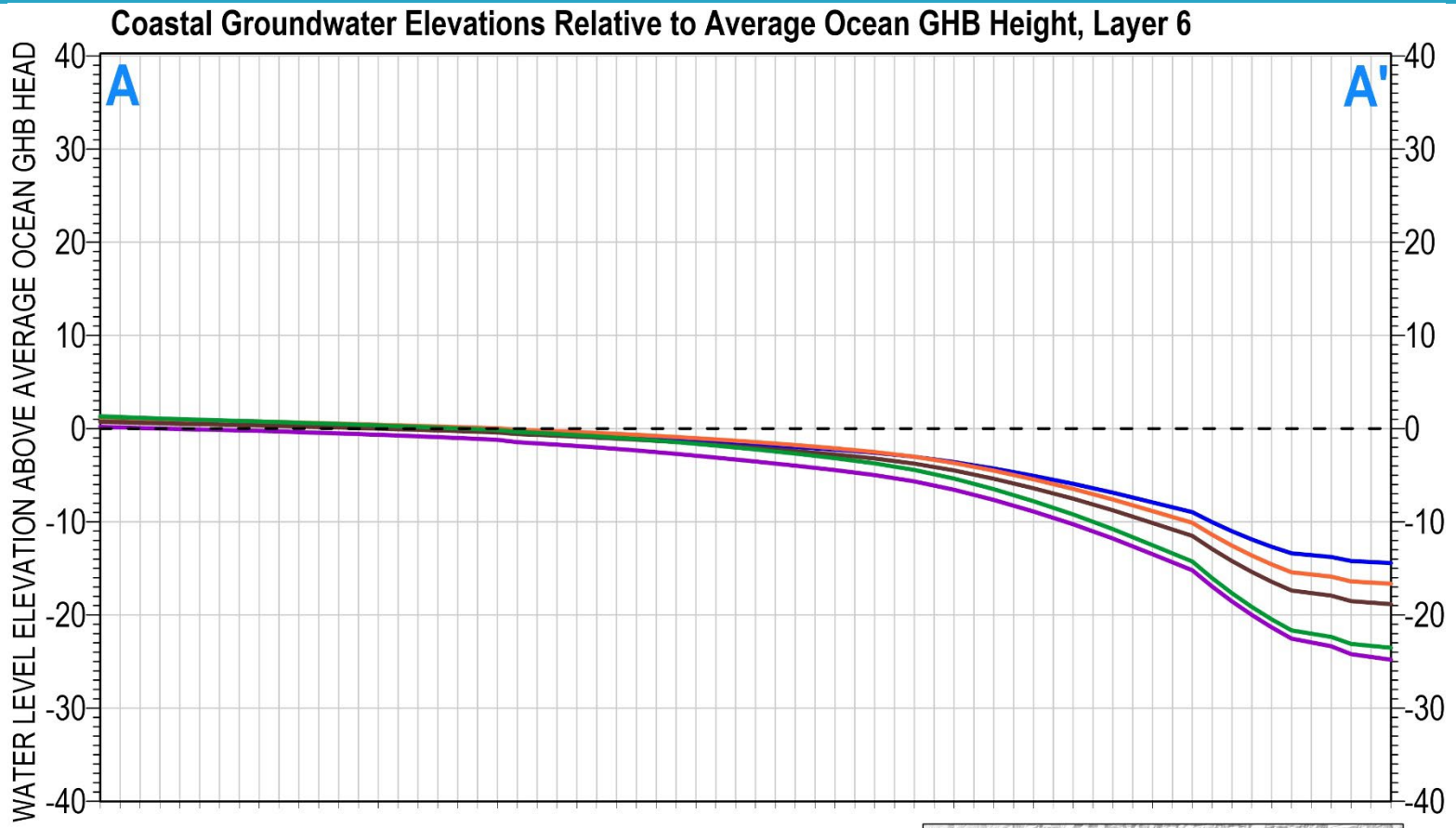
CAPP Groundwater Modeling Results
Water Levels – Coastal Cross-Section (B Zone)



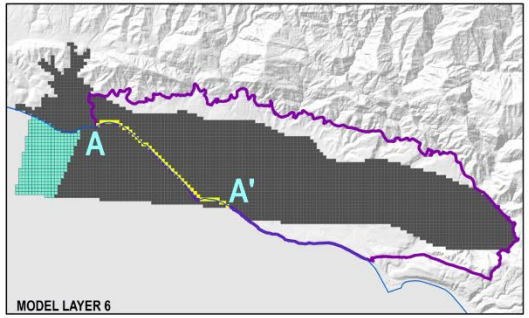
Period	Average GHB Height (NAVD88)
2020-2033	3.80
2034-2043	4.19
2044-2053	4.44
2054-2063	4.69
2063-2073	4.94



