Stakeholder workshop No. 3: Sustainable Goal Setting

Arlington Basin Groundwater Sustainability Plan (GSP)

November 23, 2021 • 3 p.m. – 5 p.m.

WESTERN MUNICIPAL WATER DISTRICT

Who's here?

ENVIRONMENTAL / CONSERVATION GROUPS

Santa Ana Watershed Project Authority (SAWPA)

URBAN / AGRICULTURE WATER USERS

Western Municipal Water District

INTEGRATED WATER MANAGEMENT

Bureau of Reclamation

Elsinore Valley Municipal Water District

PRIVATE WATER USERS

La Sierra University

City of Riverside

Clayson, Bainer & Saunders Professional Law Corporation

Corona – The Circle City – Established May 4, 1886 – To Cherish Our Past - To Plan Our Future

OTHER

DUDEK

Workshop goals

- Describe SGMA requirements for Projects and Management Actions

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- Provide Overview of proposed **projects and management actions**

- Document stakeholder input on **projects and management actions**

Workshop agenda

5 min	Project Grounding
30 min	**PRESENTATION:** SGMA Sustainability Requirements and Key Terms
30 min	**DISCUSSION:** Projects and Management Actions
5 min	What's Next and Audience Q&A

Presenters

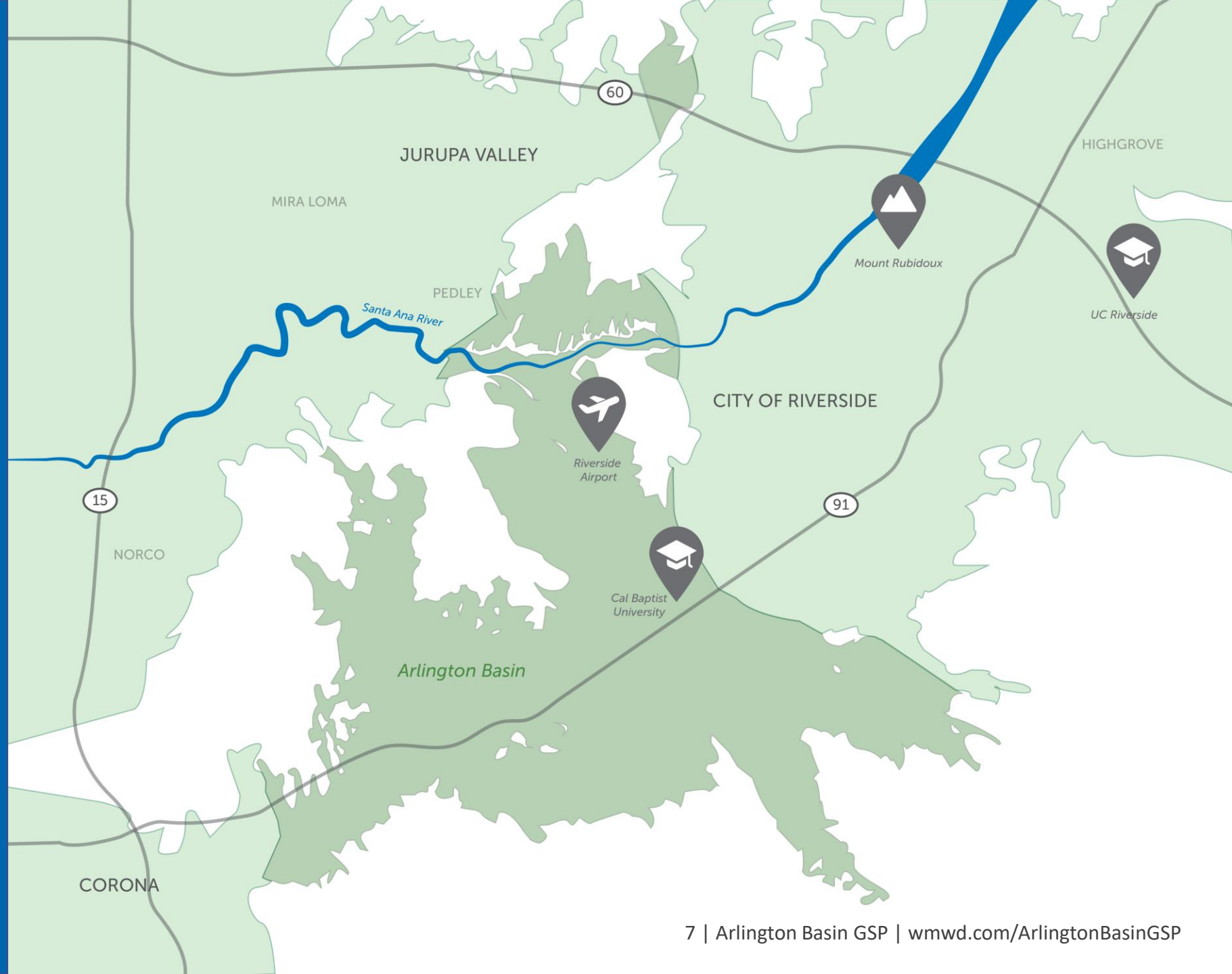
Brian Villalobos
Principal Hydrogeologist
Geoscience

Ryan Shaw
Groundwater Sustainability Agency
(GSA) Representative
Western Municipal Water District

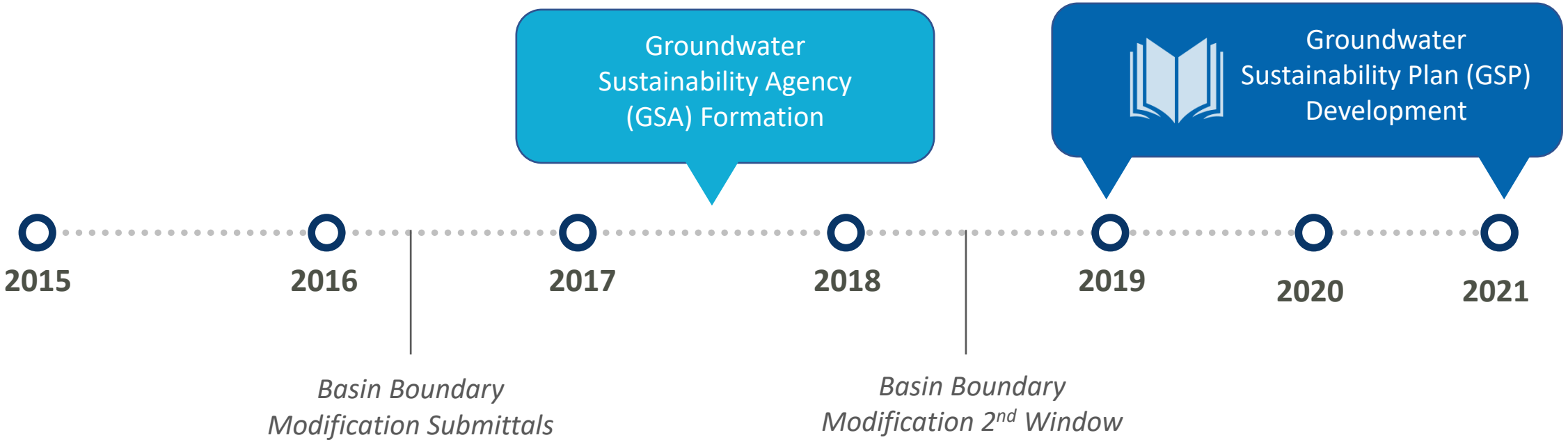
Quick project overview

Ryan Shaw
Western Municipal Water District,
Arlington Basin GSP Groundwater Sustainability Agency

Securing sustainable groundwater in the Arlington Basin



Arlington Basin governance



Sustainable Groundwater Management Act (SGMA) deadlines

Groundwater Sustainability Plan (GSP) Complete

Arlington Basin Achieves Sustainability

2022

GSPs due per SGMA

2027

Evaluate Progress

2032

Evaluate Progress

2037

Evaluate Progress

2042

20 years to achieve goals stated in plan

Questions?

Projects and Management Actions

Brian Villalobos
Hydrogeologist, Geoscience

SMGA requirements

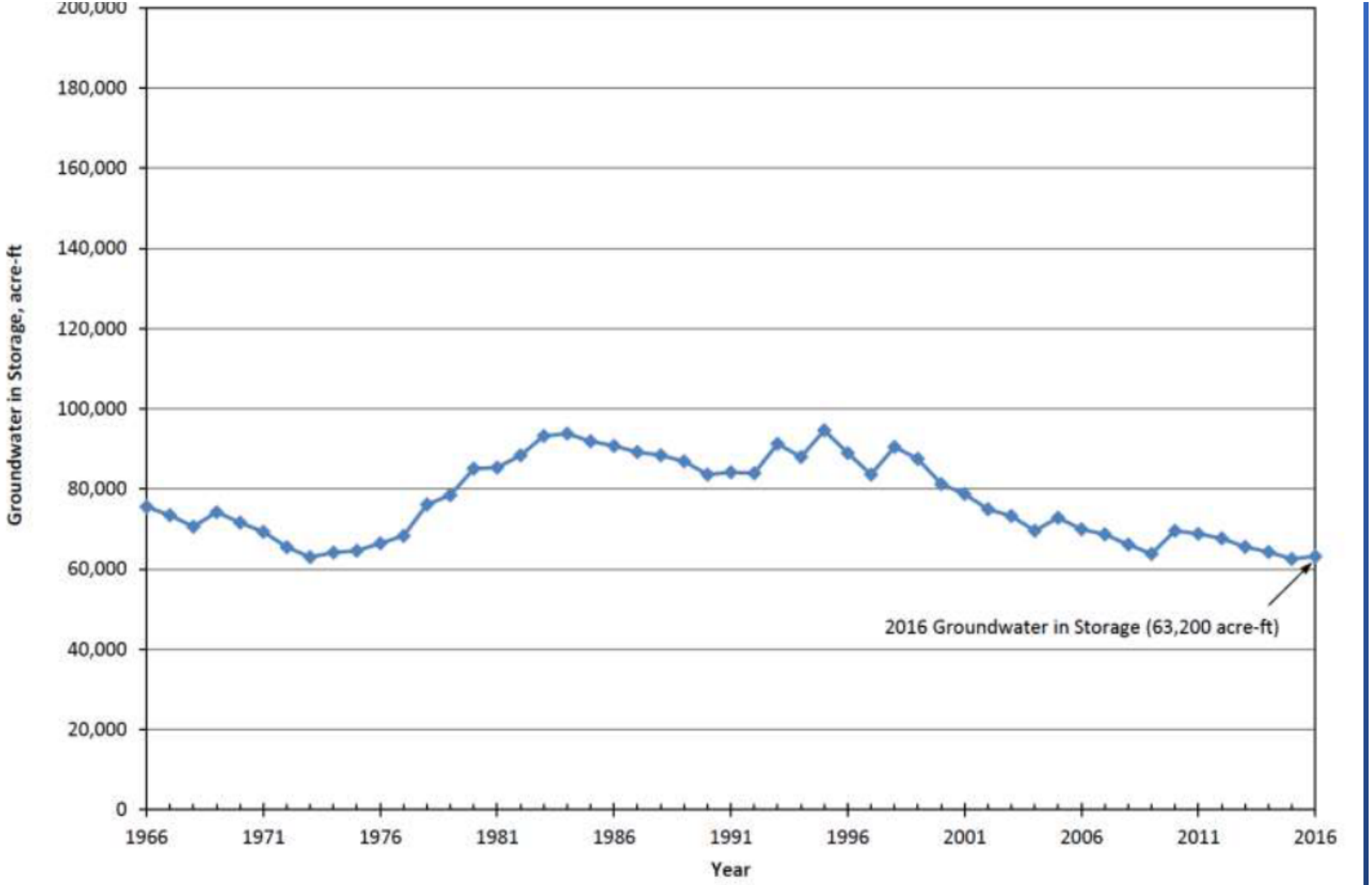
Projects and Management Actions will be identified to address Undesirable Results

