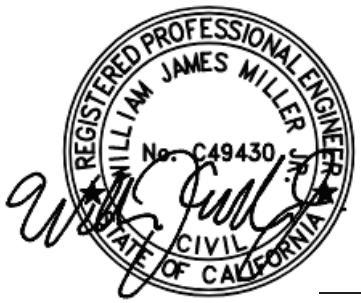
Appendix L Water Supply Assessment

Water Supply Assessment

for

Prologis IPC II
San Joaquin County, CA



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LIST OF ABBREVIATIONS

AFY - Acre Feet Per Year

BBID - Byron Bethany Irrigation District

CEQA - California Environmental Quality Act

CVP - Central Valley Project

DWR - California Department of Water Resources

GSA - Groundwater Sustainability Agency

GSP - Groundwater Sustainability Plan

PWBT – Projected Water Budget Tracy Subbasin

PWBCT – Projected Water Budget with Climate Change Tracy Subbasin

PWBCD – Projected Water Budget with Climate Change Non-Delta Management Area

SB - Senate Bill

SGMA - Sustainable Groundwater Management Act

SJVB - San Joaquin Valley Groundwater Basin

WSA - Water Supply Assessment

1 INTRODUCTION

1.1 PURPOSE OF WATER SUPPLY ASSESSMENT

California Senate Bill 610 (SB 610) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610, codified in Water Code Sections 19010 to 19015., promotes more collaborative planning between local water suppliers, cities, and counties. It requires detailed information regarding water supply availability be provided to city and county decision-makers prior to approval of specified large development projects. The purpose of this coordination is to ensure that prudent water supply planning has been conducted, and that planned water supplies are adequate to meet existing demands, plus anticipated demands from approved projects and tentative maps, and the demands of proposed projects.

Projects are subjected to SB 610 if the project is subject to the California Environmental Quality Act (CEQA), and it meets the criteria of a "project" as defined in Water Code Section 10912. The "project" criteria are as follows:

- A proposed residential development of more than 500 dwelling units
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space
- A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space
- A proposed hotel or motel, or both, having more than 500 rooms
- A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area
- A mixed-use project that includes one or more of the projects specified above
- A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project

Once the project is determined to be subject to SB 610, the land use agencies must identify any public water purveyor that may supply water for the proposed development project; and request a WSA from the identified water purveyor. If no public water purveyor is identified, the lead agency must prepare the WSA.

1.2 PROJECT APPLICABILITY

San Joaquin County (County), the lead agency for this proposed project (Project), has determined that the Project is subject to CEQA and requires an environmental impact report. Additionally, the Project includes an industrial park occupying over 40 acres with over 1,000 people. Due to the combined criteria, a WSA is required for the Project. This WSA analyzes the sufficiency of the proposed water supplies to meet the Project's projected future water demands, under all hydrologic conditions (Normal Years, Single Dry Years, and Multiple Dry Years), in addition to the existing and future water uses of the area within a 20-year planning horizon.

1.3 PROJECT DESCRIPTION

The Project contains a 282-acre industrial park comprised of four parcels: APNs 209-25-037, 209-25-010, 209-24-036 and 209-24-037. The current County land use designation for the site is agricultural. The Project proposes to change the land use designation to industrial warehousing. The development will consist of industrial warehouse buildings, parking lots, landscaping, sewer and water facilities, power substations, and stormwater treatment basins. The Project is estimated to include 4,733 employees, working 1 shift per day.

The Project is located on West Schulte Road in San Joaquin County, approximately 1 mile east of Hansen Road and 0.5 mile west of S Lammers Road. West Schulte Road bisects the development site with approximately half of the site area north of West Schulte Road and half of the site area south of West Schulte Rd. The location of the Project may be observed in Figure 1 below.