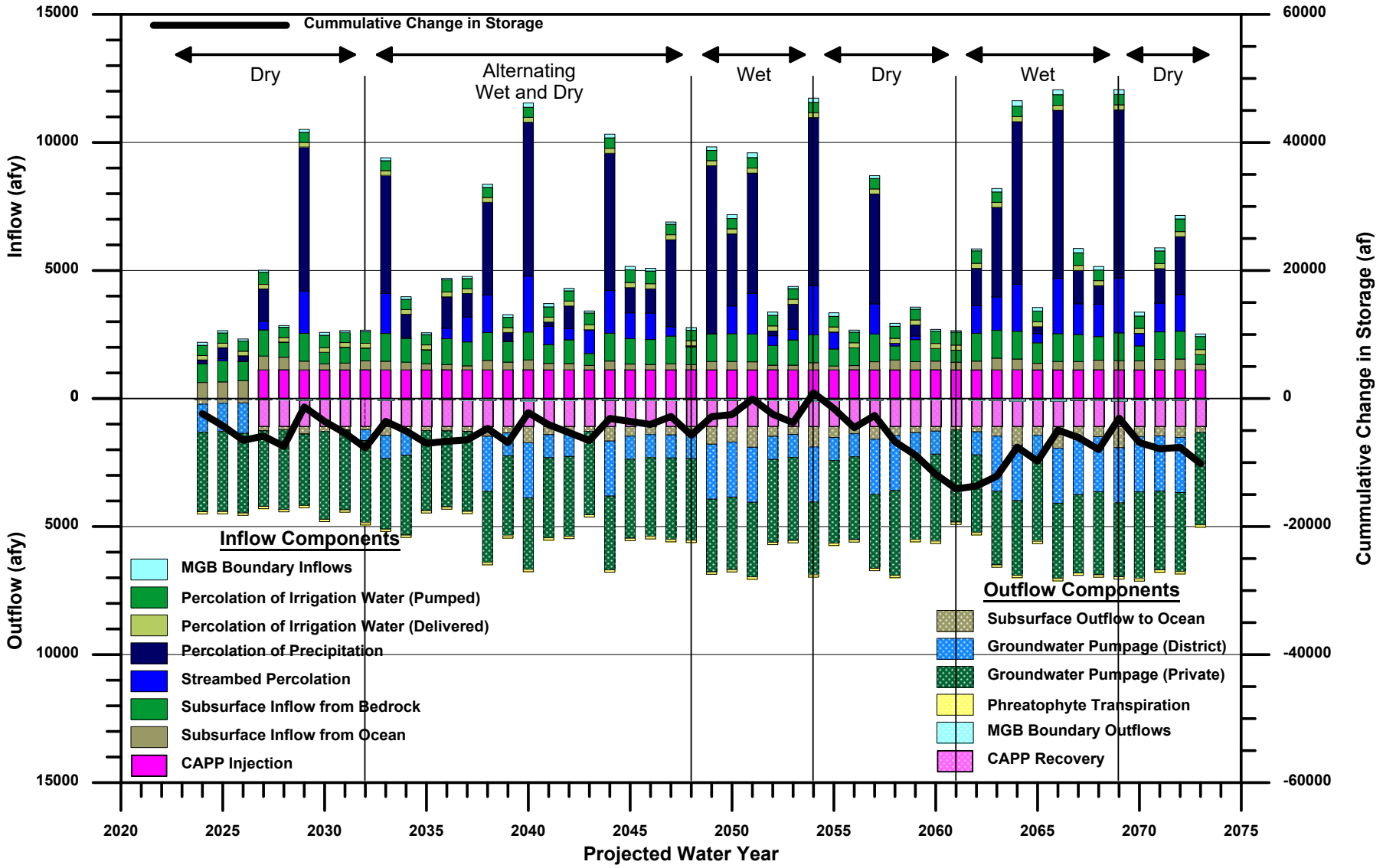
CAPP Groundwater Modeling Results
Water Levels – Coastal Cross-Section (C Zone)



Period	Average GHB Height (NAVD88)
2020-2033	4.17
2034-2043	4.56
2044-2053	4.81
2054-2063	5.06
2063-2073	5.32



CAPP Scenario Water Budget Results



No-Project Baseline vs CAPP Water Budget Comparison

Groundwater Budget Component		No Project Baseline	CAPP Scenario 6	Differences	
				afy	%
Inflows (acre-feet per year)					
Subsurface Inflow		866	866	0	0%
Streambed Percolation		734	734	0	0%
Percolation of Precipitation		1877	1877	0	0%
Percolation of Irrigation Water	Delivered	194	194	0	0%
	Pumped	430	430	0	0%
MGB Boundary Inflow		122	115	-7	-6%
Subsurface Inflow from Ocean Boundary		438	323	-115	-26%
CAPP Injection		0	1054	1054	--
Total Inflow		**4,662**	**5,593**	**931**	**20%**
Outflows (acre-feet per year)					
MGB Boundary Outflow		61	61	0	0%
Subsurface Outflow to Ocean Boundary		358	357	0	0%
Groundwater Pumping	CVWD	1263	1156	-107	-8%
	Private	3094	3094	0	0%
	CAPP Recovery	0	1034	1034	--
	TOTAL	4357	5284	927	21%
Phreatophyte Transpiration		94	94	0	0%
Total Outflow		**4,870**	**5,797**	**927**	**19%**
Inflows - Outflows (acre-feet per year)		**(208)**	**(204)**	**4**	**1%**

Sustainable Yield Comparison
No-Project Baseline vs CAPP Scenarios

Sustainable Yield =
Total Pumping +/– Change in Storage – Inflow from Ocean

No Project Scenario Sustainable Yield (afy) =
4,357 – 208 – 438 = **3,711 afy**

CAPP-6 Scenario Sustainable Yield (afy) =
5,284 – 204 – 323 = **4,757 afy**

- **Previous estimates ranged between 3,600 – 4,000 afy (PWR, 2012)**

Summary of CAPP Basin Benefits

1. Increases Water Levels at RMS Wells
2. Reduces Inflow from Ocean Boundary
3. Allows for ~10% Reduction in CVWD Pumping of Native Groundwater
4. Increases Sustainable Yield by ~ 1,100 afy

QUESTIONS?