Projects and Management Actions Chapter

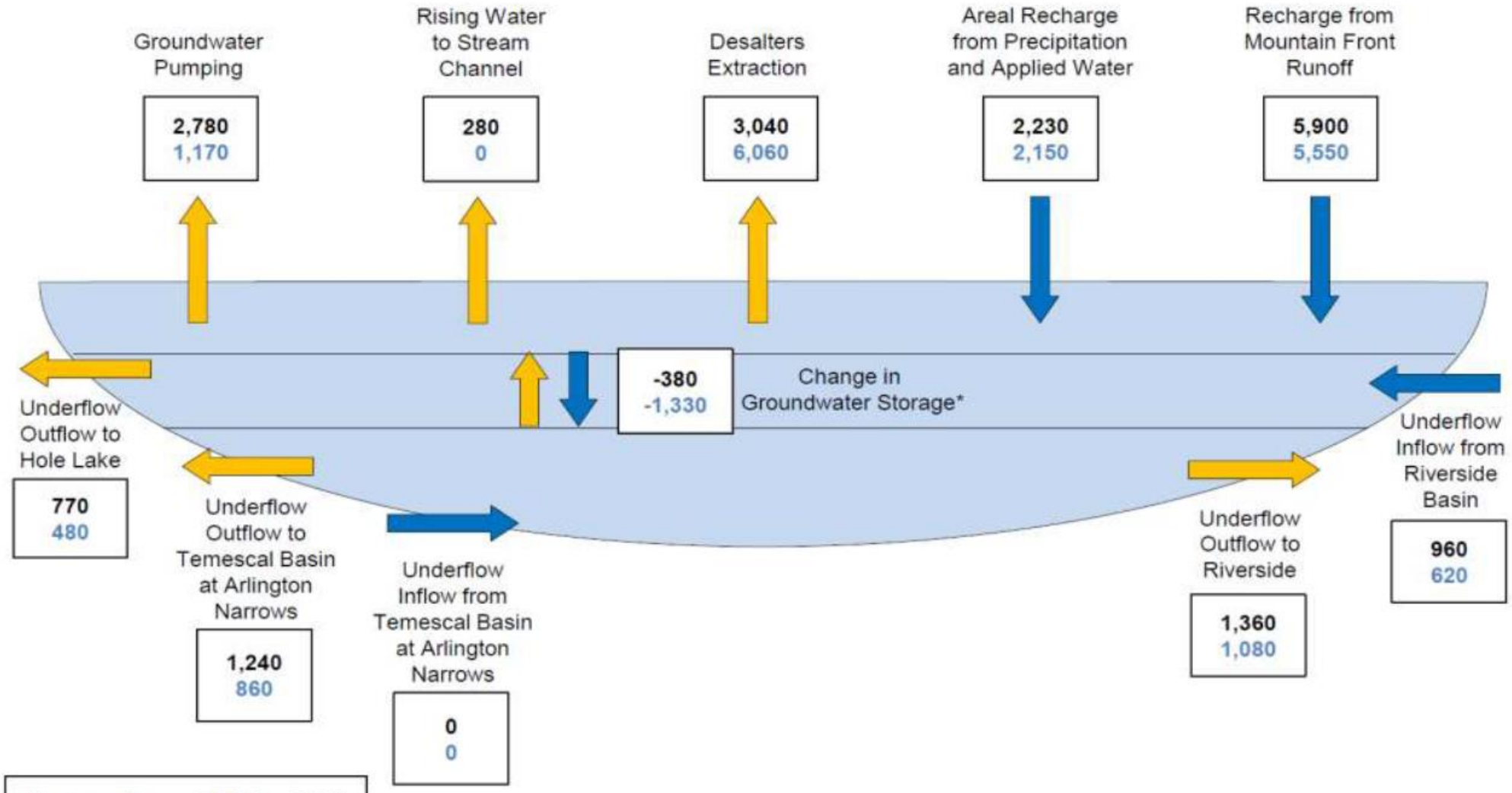
Goal

- Provide a list and description of proposed projects and management actions to meet the sustainability goals and indicators established in the Sustainable Management Criteria chapter.

Groundwater in Storage – Arlington Basin



Current and Historical Water Budgets



All values in acre-ft/yr

*A positive sign indicates an increase in groundwater storage and a negative sign represents a decline in groundwater storage.

WATER BUDGET FOR ARLINGTON BASIN (1966 -2016 and 2012 -2016)

Current Management Actions

Water Conservation

- Community Outreach
- Residential Indoor and outdoor rebate programs
- Commercial Indoor and Outdoor rebate programs
- Turf Replacement
- Qualified Water Efficient Landscaper Program - QWEL
- Code requirements such as Gray Water Systems and Rain Water Collection Systems
- Irrigation efficiency
- Low impact development standards for new or retrofitted construction
- Imposition of SGMA or other available fees to encourage increased conservation

Additional information on existing and proposed water efficiency programs can reviewed in the Western Municipal Water Efficiency Masterplan located at the link below:
https://www.wmwd.com/DocumentCenter/View/4732/WUEMasterPlan1-25-19

Current Management Actions

Data Collection and Management

- Monitoring of Groundwater Levels and Water Quality
- Metering Infrastructure
- Collection of Pumping Records

Current Proposed Projects (5-Years)

Table 5-1. Summary of Sustainability Indicator Management by Projects and Management Actions

Activity / Project	Sustainability Indicator		
	Reduction of Groundwater in Storage	Chronic Lowering of Groundwater Levels	Degraded Water Quality
Stormwater Capture and Spreading	Groundwater in storage would be increased by enhancing groundwater recharge. Preliminary modeling indicates additional recharge of 440 acre-ft/yr for stormwater capture activies in Victoria spreading basin, which corresponds to an increase in groundwater storage of 220 acre-ft/yr.	Enhanced groundwater recharge and increased groundwater storage are typically associated with increases in groundwater levels. Initial modeling indicates increases in groundwater levels will be greatest in the vicinity of the Arlington Desalter Wells.	Stormwater runoff is typically very good quality water. Capture and infiltration of this water source could provide water quality benefits.
Artificial Recharge using Recycled Water	Groundwater in storage would be increased by enhancing groundwater recharge. Preliminary modeling indicates additional recharge of 350 acre-ft/yr for the artificial recharge of recycled water in Victoria spreading basin, which corresponds to an increase in groundwater storage of 190 acre-ft/yr.	Enhanced groundwater recharge and increased groundwater storage are typically associated with increases in groundwater levels. Initial modeling indicates increases in groundwater levels will be greatest in the vicinity of the Arlington Desalter Wells.	The recharge of recycled water may increase water quality in the Arlington Subbasin since recycled water generated at the RWQCP and WRCWRA is typically has lower TDS and TIN concentrations than current (2018) ambient groundwater conditions. Water quality in the basin will need to continue to be monitored.
Irrigation with Recycled Water	Create supplemental groundwater in storage or increase groundwater in storage by replacing a portion of groundwater pumping for irrigation with recycled water.	Increased groundwater storage and reduced pumping are typically associated with increases in groundwater levels.	The use of recycled water may increase water quality in the Arlington Subbasin since recycled water generated at the RWQCP and WRCWRA is typically has lower TDS and TIN concentrations than current (2018) ambient groundwater conditions. Water quality in the basin will need to continue to be monitored.
Aquifer Storage and Recovery (ASR) / Managed Aquifer Recharge	Groundwater in storage would be increased by enhancing groundwater recharge. Preliminary modeling indicates additional recharge of 1,290 acre-ft/yr using stormwater, recycled water, and groundwater from Riverside South in Victoria spreading basin, which corresponds to an increase in groundwater storage of 620 acre-ft/yr.	Enhanced groundwater recharge and increased groundwater storage are typically associated with increases in groundwater levels. Initial modeling indicates increases in groundwater levels will be greatest (up to 20 ft after 25 years) in the vicinity of the Arlington Desalter Wells.	ASR/managed aquifer recharge in Victoria spreading basins may increase water quality in the Arlington Subbasin. Stormwater runoff is typically very good quality water, recycled water generated at the RWQCP and WRCWRA is typically has lower TDS and TIN concentrations than current (2018) ambient groundwater conditions, and ambient groundwater concentrations in Riverside South are also lower than those in Arlington. Water quality in the basin will need to continue to be monitored.

Table 5-1. Summary of Sustainability Indicator Management by Projects and Management Actions

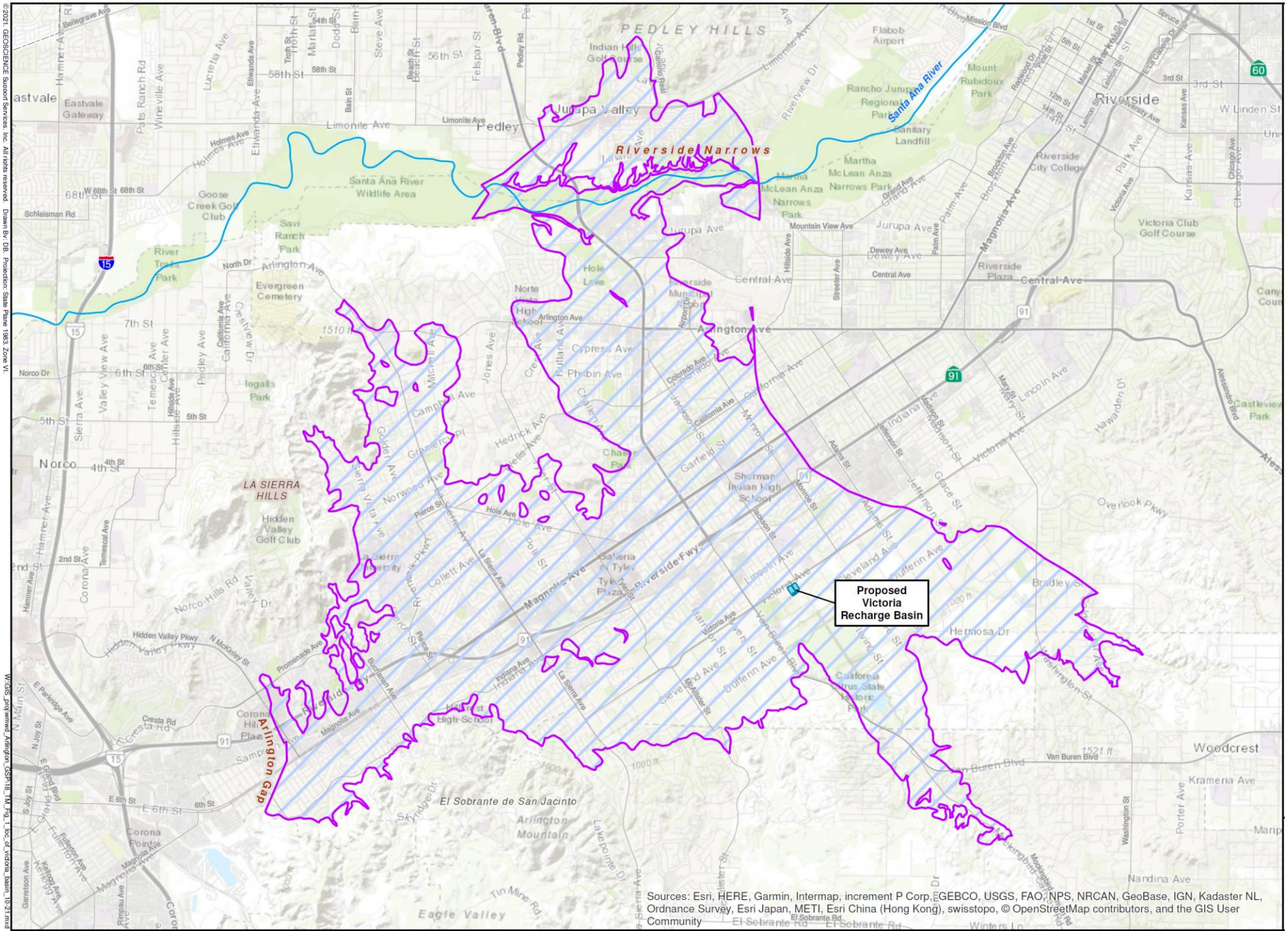
Activity / Project	Sustainability Indicator		
	Reduction of Groundwater in Storage	Chronic Lowering of Groundwater Levels	Degraded Water Quality
Metering Infrastructure	Support the refinement of sustainable yield estimate for the subbasin, assisting with sustainable management of groundwater pumping to ensure adequate groundwater in storage.	Support the refinement of sustainable yield estimate for the subbasin, assisting with sustainable management of groundwater pumping to ensure groundwater levels are maintained in such a way to avoid undesirable results.	-
Decreased Evapotranspiration	Removal of high water use, invasive vegetation will reduce evapotranspiration - lessening potential declines of groundwater storage.	Removal of high water use, invasive vegetation will reduce evapotranspiration - lessening potential declines of groundwater levels.	Removal of high water use vegetation may result in a benefit to water quality. Typically, plants take the water and leave the salts behind. Therefore removal of high water use can beneficially impact water quality.
Monitoring of Groundwater Levels and Water Quality Data	Ongoing monitoring will allow the GSA to identify areas trending towards undesirable effects and proactively enact projects and/or management actions as needed to improve management of groundwater resources above management thresholds and help reach management objectives.		
Collection of Pumping Records	Supports the refinement of sustainable yield estimate for the subbasin, assisting with sustainable management of groundwater pumping to ensure adequate groundwater in storage.	Supports the refinement of sustainable yield estimate for the subbasin, assisting with sustainable management of groundwater pumping to ensure groundwater levels are maintained in such a way to avoid undesirable results.	-
Water Transfers / In-Lieu Groundwater Recharge	Create supplemental groundwater in storage or increase groundwater in storage by replacing a portion of groundwater pumping with additional imported water.	Increase groundwater levels by replacing a portion of groundwater pumping with imported water supply.	The use of recycled water may increase water quality in the Arlington Subbasin since imported water and ambient groundwater in Riverside South typically have lower TDS and TIN concentrations than current (2018) ambient groundwater conditions. Water quality in the basin will need to continue to be monitored.