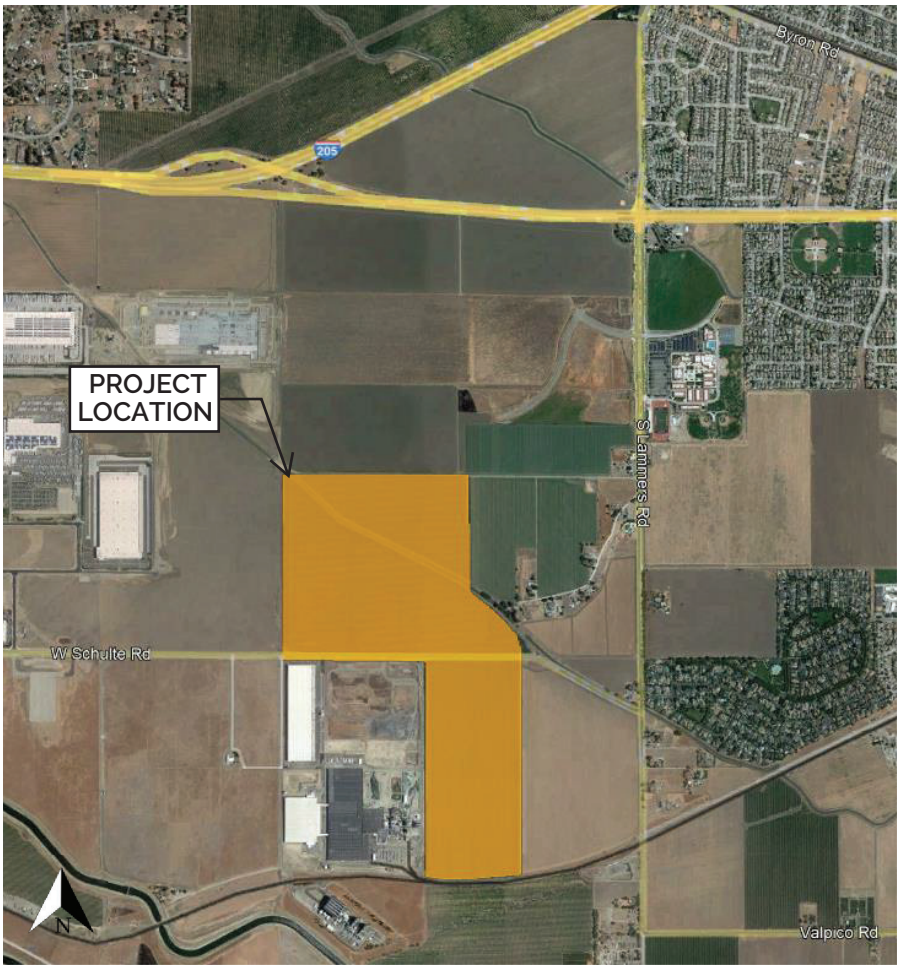

Figure 1: Project Location

The Project is adjacent to the City of Tracy (City), however is not within the City's service area nor sphere of influence (Attachment 1). Additionally, the Tracy Urban Water Management Plan (UWMP) did not account for this Project. Connection to the City's water system is not considered feasible due to the City's limited surface water supplies, as described in the City's water master

plan. Therefore, groundwater from the Tracy Subbasin will be the source of water for this Project. The 2021 Tracy Subbasin Groundwater Sustainability Plan (GSP) will be referenced in this WSA.

2 PROJECT SUMMARY

2.1 PROJECT SITE BACKGROUND

The existing site has historically been used for agricultural purposes and is currently used for farming almond orchards. The water supply for the existing orchards is surface water from the West Side Irrigation District – which has recently been consolidated with the Byron Bethany Irrigation District (BBID). BBID estimates the existing site uses about 1,500 AFY of water. This aligns with the average almond crop water use factor of 3 to 5 acre feet per acre per year according to the 2015 California Agricultural Production and Irrigated Water Use report prepared by the Congressional Research Service.

The site is surrounded to the north and west by industrial and warehouse distribution centers including the International Park of Commerce, Owens Brockway Glass Container manufacturing plant, and LBA warehousing center.

2.2 PROJECT WATER DEMAND

The Project proposes to supply all water demands (domestic, irrigation and fire) via three onsite groundwater wells. Two wells will satisfy the potable water demands for the Project while the third well will serve the fire system. The source of groundwater will come from the Tracy Subbasin. Disinfected tertiary treated recycled water will serve as a secondary source of supply to satisfy a large portion of annual irrigation demands. The proposed water system will be defined as a non-transient noncommunity water system and will be operated by the Project owner pursuant to the California Health & Safety Code.