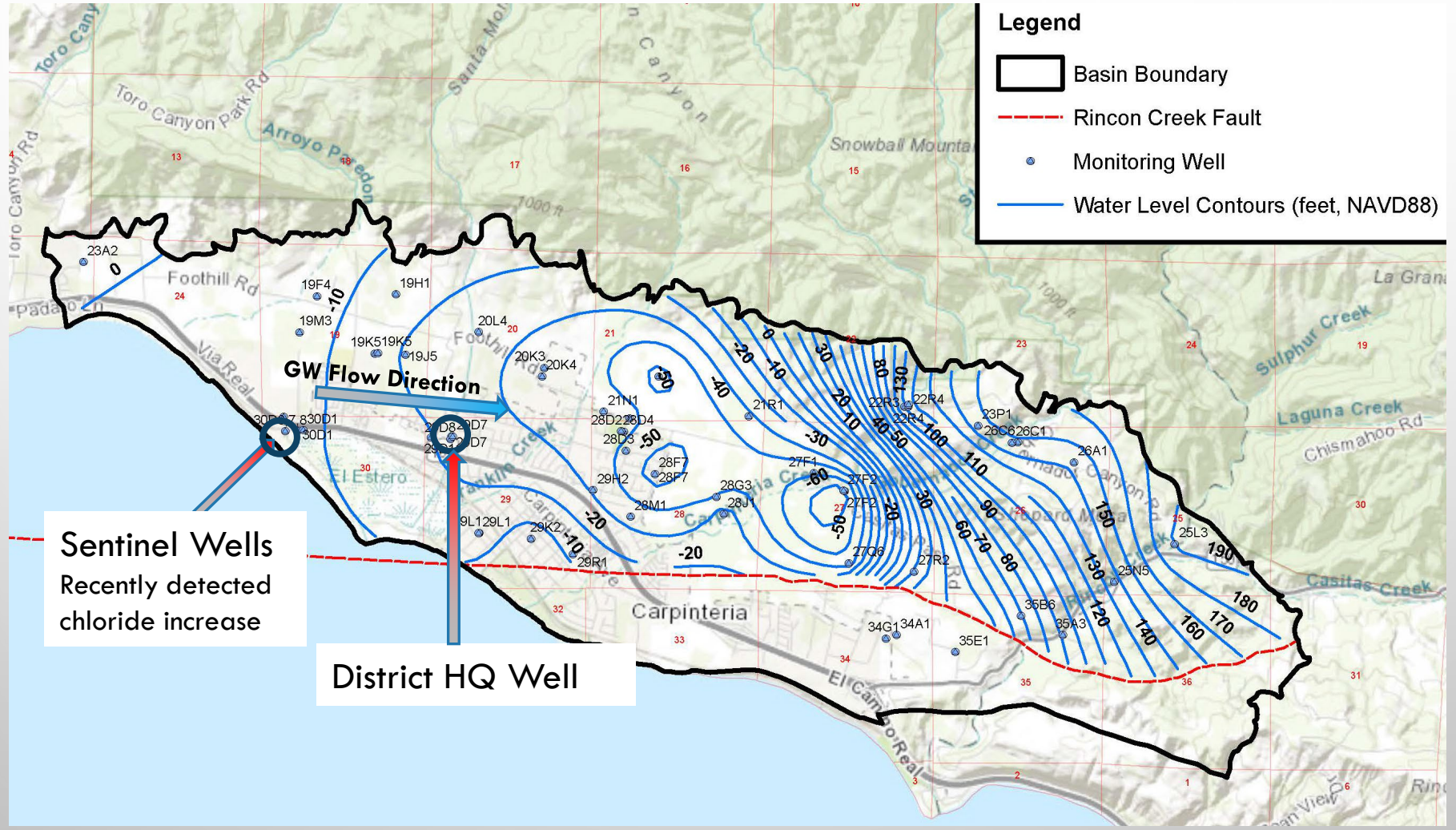
Projects and Management Actions

Potential Projects

- CAPP – Indirect Potable Reuse through Groundwater Basin
- Sentinel Well Monitoring Network Expansion
- Seawater Intrusion Barrier
  - Scope and design dependent on new data collected from Sentinel Wells
- Municipal Pumping Re-distribution
- Aquifer Storage and Recovery
  - Previously studied
- Regional Water Banking Agreements
  - Conceptual
- Recharge Enhancement
    - Recharge Basins- including onsite retention
    - De-lining of creeks