Table 5-1. Summary of Sustainability Indicator Management by Projects and Management Actions

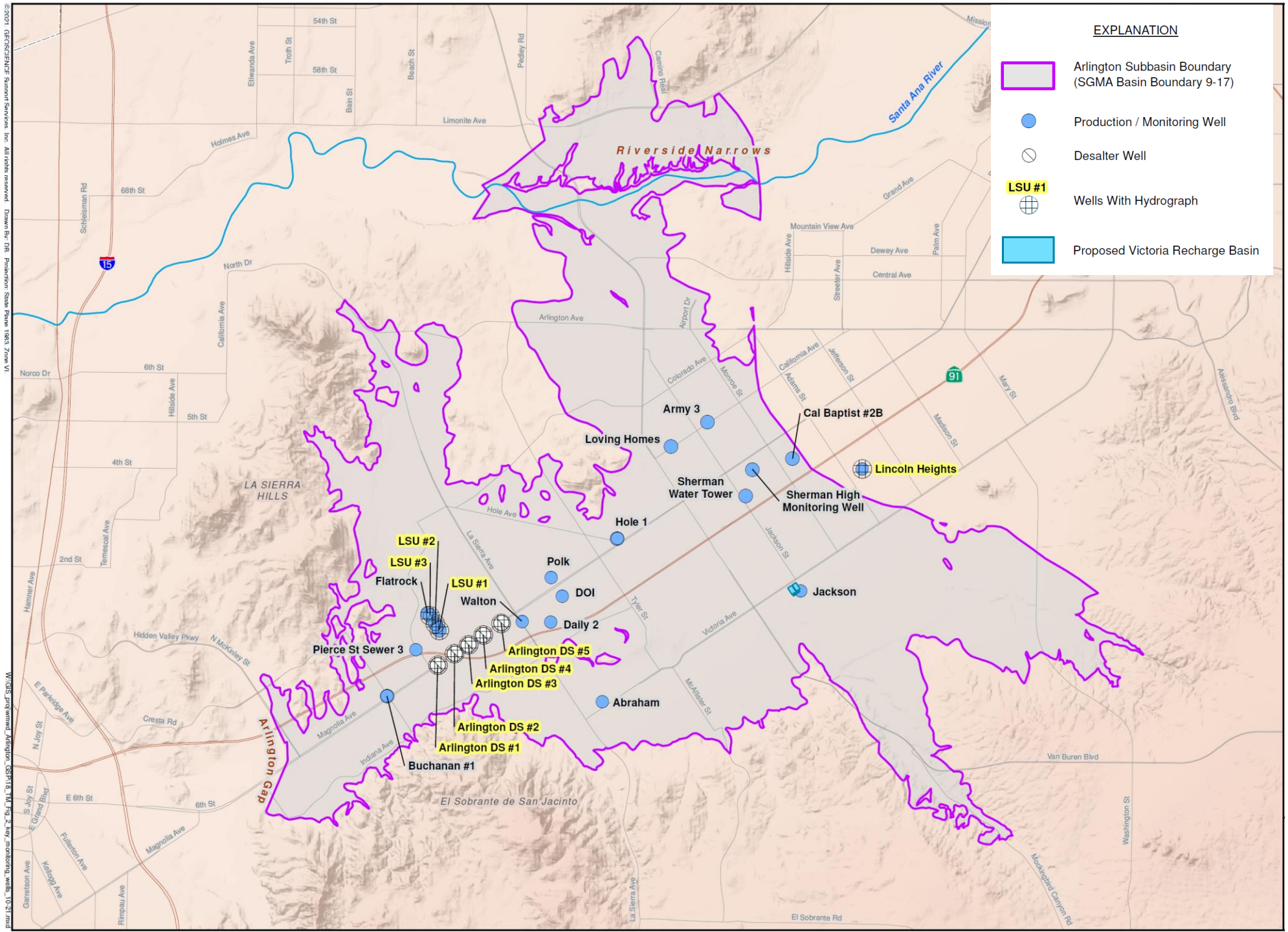
Activity / Project	Sustainability Indicator		
	Reduction of Groundwater in Storage	Chronic Lowering of Groundwater Levels	Degraded Water Quality
Water Conservation	Water demand reduction and efficient water practices provide opportunities to reduce groundwater pumping, support the ability to maintain and even raise groundwater levels, and allow more groundwater to remain in storage.	Water demand reduction and efficient water practices provide opportunities to reduce groundwater pumping, support the ability to maintain and even raise groundwater levels, and allow more groundwater to remain in storage.	Water conservation activities could cause slight decreases in water quality because less return flow from irrigation activities (using higher quality water than ambient groundwater concentrations) could be realized. Water quality in the basin will need to continue to be monitored.
Groundwater Pumping Curtailment and/or Restrictions	Groundwater pumping curtailment or restrictions halts or lessens the decline of groundwater levels, allowing water levels to recovery and groundwater storage to increase.	Groundwater pumping curtailment or restrictions halts or lessens the decline of groundwater levels, allowing water levels to recovery and groundwater storage to increase.	Groundwater pumping curtailment may lead to increased imported water use, which is typically higher in quality than ambient groundwater in Arlington Basin. This may lead to slight increases in water quality, which would need to continue to be monitored.
Redistribution of Pumping	-	While redistribution of pumping will not necessarily change the amount of water being withdrawn from the basin (i.e., change groundwater storage), it may help manage local groundwater levels to meet management criteria.	-
Adaptive Groundwater Management	Adaptive management allows the GSA to react to changing groundwater conditions, evaluate the success or failure of projects and management actions, and make management decisions to redirect efforts to achieve sustainability goals more effectively.		
Conjunctive Use	Groundwater in storage would be increased by enhancing groundwater recharge through coordinated use of surface water, imported water, and groundwater.	Enhanced groundwater recharge and increased groundwater storage are typically associated with increases in groundwater levels.	The coordinated use of different water sources may increase water quality in the Arlington Subbasin. Stormwater runoff is typically very good quality water, recycled water generated at the RWQCP and WRCWRA is typically has lower TDS and TIN concentrations than current (2018) ambient groundwater conditions, and ambient groundwater concentrations in Riverside South are also lower than those in Arlington. Water quality in the basin will need to continue to be monitored.
Basin Wide Economic Analysis	Basin-wide economic analysis would provide a cost-benefit anlaysis of the proposed projects and management actions included in this GSP.		

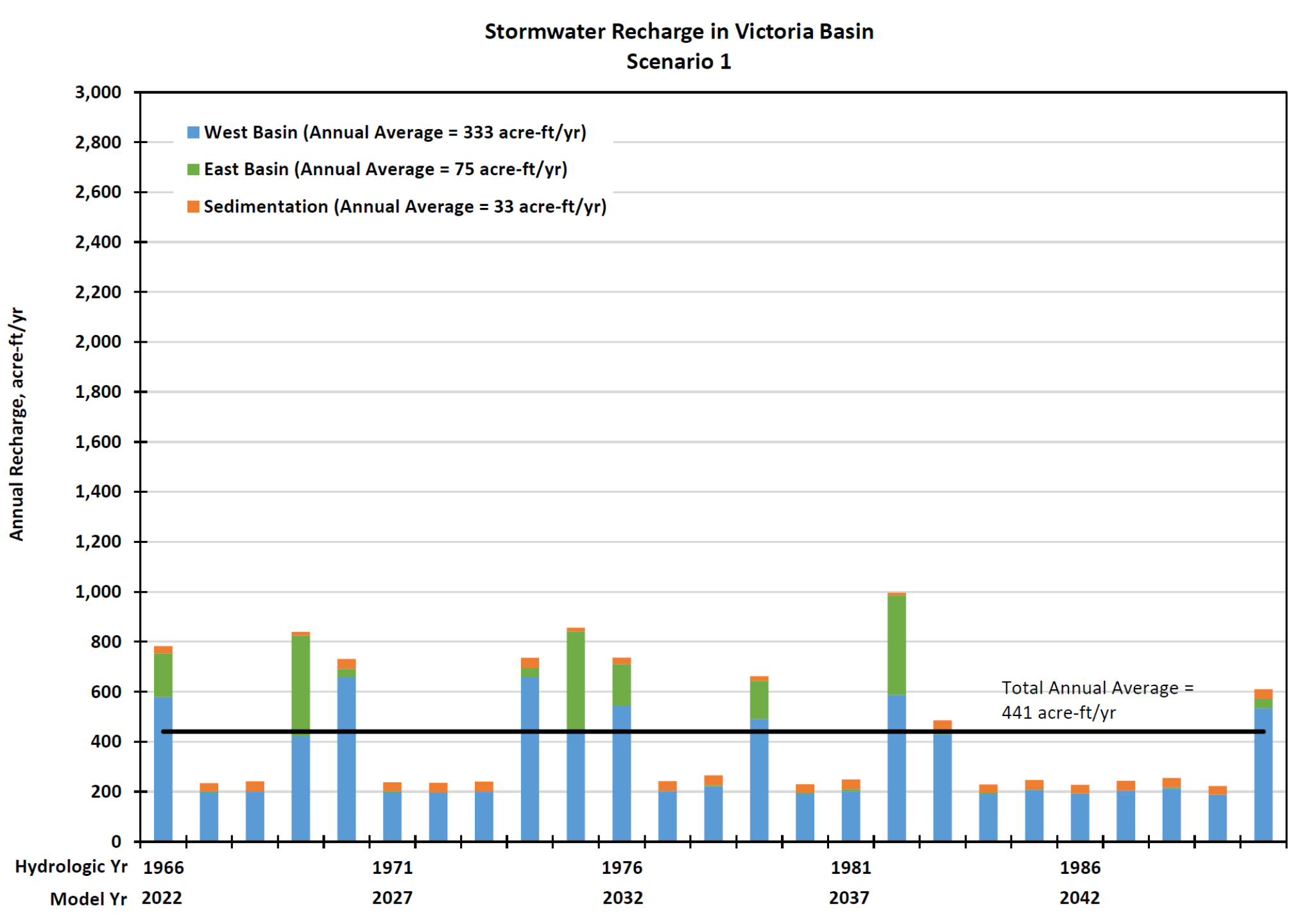
Evaluation of Groundwater Recharge Project