The potable indoor water demand was determined for six light industrial warehouse/distribution buildings with approximately 4,733 employees at 1 shift per day. The Project's indoor water use is based on the nonresidential Baseline Water Use Worksheet (WS-1) in the 2019 California Green Building Standards Code. Multiplying the total fixture flow rate, duration, and daily use by the number of occupants per shift, yields an average indoor potable water demand of approximately 58 AFY.

The Project's irrigation demand was determined by assuming 15 percent of the developed area (approximately 38.4 acres) will be landscaped and require irrigation. A conservative demand factor of 1.9 was applied to the landscaped area to determine an annual landscape irrigation demand of 73 AFY.

The conservative value of 73 AFY is assumed to occur during the summer months and will therefore require supplemental water. During the summer months where peak irrigation will occur, 53 AFY of the irrigation demands will be met through treated wastewater from the Project's recycled water system, and the remaining demand is planned to be supplemented by BBID (mostly during the summer months). The supplemental water will be approximately 20 AFY and will enter the recycled water system via an air gap. A summary of the Project water demands is provided in Table 1.

Table 1 – Project Water Demands (AFY)			
	Proposed Project Demand	Recycled Water Supplement	Net New Potable Demand
Industrial Warehousing	58	0	58
Irrigation	73	53[1]	20
		Total Water Demand	**78**

[1] Recycled water produced from treated wastewater to supplement Project irrigation demands

2.3 PROJECT WATER QUALITY

Three test wells were developed at the Project site to locate water bearing zones and to test water quality. An electric log was used to identify probable locations of water bearing strata and each of those zones were then tested for water quality. A zone roughly 450 feet below grade was found to have the best water quality and will be the target zone for sourcing the Project's potable water supply. Research of wells in the area found that nearby wells are pumping from a shallower aquifer zone. As a result, it is assumed that this Project will have little to no impact on the local wells in the area.

The water quality indicates that treatment is not necessary for the potable water system; however, wellhead treatment is being considered to lower nuisance contaminant concentrations and to assist in higher treated wastewater quality. The two systems, potable and fire, are assumed to be separate and independent water systems extracting water from different water bearing zones in the groundwater basin. The fire well is anticipated to draw from all zones as treatment is not necessary.

3 WATER SUPPLIER

3.1 DESCRIPTION OF WATER SUPPLIER

3.1.1 BBID

The BBID is a multi-county special district that serves parts of Alameda, Contra Costa, and San Joaquin counties across 55 square miles and includes 36,000 acres. A total of six service areas are covered under the BBID. These service areas are as follows: Byron Division, Bethany Division, Raw Water Service Area 1 (RWSA 1), Raw Water Service Area 2 (RWSA 2), the Central Valley Project (CVP) Service Area, and the West Side Service Area (WSSA).

The Byron and Bethany Divisions and RWSAs 1 and RWSAs 2 are all served by the pre-1914 senior water right. The CVP service area is serviced through a water services contract with the Bureau of Reclamation (BOR). The BBID consolidated with the West Side Irrigation District (WSID) in 2020 and renamed the area as the WSSA. The WSID was served through a post-1914 junior water right and a water service contract with the BOR. As of August 2022, the BBID water rights (both pre and post) have not been included in the new round of curtailments by the State Water Board Emergency Regulation regarding water use and curtailment in the Sacramento-San Joaquin Delta watershed. A curtailment order is a directive from the State Water Board to stop all diversion of water under a specific water right or claim and is enforced under the Water Code.

The BBID serves its customers through several key infrastructures such as intake pump stations, canals, pipelines, and subsurface drains along the Delta-Mendota Canal. See Attachment 2 to observe the BBID service areas (prior to consolidation with the WSID) and its critical infrastructure

locations. There are currently no public BBID documents that include the WSSA. See Attachment 3 to observe the previous WSID service area (now the WSSA) in comparison to BBID.