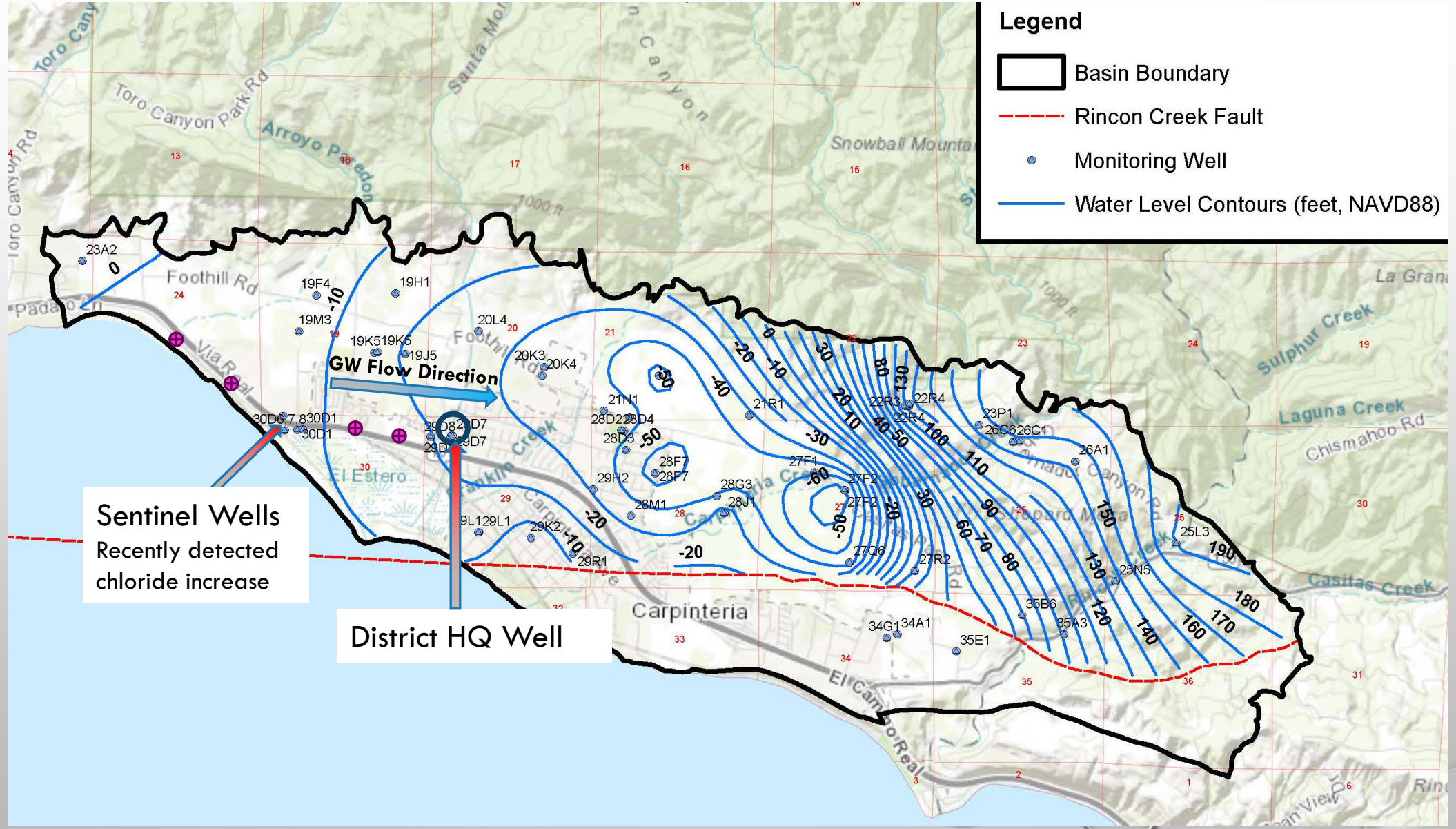
Sentinel Well Network Expansion

COASTAL BASINS AND
SEAWATER INTRUSION



CARPINTERIA BASIN

POTENTIAL SEAWATER INTRUSION IMPACT



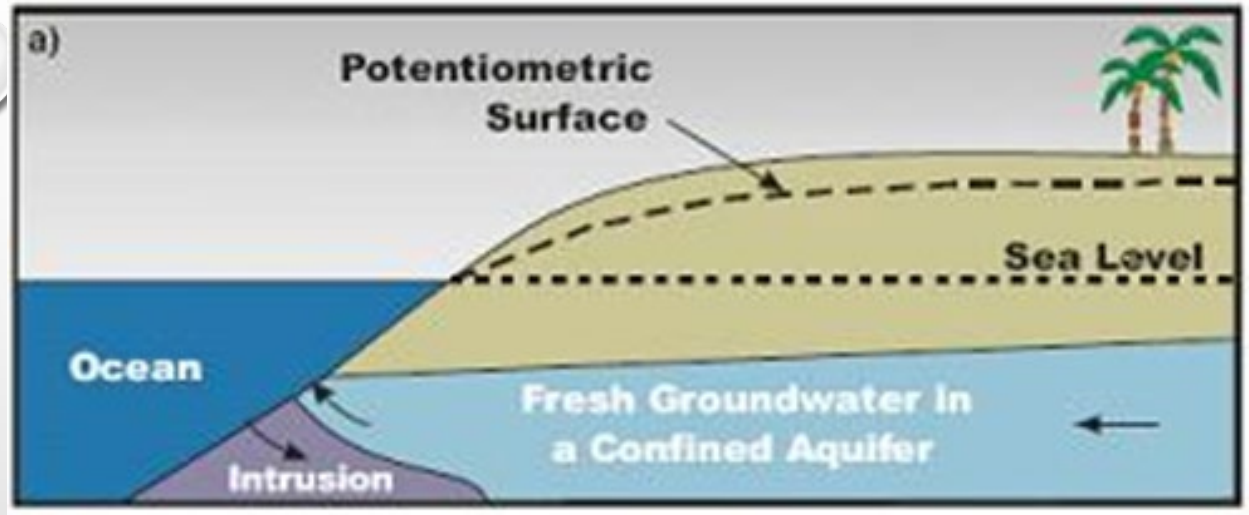
SENTINEL WELL NETWORK EXPANSION

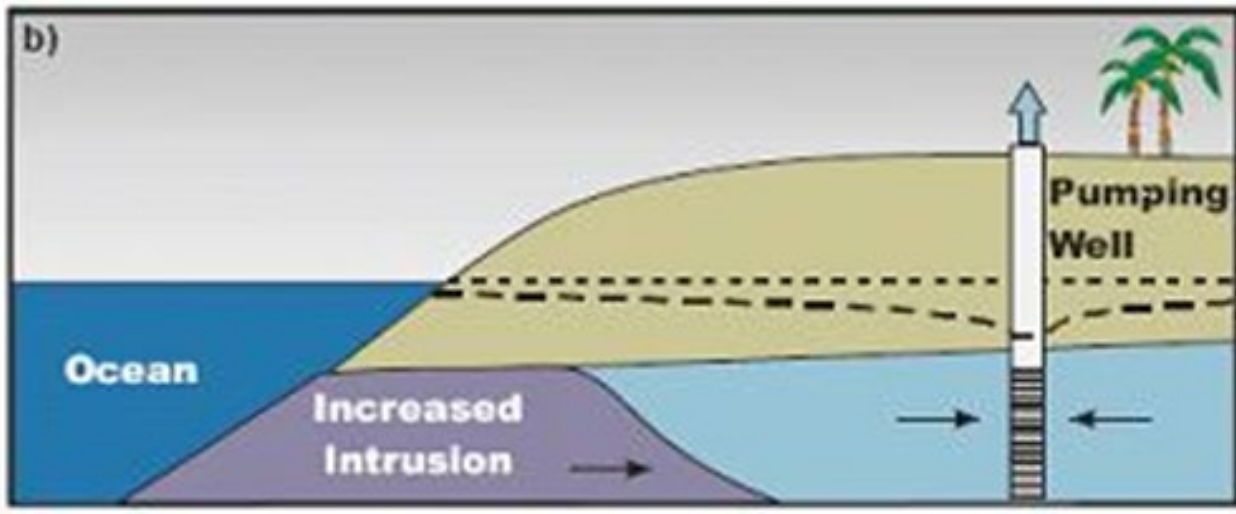
APPROXIMATE COST AND SCHEDULE