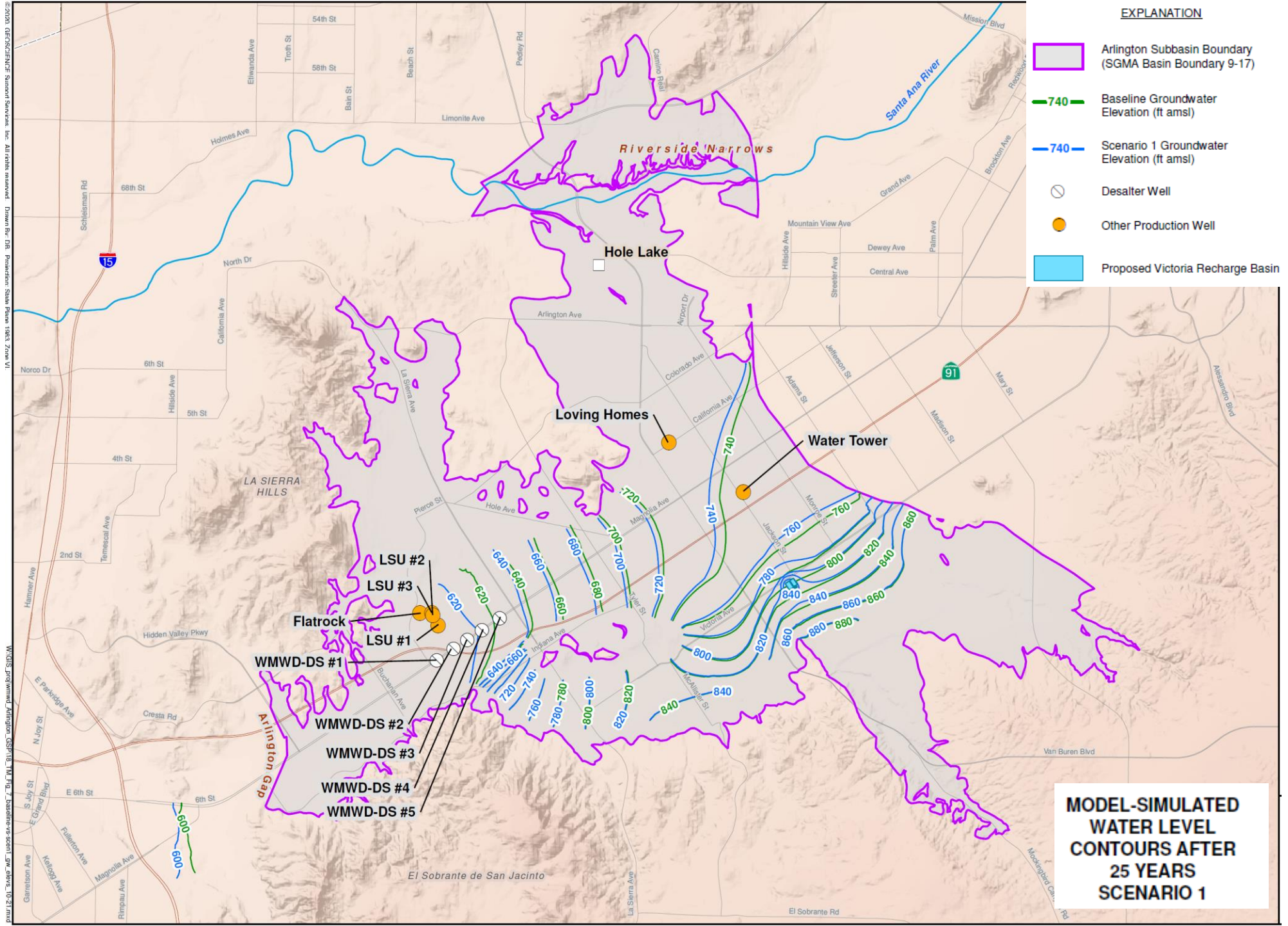
Victoria Basins

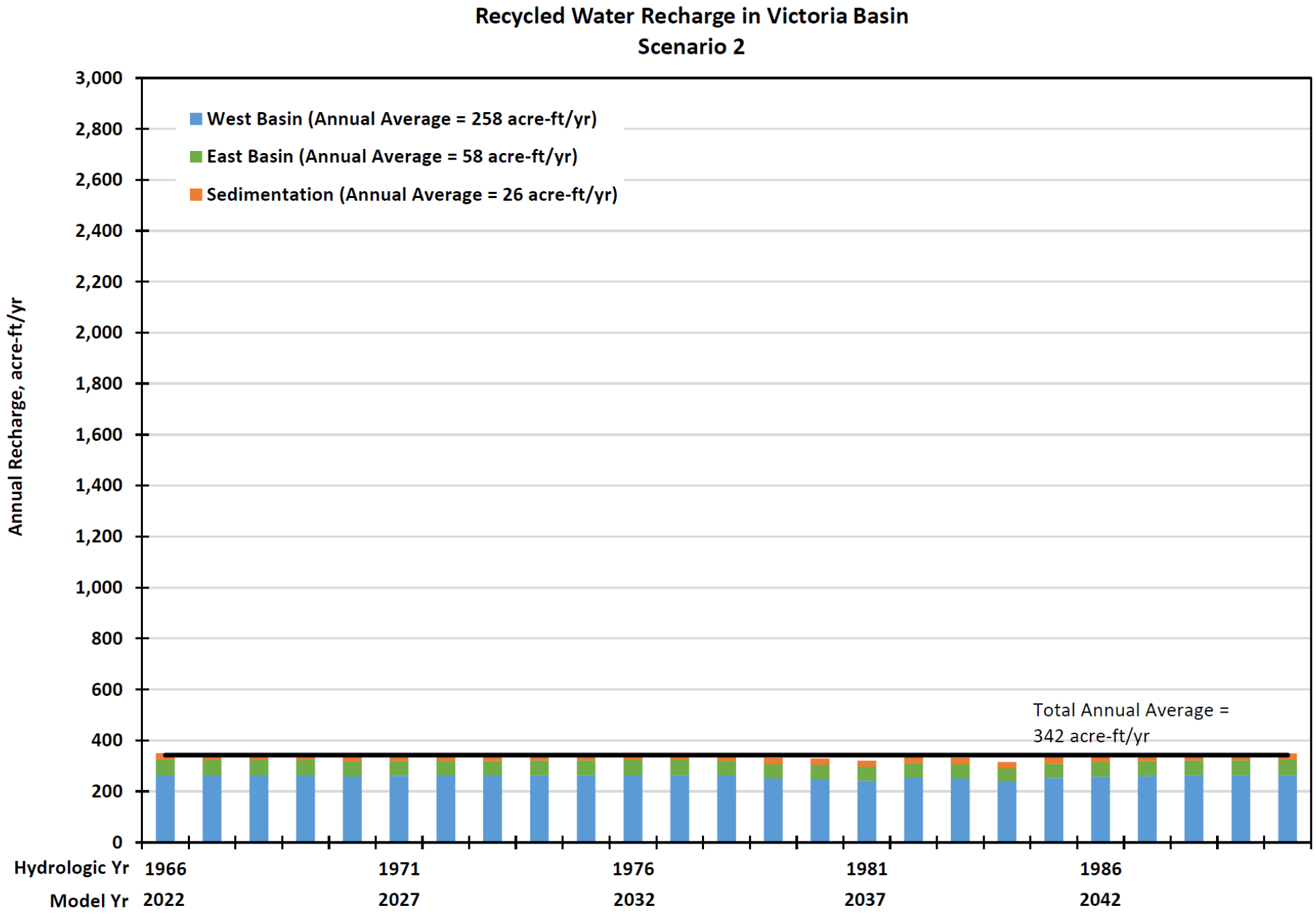


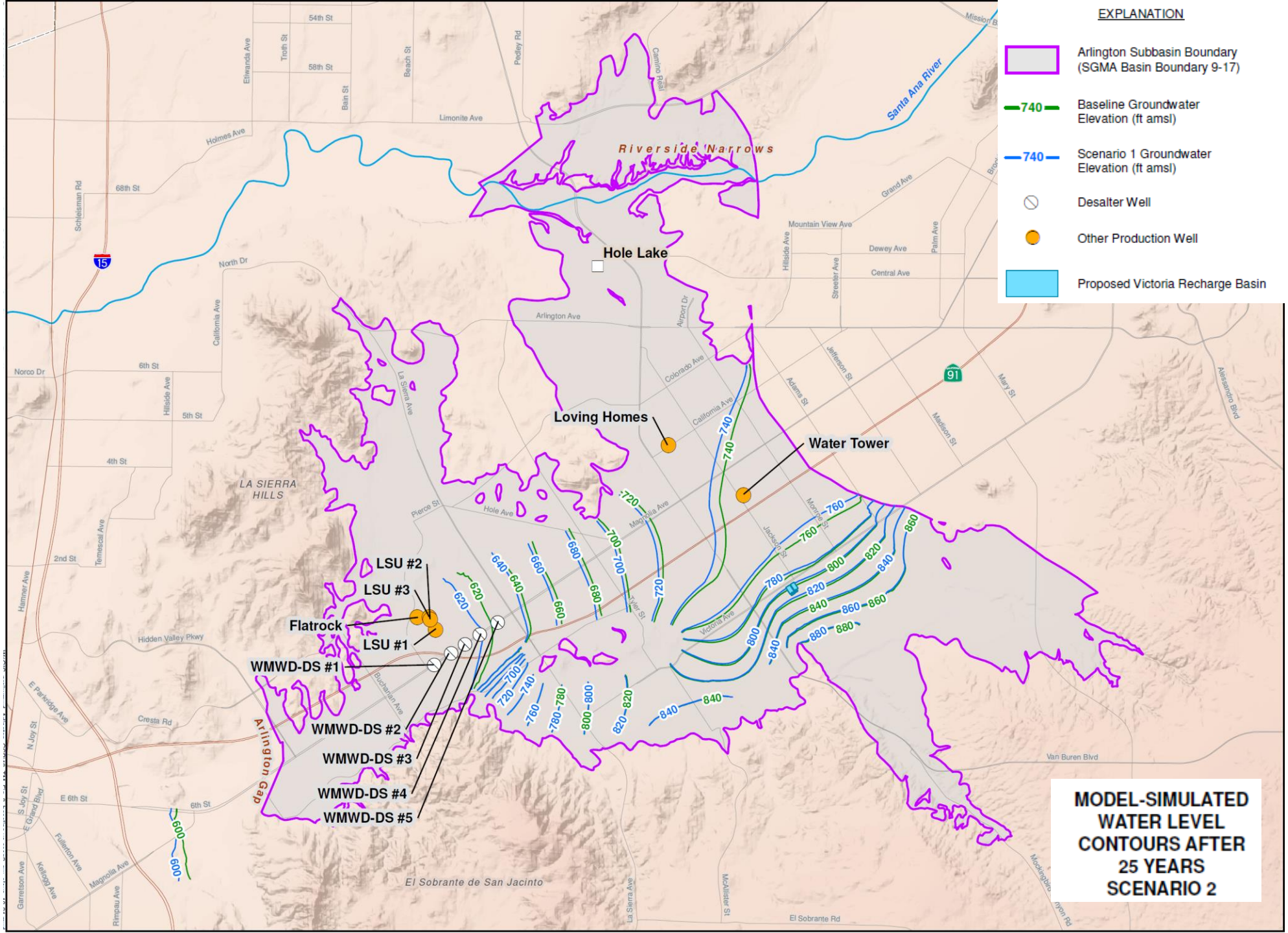
W:\GIS_proj\wmwd_Arlington_GSP\18_TM_Fig_1_loc_of_victoria_basin_10-21.mxd