3.1.2 TRACY SUBBASIN

Because the Project's water system will source the water supply entirely from the Tracy Subbasin, the Project is applying to form a new public water system. There is currently an application into the California State Water Resources Control Board for a new public water system permit to serve the Project. The public water system would source its water supply entirely from groundwater drawn from the Tracy Subbasin. See Attachment 4 for the Tracy Subbasin area regarding the Project location.[1]

3.2 SAN JOAQUIN VALLEY GROUNDWATER BASIN

The Central Valley of California relies significantly on groundwater for agricultural purposes. Much of the groundwater supplied to the Central Valley comes from the San Joaquin Valley groundwater Basin (SJVB). The SJVB is bounded by the Sierra Nevada Mountains, Coastal Ranges, City of Sacramento, and Los Padres National Forest. The basin area consists of 19 total subbasins that are categorized into three significant hydrologic zones – the Sacramento River, the San Joaquin River, and Tulare Lake. The project is located within the San Joaquin Hydrologic Region 5-022.15, also known as the Tracy Subbasin. A list of the SJVB subbasins and corresponding hydrologic zone is provided in Table 2 below (refer to Attachments 4 and 6 for zone maps).

[1] The Project is in the Central Valley Project (CVP) water supply contract service area of the BBID. (Attachment 2). CVP water service is subject to allocations from the U.S Bureau of Reclamation. (BBID Agricultural Water Management Plan), which are highly unreliable due to hydrologic conditions and fish protection regulations governing CVP operations. Irrigation water service from BBID is legally feasible. However, due to CVP water reliability concerns, and because the Project can be more efficiently served without the extension of additional infrastructure from BBID, water service from BBID is not deemed to be practically feasible.

Table 2 – List of Subbasins within the San Joaquin Valley Basin (5-022)	
DWR SUBBASIN	GROUNDWATER SUBBASIN NAME
Sacramento River Hydrologic Region	
5-022.16	Consumnes (1%)
San Joaquin River Hydrologic Region	
5-022.02	Chowchilla
5-022.16	Consumnes
5-022.07	Delta-Mendota
5-022.19	East Contra Costa
5-022.01	Eastern San Joaquin
5-022.06	Madera
5-022.04	Merced
5-022.02	Modesto
5-022.15	Tracy
5-022.03	Turlock
5-022.09	Westside
Tulare Lake Hydrologic Region	
5-022.07	Delta-Mendota
5-022.08	Kings
5-022.09	Westside
5-022.10	Pleasant Valley
5-022.11	Kaweah
5-022.12	Tulare Lake
5-022.13	Tule
5-022.14	Kern County
5-022.17	Kettleman Plain
5-022.14	Kern County
5-022.18	White Wolf

Source: DWR California's Groundwater Update 2020 – Chapter 7

The SJVB receives four types of inflows from local watersheds, precipitation, diversions from the Delta and water imported from other regions such as the Sacramento-San Joaquin Delta. Groundwater is discharged from the SJVB primarily by well pumping, water use from evapotranspiration, outflows to the Delta, and seepage into tributary rivers with subsequent extractions.

3.3 TRACY SUBBASIN

3.3.1 DESCRIPTION AND BOUNDARIES

The Tracy Subbasin is bounded by the Eastern San Joaquin Subbasin on the east and the Delta-Mendota Subbasin on the south (all within the larger SJVB). The Tracy Subbasin is non-adjudicated, nor are the surrounding subbasins. The Tracy Subbasin is defined by the areal extent of unconsolidated to semi consolidated sedimentary deposits that are bounded by the Diablo Range on the west; the Mokelumne and San Joaquin Rivers on the north; the San Joaquin River to the east; and the San Joaquin-Stanislaus County line on the south.

The Tracy Subbasin is drained by the San Joaquin River and one of its major westside tributaries, Corral Hollow Creek. The San Joaquin River flows northerly into the Sacramento and San Joaquin Delta and discharges into the San Francisco Bay.

3.3.2 PHYSICAL GEOLOGY AND MATERIAL VARIABILITY

The Tracy Subbasin is comprised of continental deposits of Late Tertiary to Quaternary age. These deposits include the Tulare Formation, Older Alluvium, Flood Basin Deposits, and Younger Alluvium. The cumulative thickness of these deposits increases from a few hundred feet near the Coast Range foothills on the west to about 3,000 feet along the basin's eastern margin. See Attachment 5 for the geologic locations and relevant sections of the Tracy Subbasin.