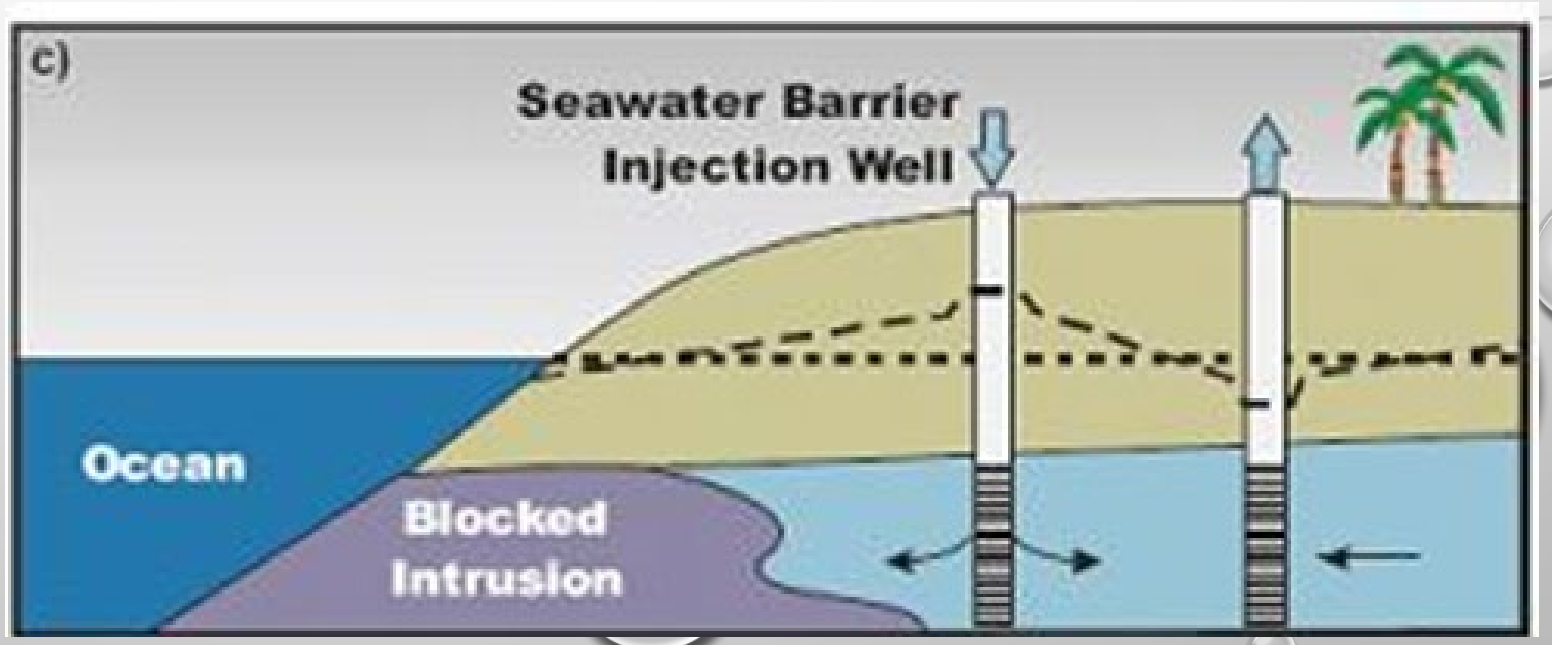
- Drilling Costs ~ $750K/well
  - Based on El Carro Well Costs
- Engineering, Design, Permitting Support ~$150K/well
- Total ~ $900K/well cluster
- Schedule
  - Prioritize 1-2 well cluster locations between existing Sentinel wells and District Headquarters well within first 5-year SGMA Implementation Period