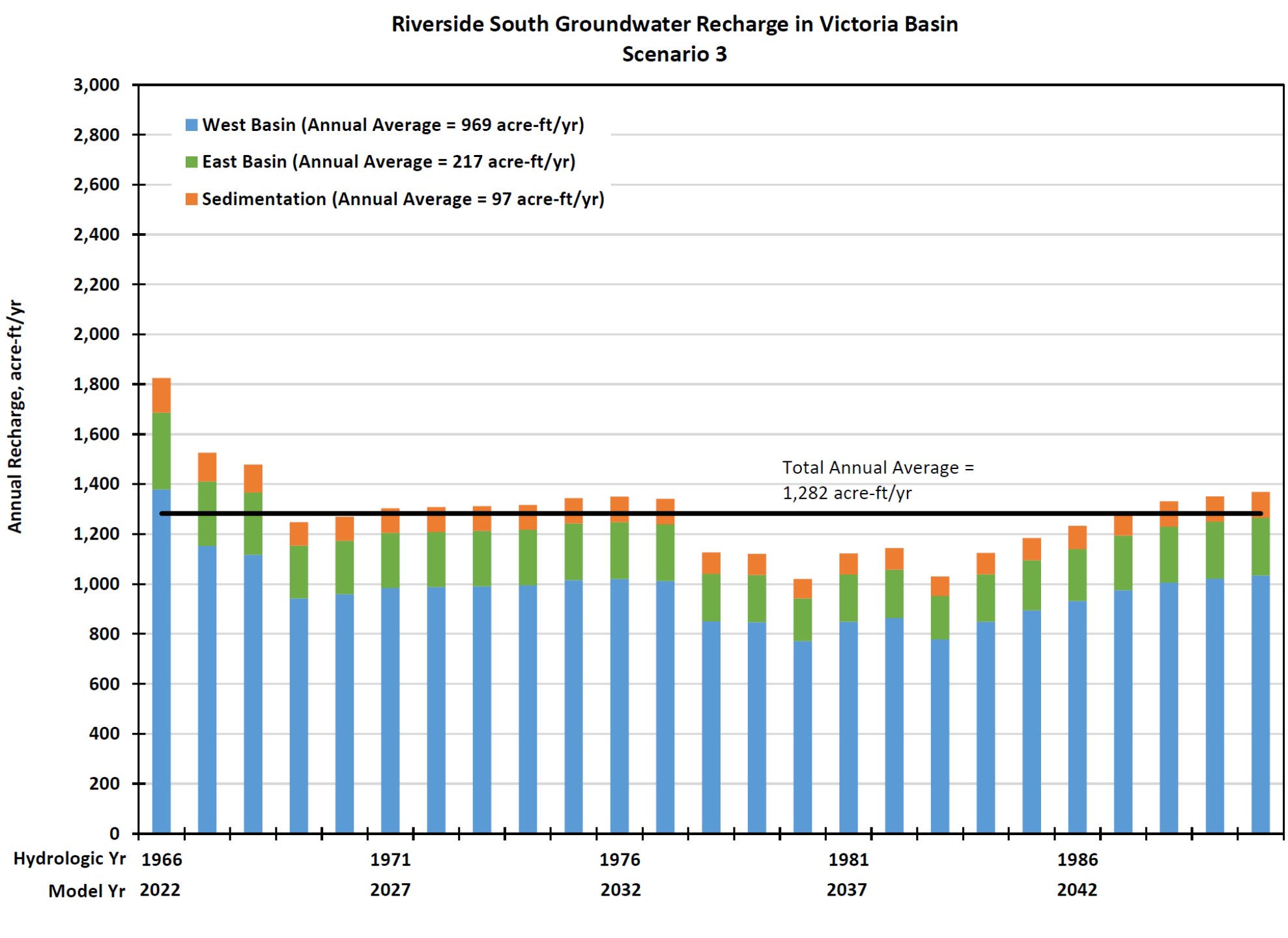

EXPLANATION
Arlington Subbasin Boundary (SGMA Basin Boundary 9-17)
Production / Monitoring Well
Desalter Well
LSU #1
Wells With Hydrograph
Proposed Victoria Recharge Basin
Riverside Narrows
Santa Ana River
Arlington Gap
LA SIERRA HILLS
El Sobrante de San Jacinto
Army 3
Loving Homes
Cal Baptist #2B
Lincoln Heights
Sherman Water Tower
Sherman High Monitoring Well
Hole 1
Polk
DOI
Daily 2
Jackson
Abraham
LSU #2
LSU #3
Flatrock
LSU #1
Walton
Pierce St Sewer 3
Arlington DS #5
Arlington DS #4
Arlington DS #3
Arlington DS #2
Arlington DS #1
Buchanan #1
Limonite Ave
Holmes Ave
68th St
North Dr
Arlington Ave
Mountain View Ave
Dewey Ave
Central Ave
Grand Ave
Noroco Dr
6th St
5th St
4th St
2nd St
Hole Ave
Colorado Ave
Victoria Ave
Van Buren Blvd
El Sobrante Rd
Cresta Rd
Magnolia Ave
Hidden Valley Pkwy
E 6th St
Schleisman Rd
California Ave
Hillside Ave
Temescal Ave
Hamner Ave
N McKinley St
E Parkridge Ave
N Joy St
S Joy St
E Grand Blvd
Fullerton Ave
Kellogg Ave
Garretson Ave
Rimpau Ave
Indiana Ave
La Sierra Ave
Airport Dr
Streeter Ave
Hillside Ave
Palm Ave
Monroe St
Adams St
Jefferson St
Madison St
Mary St
Jackson St
Tyler St
McAllister St
Alessandro Blvd
Washington St
Mockingbird Canyon Rd
Pedley Rd
Camino Real
Beach St
Bain St
Troth St
Eliwanda Ave
54th St
58th St
15
91

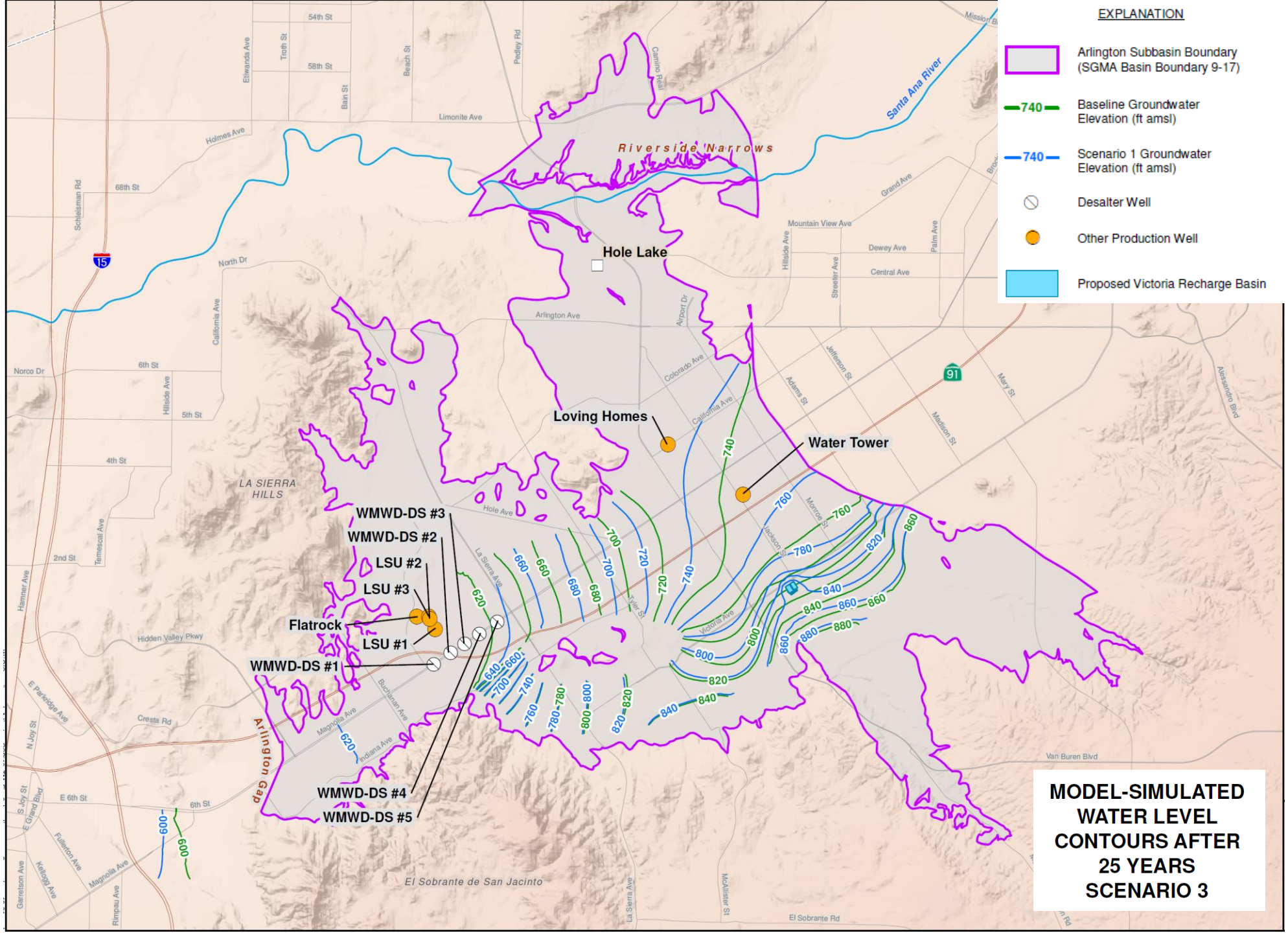

Stormwater Recharge in Victoria Basin
Scenario 1
West Basin (Annual Average = 333 acre-ft/yr)
East Basin (Annual Average = 75 acre-ft/yr)
Sedimentation (Annual Average = 33 acre-ft/yr)
Annual Recharge, acre-ft/yr
3,000
2,800
2,600
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Total Annual Average =
441 acre-ft/yr
Hydrologic Yr
Model Yr
1966
2022
1971
2027
1976
2032
1981
2037
1986
2042

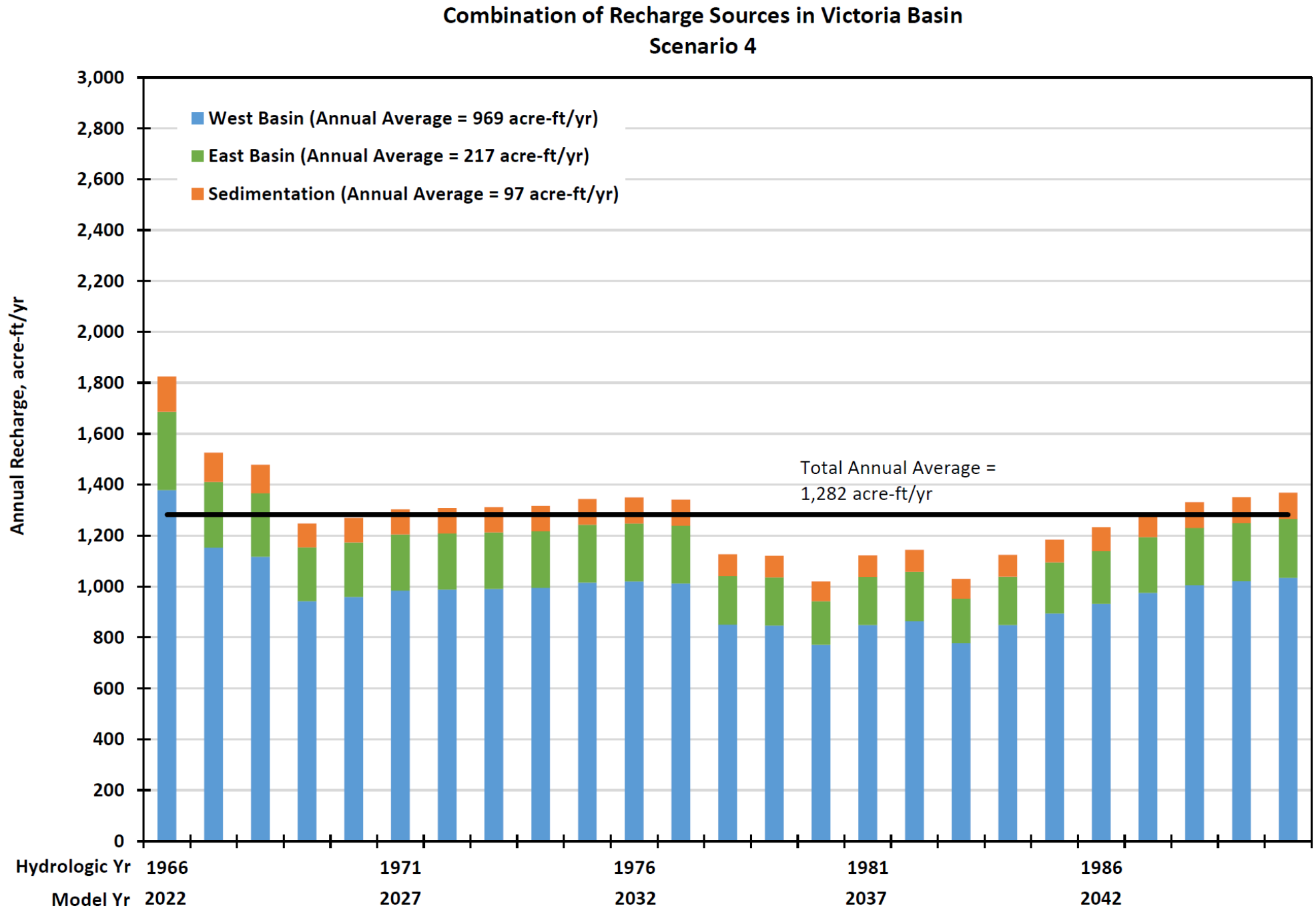

EXPLANATION
Arlington Subbasin Boundary (SGMA Basin Boundary 9-17)
740
Baseline Groundwater Elevation (ft amsl)
740
Scenario 1 Groundwater Elevation (ft amsl)
Desalter Well
Other Production Well
Proposed Victoria Recharge Basin
Riverside Narrows
Santa Ana River
Hole Lake
Loving Homes
Water Tower
LSU #2
LSU #3
Flatrock
LSU #1
WMWD-DS #1
WMWD-DS #2
WMWD-DS #3
WMWD-DS #4
WMWD-DS #5
LA SIERRA HILLS
Arlington Gap
El Sobrante de San Jacinto
MODEL-SIMULATED WATER LEVEL CONTOURS AFTER 25 YEARS SCENARIO 1