Seawater Barrier Project

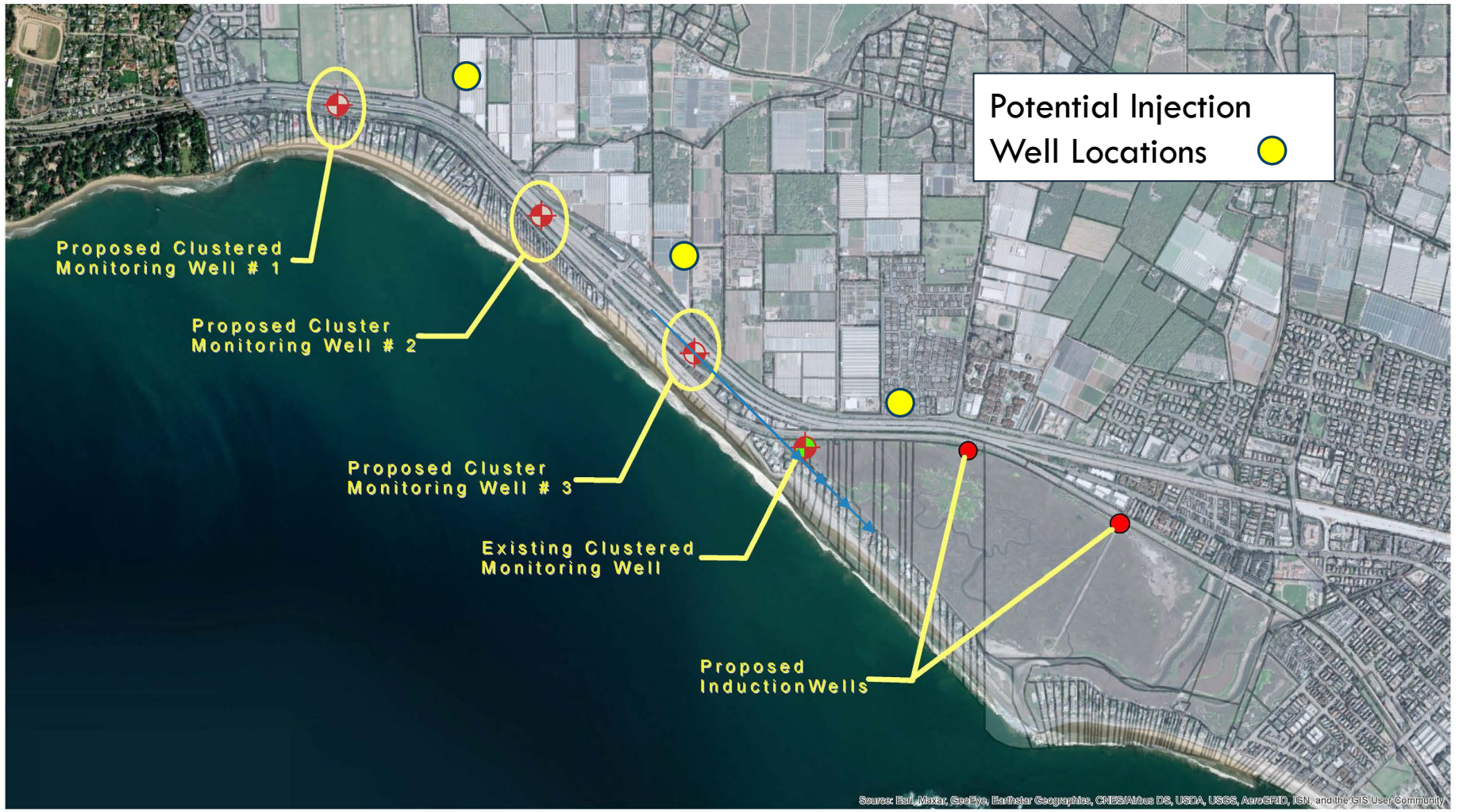
SEA WATER INTRUSION BARRIER WELLS PROJECT CONCEPT







COASTAL BASINS AND
SEAWATER INTRUSION



Source: Carpinteria Valley Water District

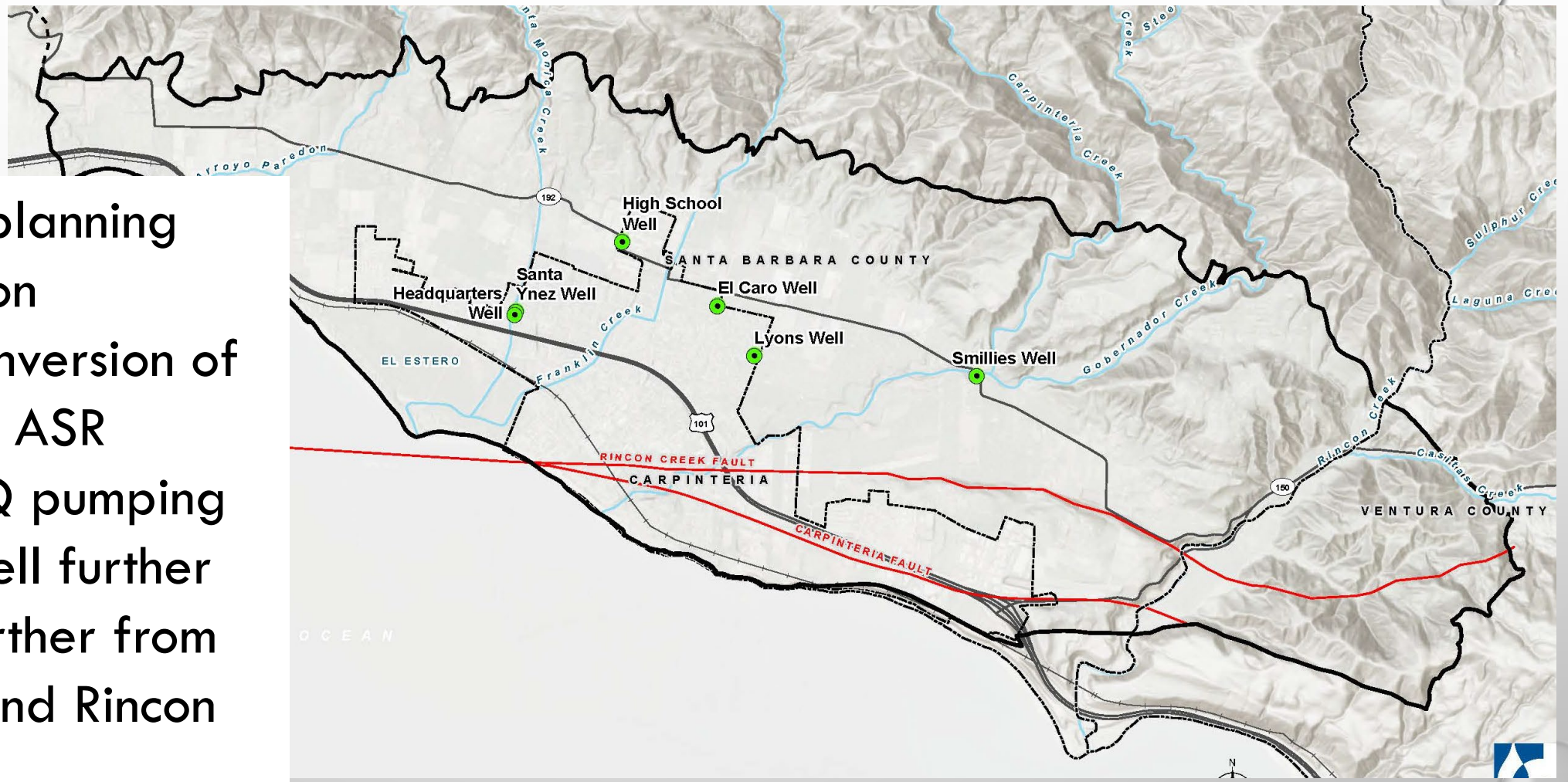
Sea Water Barrier Project Sequencing

- Sentinel Well Expansion necessary to collect data on aquifer parameters in this area
- Currently inadequate data to estimate conceptual project design or costs
- Additional Modeling to refine conceptual design
- Engineering Analysis (Feasibility, Cost Estimates, etc.)
- Field testing

Municipal Pumping Distribution

CVWD WELLS

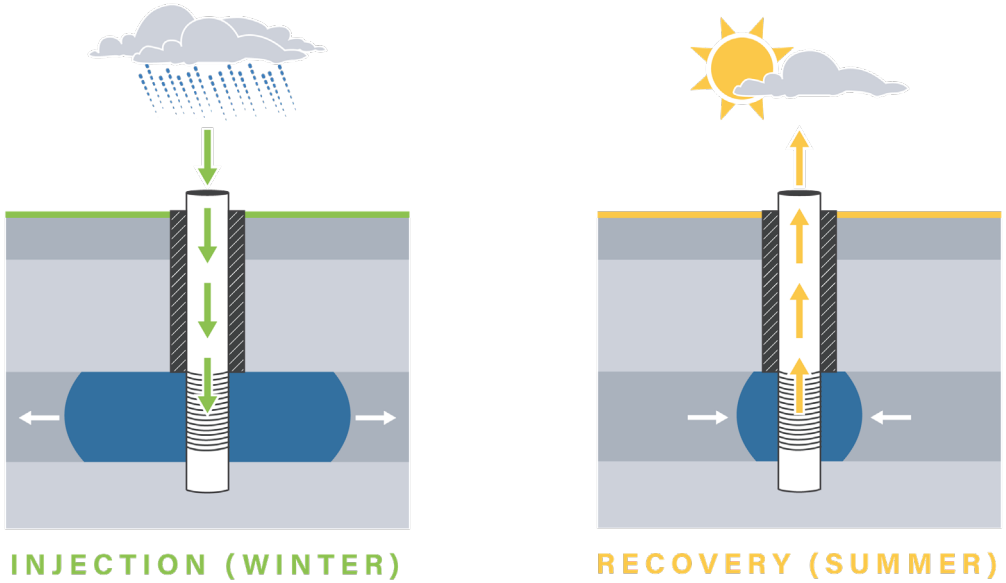
- Long-term planning consideration
- Eventual conversion of HQ Well to ASR
- Replace HQ pumping with new well further inland – farther from ocean/behind Rincon fault