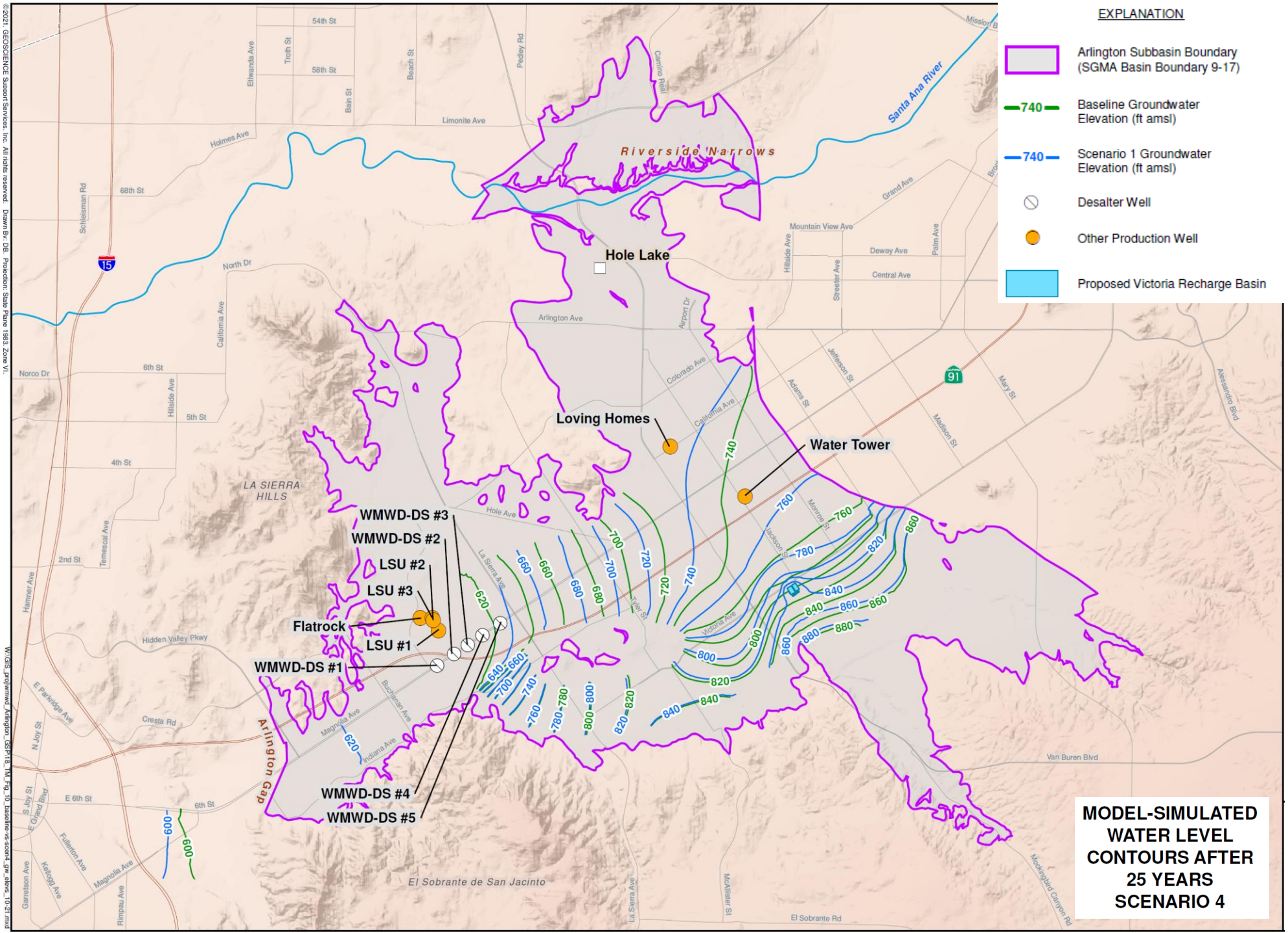

Recycled Water Recharge in Victoria Basin
Scenario 2
West Basin (Annual Average = 258 acre-ft/yr)
East Basin (Annual Average = 58 acre-ft/yr)
Sedimentation (Annual Average = 26 acre-ft/yr)
Annual Recharge, acre-ft/yr
3,000
2,800
2,600
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Total Annual Average =
342 acre-ft/yr
Hydrologic Yr
1966
1971
1976
1981
1986
Model Yr
2022
2027
2032
2037
2042

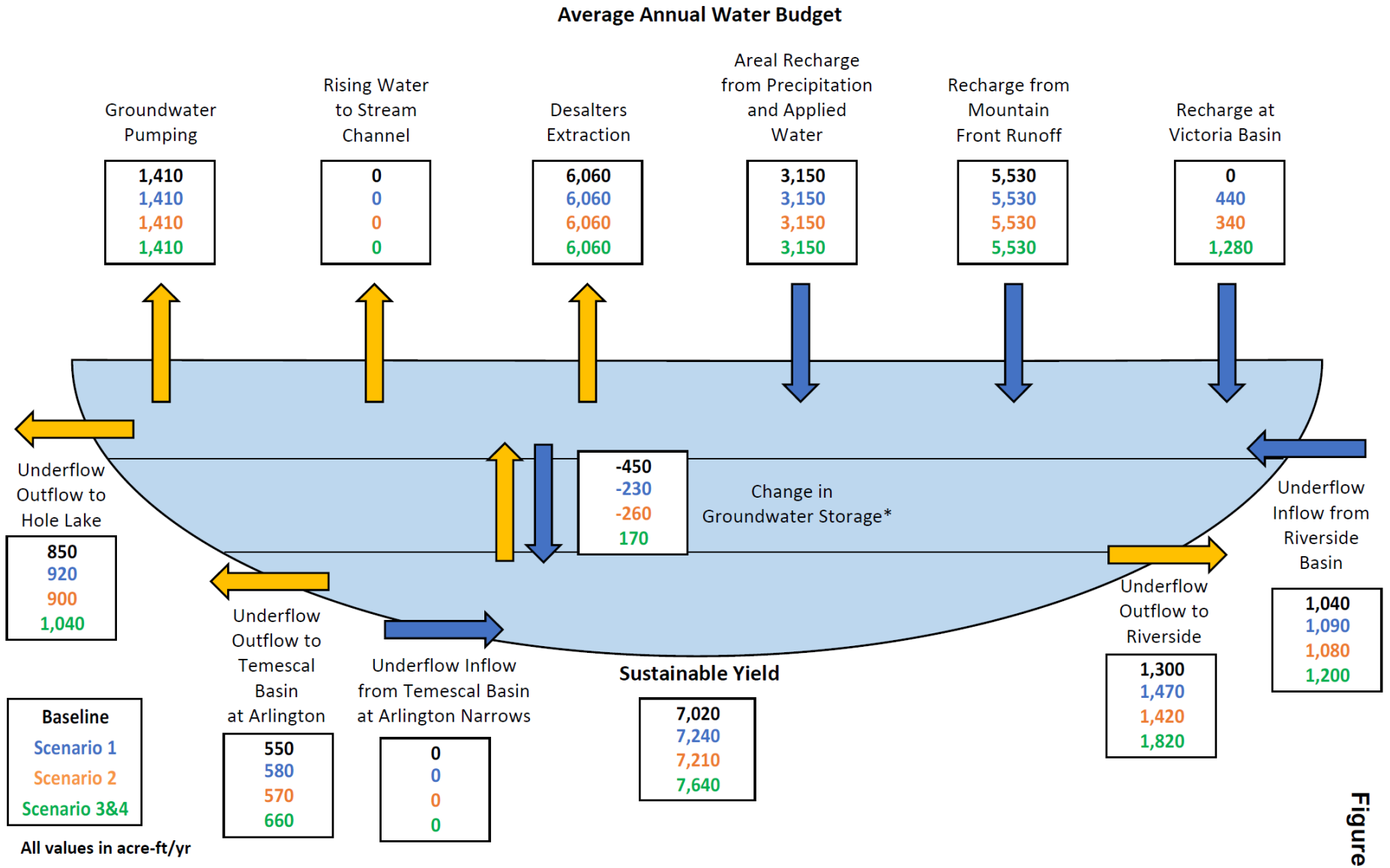

EXPLANATION
Arlington Subbasin Boundary (SGMA Basin Boundary 9-17)
740
Baseline Groundwater Elevation (ft amsl)
740
Scenario 1 Groundwater Elevation (ft amsl)
Desalter Well
Other Production Well
Proposed Victoria Recharge Basin
Hole Lake
Loving Homes
Water Tower
LSU #2
LSU #3
Flatrock
LSU #1
WMWD-DS #1
WMWD-DS #2
WMWD-DS #3
WMWD-DS #4
WMWD-DS #5
Riverside Narrows
Santa Ana River
LA SIERRA HILLS
Arlington Gap
El Sobrante de San Jacinto
MODEL-SIMULATED WATER LEVEL CONTOURS AFTER 25 YEARS SCENARIO 2


Riverside South Groundwater Recharge in Victoria Basin
Scenario 3
West Basin (Annual Average = 969 acre-ft/yr)
East Basin (Annual Average = 217 acre-ft/yr)
Sedimentation (Annual Average = 97 acre-ft/yr)
Total Annual Average = 1,282 acre-ft/yr
Annual Recharge, acre-ft/yr
3,000
2,800
2,600
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Hydrologic Yr 1966 1971 1976 1981 1986
Model Yr 2022 2027 2032 2037 2042


EXPLANATION
Arlington Subbasin Boundary (SGMA Basin Boundary 9-17)
740
Baseline Groundwater Elevation (ft amsl)
740
Scenario 1 Groundwater Elevation (ft amsl)
Desalter Well
Other Production Well
Proposed Victoria Recharge Basin
Hole Lake
Loving Homes
Water Tower
WMWD-DS #3
WMWD-DS #2
LSU #2
LSU #3
Flatrock
LSU #1
WMWD-DS #1
WMWD-DS #4
WMWD-DS #5
Riverside Narrows
Santa Ana River
Arlington Gap
LA SIERRA HILLS
El Sobrante de San Jacinto
MODEL-SIMULATED WATER LEVEL CONTOURS AFTER 25 YEARS SCENARIO 3


Combination of Recharge Sources in Victoria Basin
Scenario 4
West Basin (Annual Average = 969 acre-ft/yr)
East Basin (Annual Average = 217 acre-ft/yr)
Sedimentation (Annual Average = 97 acre-ft/yr)
Total Annual Average =
1,282 acre-ft/yr
Annual Recharge, acre-ft/yr
3,000
2,800
2,600
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Hydrologic Yr 1966 1971 1976 1981 1986
Model Yr 2022 2027 2032 2037 2042

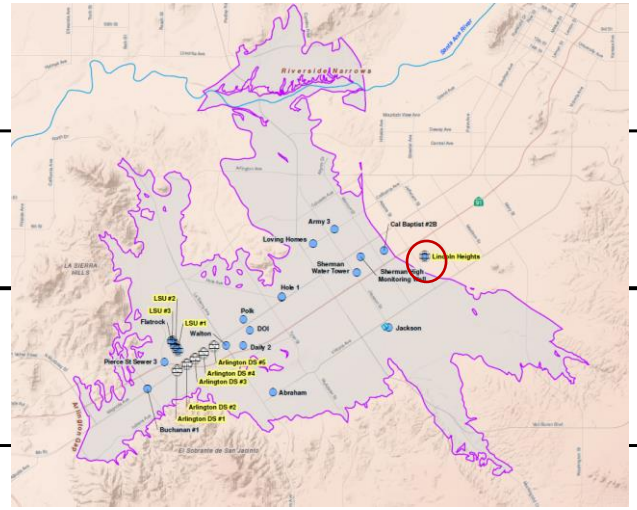

EXPLANATION
Arlington Subbasin Boundary (SGMA Basin Boundary 9-17)
740
Baseline Groundwater Elevation (ft amsl)
740
Scenario 1 Groundwater Elevation (ft amsl)
Desalter Well
Other Production Well
Proposed Victoria Recharge Basin
Hole Lake
Loving Homes
Water Tower
WMWD-DS #3
WMWD-DS #2
LSU #2
LSU #3
Flatrock
LSU #1
WMWD-DS #1
WMWD-DS #4
WMWD-DS #5
Riverside Narrows
Santa Ana River
Arlington Gap
LA SIERRA HILLS
El Sobrante de San Jacinto
MODEL-SIMULATED WATER LEVEL CONTOURS AFTER 25 YEARS SCENARIO 4



*A positive sign indicates an increase in groundwater storage; a negative sign represents a decline in groundwater storage.