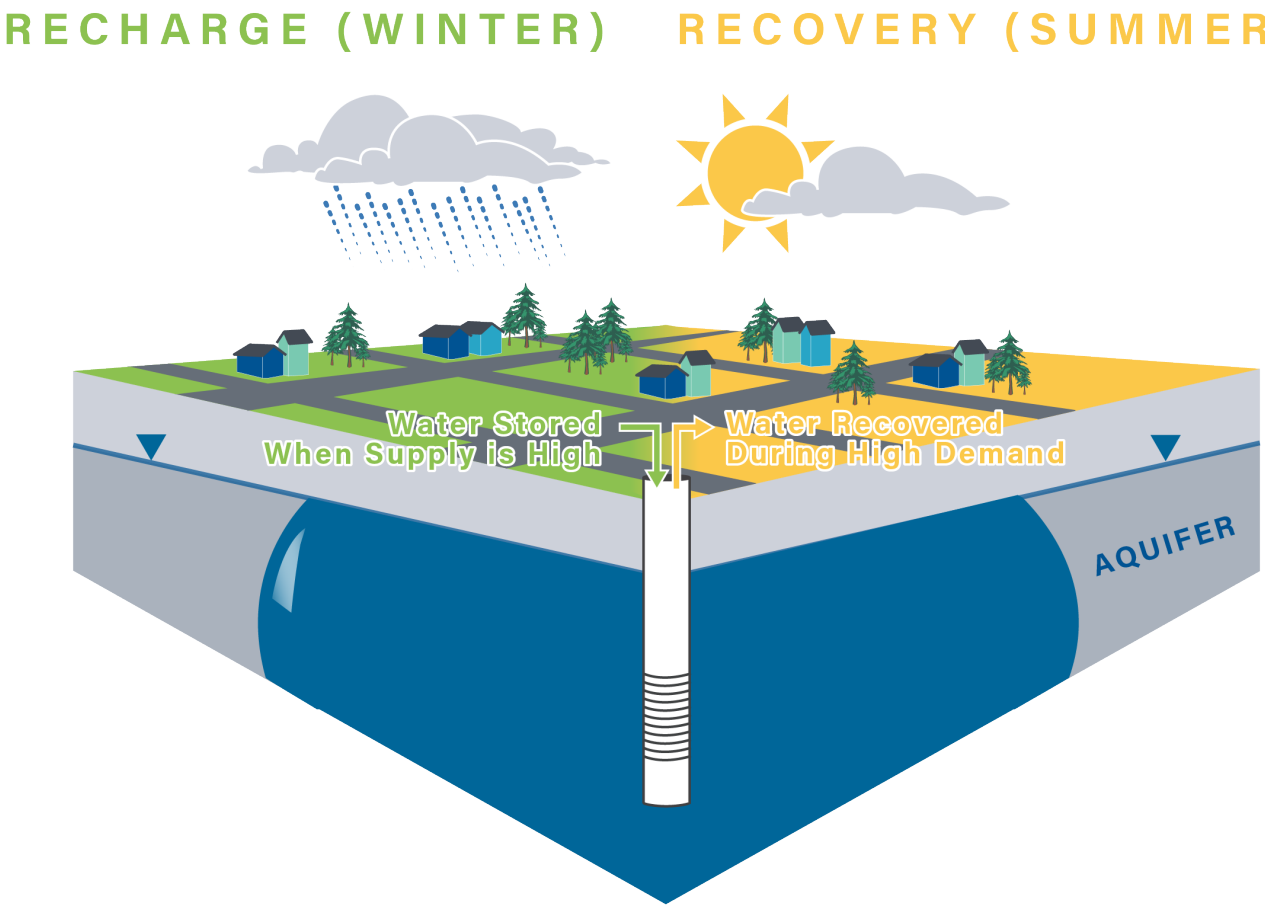


Aquifer Storage and Recovery

ASR Project Concept

- Uses Aquifer for temporary storage
- Inject water when supply is available
- Recover water during high demand periods
- Seasonal or longer (drought) storage/recovery cycles





Recharge Enhancement

Recharge Enhancement Possibilities

- Recharge Basins
  - Identify possible land and source water availability
  - Could include onsite retention
- Creek De-lining
  - Santa Monica and Franklin creeks were lined in 70s to mitigate flood risk
  - Removal of lining would allow percolation of stream water during flow events
  - Preliminary modeling performed indicates an average of ~200 AFY of additional recharge could be achieved.

Water Banking Discussion – Potential Local and Regional Partnerships

MANAGEMENT ACTIONS

Potential Management Actions

- Technical assistance for conservation/efficiency
- Well metering
- To be discussed and included in GSP to maintain qualification for future funding
- Additional monitoring to address data gaps (35E1 transducer, GDEs, seawater intrusion)

IMPLEMENTATION PLAN

Implementation Plan

5-year and 20-year SGMA planning horizons

5-year Implementation Plan Components

- Project Feasibility Ranking Study
- Implementation of CAPP Project
- Sentinel Well Network Expansion
- Metering Study
- Ongoing GSA funding
- Potential GDEs Investigation
- Set transducer and investigate RMS 35E1
- Annual Reports

20-year Implementation Plan

- Seawater Intrusion Barrier Project(?) - if needed
- New Municipal Wells? Pumping Re-distribution?
- Annual Reports – Progress Toward Sustainability

GSP Public Input and Review

GSP Public Review Schedule

- Initial Publication for Review September, 2023
- Outreach for *written* public comments
- Response to comments will be included as an Appendix to final GSP
- Final Publication for Public Review ~October 16-30
- GSP due to DWR December 31, 2023

GSPAC Schedule & Topics

- August 2023
  - Review Chapters 4- 7
  - P&MA Modeling Results
  - Implementation Plan 5-yr/20-yr
    - Will include proposed Alternatives Analysis
    - Discussion of metering and measurement
    - Discussion of needed revenues for GSA activities

QUESTIONS?