Figure 11

Water Level Hydrographs in Lincoln Heights Well
Model Layer 2



Land Surface= 858 ft amsl

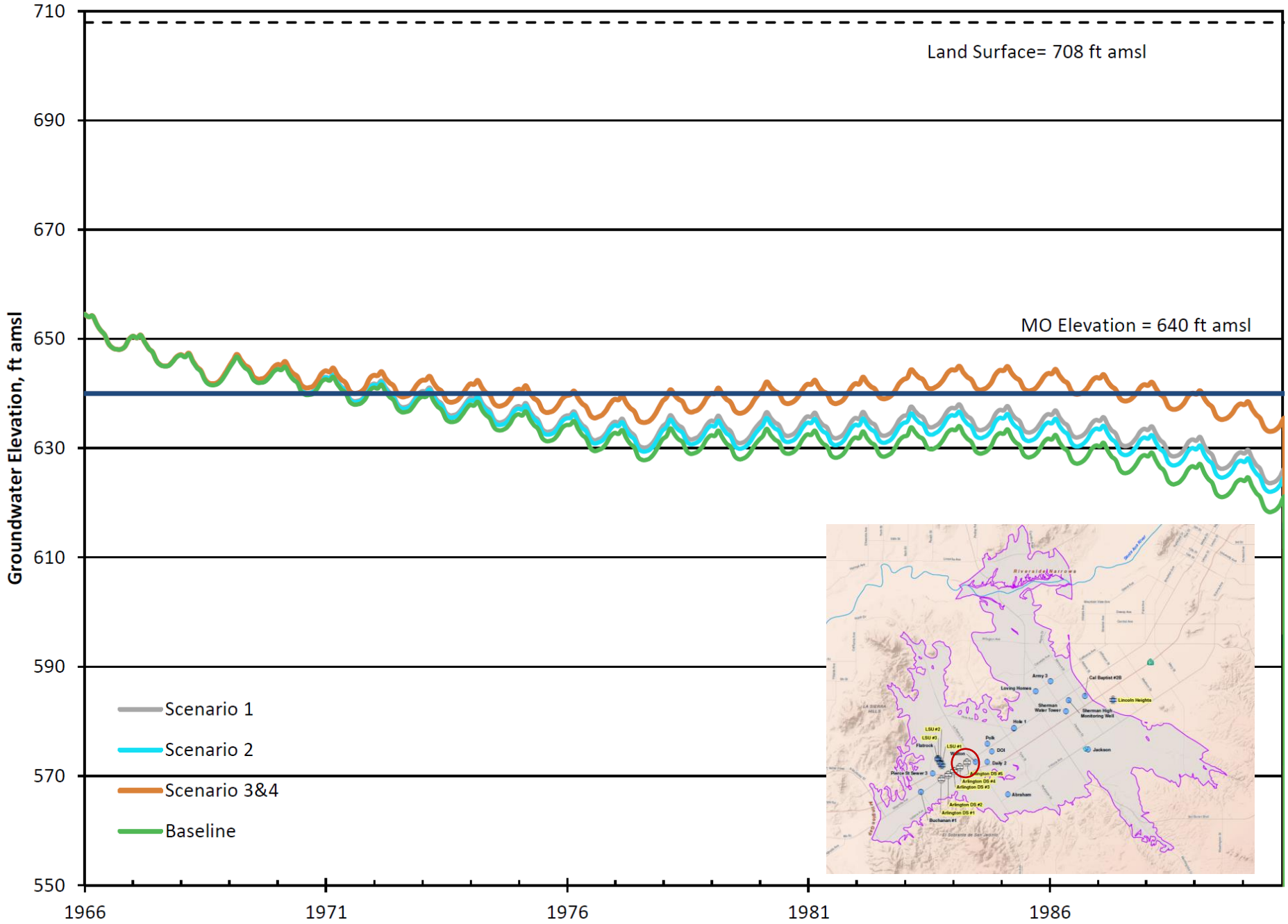
Groundwater Elevation, ft amsl

860
840
820
800
780
760
740
720
700

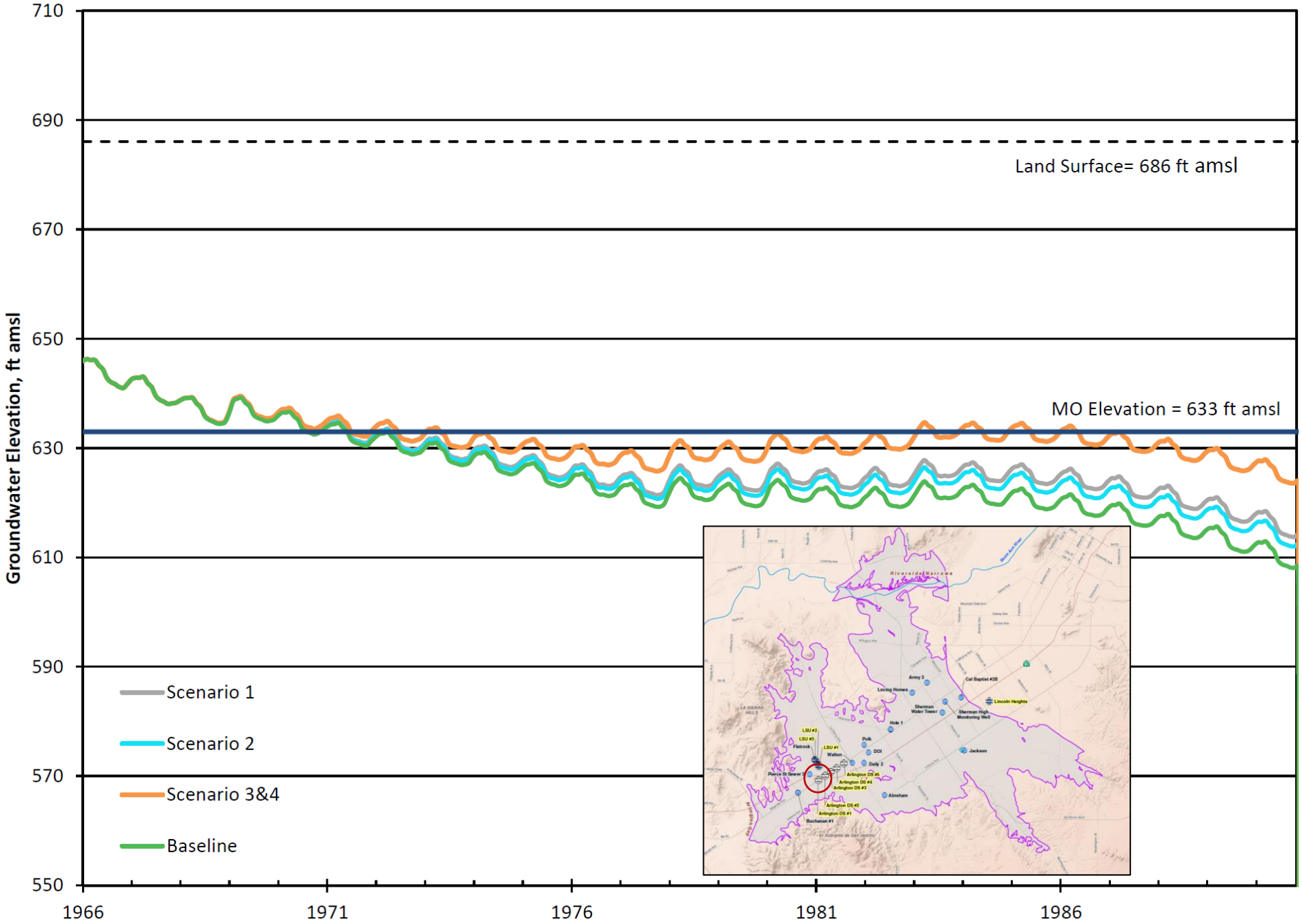
1966
1971
1976
1981
1986

Scenario 1
Scenario 2
Scenario 3&4
Baseline

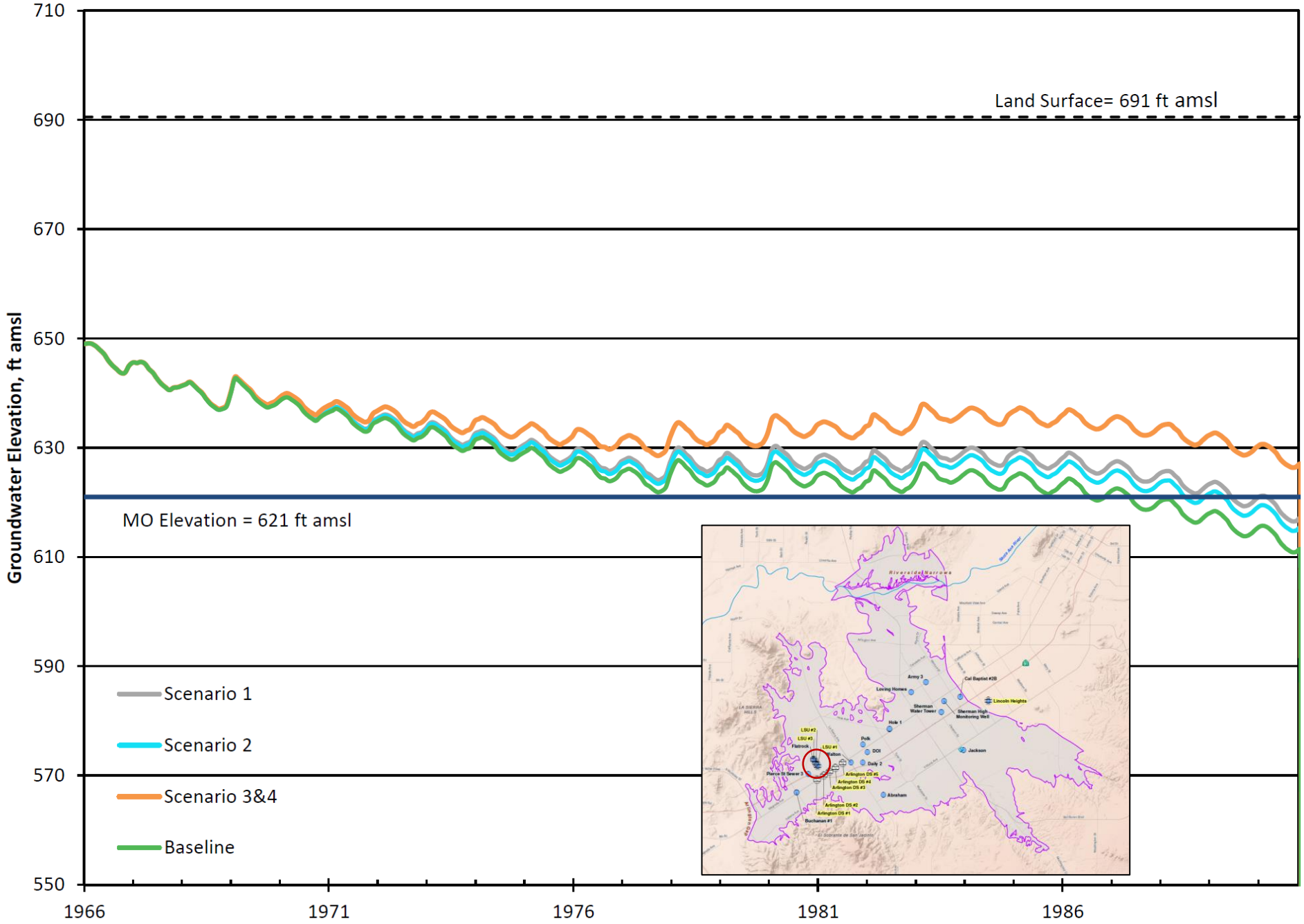
Water Level Hydrographs in WMWD Desalter Well No. 5
Model Layer 2



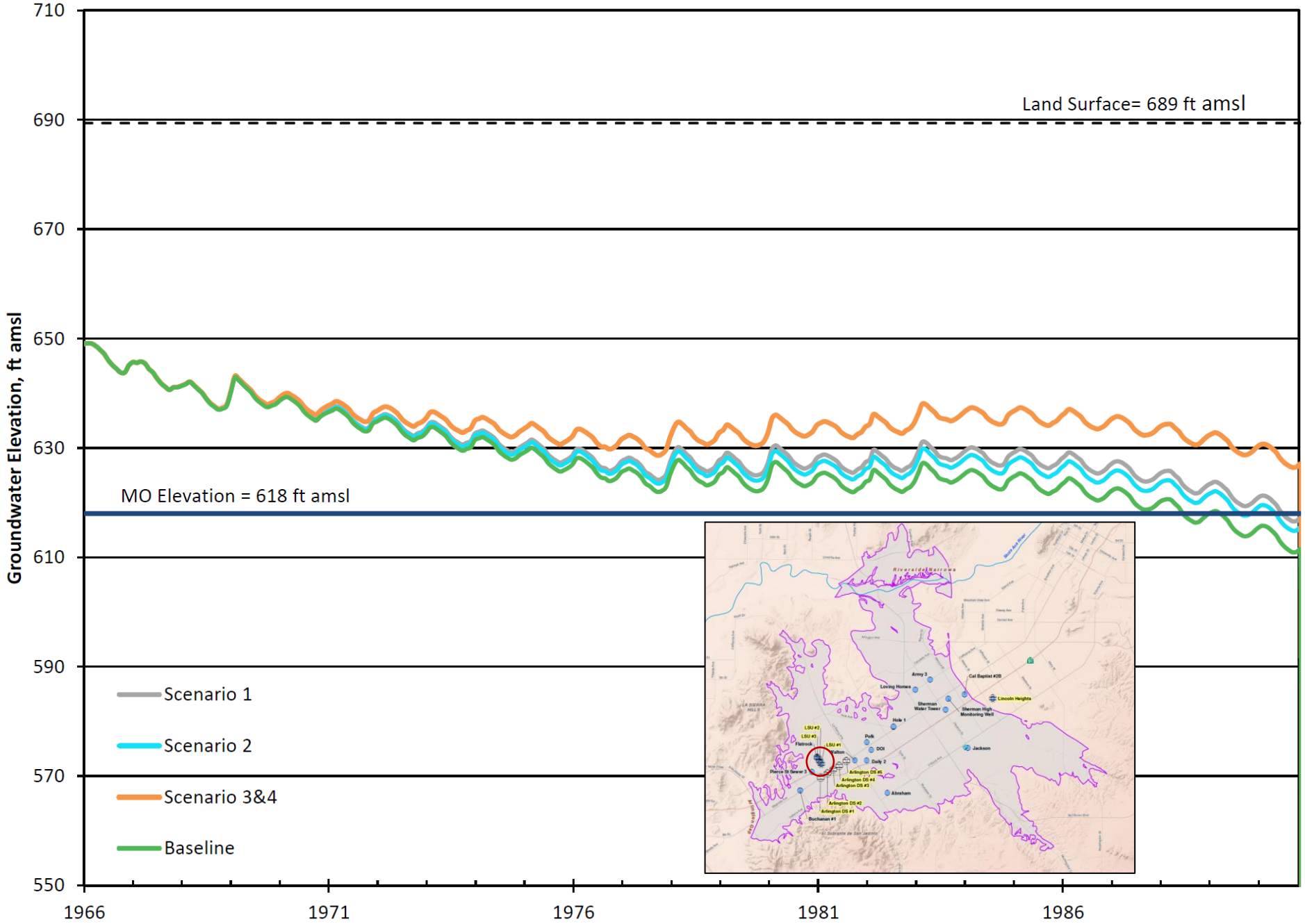
Water Level Hydrographs in WMWD Desalter Well No. 1
Model Layer 2



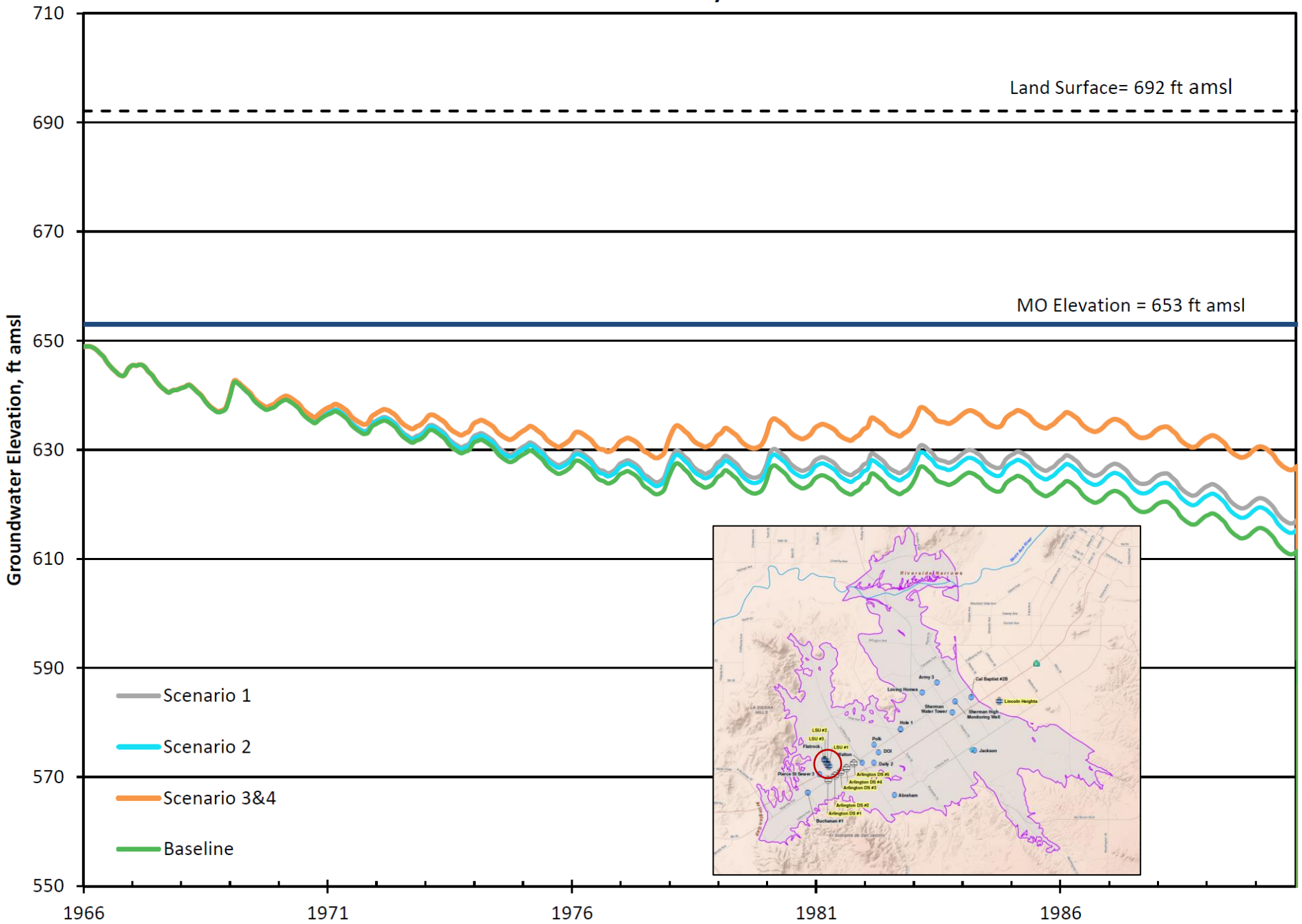
Water Level Hydrographs in La Sierra University Well No. 1
Model Layer 2



Water Level Hydrographs in La Sierra University Well No. 3
Model Layer 2



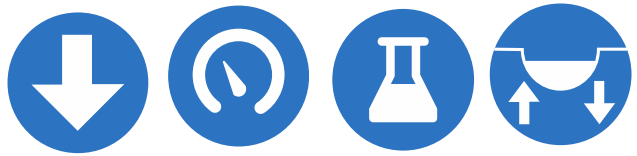
Water Level Hydrographs in La Sierra University Well No. 2
Model Layer 2



Getting to Sustainability

Basinwide Sustainability Goal

Set minimum thresholds and measurable objectives for all Sustainable Management Criteria

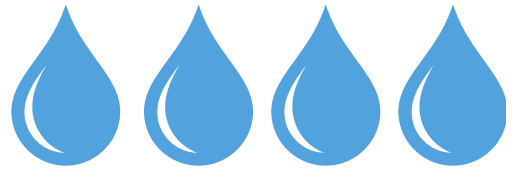


SUSTAINABLE MANAGEMENT CRITERIA

Measure and Monitor at each representative monitoring well

REPRESENTATIVE MONITORING WELLS

Achieve goals using projects and management actions



PROJECTS & MANAGEMENT ACTIONS

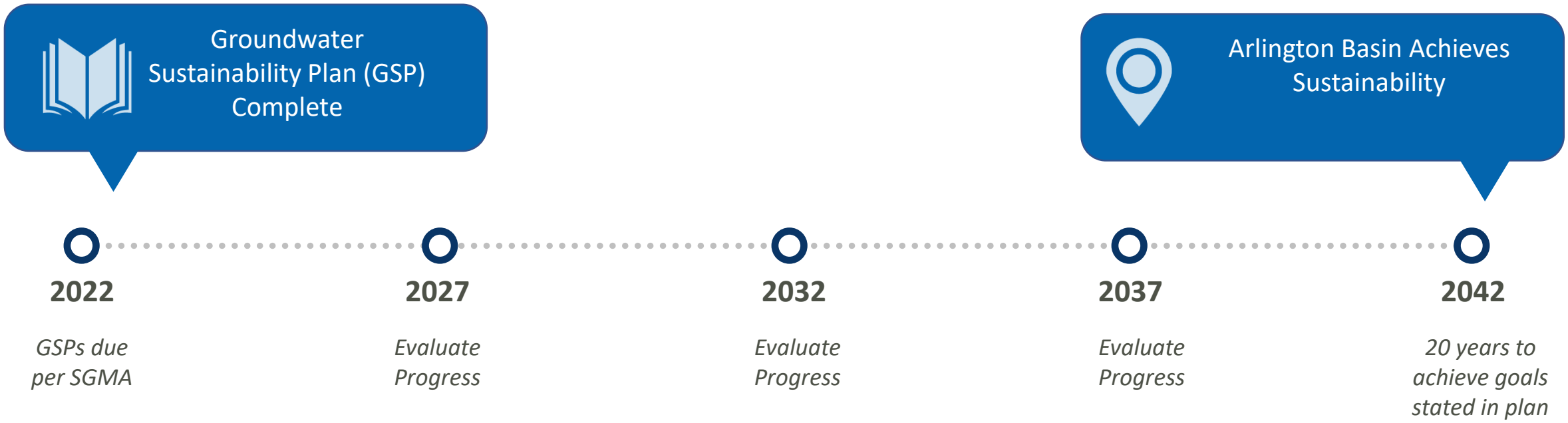
Basinwide Sustainability Goal

Questions?

What's next?

SGMA deadlines

Sustainability must be achieved by 2042 through specific projects and actions



Questions?