3.3.3 SUSTAINABLE GROUNDWATER MANAGEMENT ACT

The Sustainable Groundwater Management Act (SGMA) is a three-bill legislative package that was implemented in 2014 to ensure the protection of groundwater in California. The SGMA set forth a statewide directive to bring groundwater basins to a sustainable level through groundwater management and planning. It requires that certain groundwater basin/subbasins designated as medium or high priority by the California Department of Water Resources (DWR) develop Groundwater Sustainable Agencies (GSAs) to implement Groundwater Sustainability Plans (GSPs) for managing groundwater sustainability over a 20-year period. GSP's are to detail a sustainability goal with active measures in maintaining sustainability indicators such as: chronic lowering of groundwater levels, reduction of groundwater storage, seawater intrusion, land subsidence, water quality degradation, and depletions of interconnected surface water. Sustainability indicators are intended to provide the GSAs with indications of any undesirable results occurring in the basin.

The Tracy Subbasin is designated as a "medium priority" subbasin and is bounded by three adjacent subbasins designated as "medium" and "high priority" – each requiring compliance with the SGMA. The six GSAs overseeing the Tracy Subbasin are the following: Banta-Carbona Irrigation District, Byron-Bethany Irrigation District, City of Lathrop, City of Tracy, County of San Joaquin, and Stewart Tract. See Attachment 7 for the Tracy Subbasin GSAs and their agency areas. The six GSAs facilitated the completion of the 2021 Tracy Subbasin GSP and are currently monitoring the Subbasin sustainability indicators (except for seawater intrusion which isn't likely to occur in the future). Efforts made in the GSP to help reduce undesirable results in the Subbasin are in addition to the current efforts separately identified in the water master plans of the six GSA' overseeing the Subbasin.

4 EXISTING SUPPLY AND DEMAND

4.1 BBID

4.1.1 DEMAND

The BBID serves approximately 34,661 AFY (without curtailments) of water to its users annually. The existing project site currently makes up about 1,500 AFY of the annual water served by BBID. The Proposed site will reduce the 1,500 AFY demand down to 20 AFY, therefore positively impacting the BBID supply.

4.1.2 SUPPLY

The BBID water supply consists of agricultural water from the CVP and the Italian Slough, groundwater from the Tracy Subbasin, and water transfers from the Contra Costa and Carmichael water districts. The BBID water supply recently increased as a result of consolidation with the WSID. The WSID's water supply originally consisted of agricultural water from the CVP, diverted water from the Old River, and upslope drain water. A summary of the allowed allocation of each water source, its contract or license, and the average quantity served may be observed in the Table 3 below.

Table 3 – Summary of BBID Water Source

Water Source	Water Right, Contract, or License	Annual Allowed Allocation (AFY)	Average Quantity of Water (AFY)
BBID			
CVP (Federal Agricultural Water)	BOR Contract	20,600[1]	3,601[2]
Surface Water (Italian Slough)	Pre-1914 water right	50,000[1]	26,060[2]
Groundwater	-	-	1,073[2]
Transfers	-	-	1,393[2]
WSID (Now WSSA)			
CVP (Federal Agricultural Water)	BOR Contract #7-07-20-W0045 LT-1	2,500[1]	0
Surface Water (Old River)	Post-1914 Water Right #1381	27,000[1] (cfs)	2,500
Upslope Drain Water	-	2,500 est	2,500
Total with Curtailments =		100,557	51,377
Total without curtailments =		100,557	34,661
Total (CVP only) =		23,100	3,601

[1]Subject to restrictions
[2]Averaged from 2013-2015

The BBID is not restricted by a groundwater pumping limit. However, groundwater has only been used as a water source when BBID's water rights have been curtailed by the State Water Board. Transfers from the Contra Costa and Carmichael water district is minimal and has not occurred since 2015 (due to curtailment). According to the BBID water supply updates, the BBID water rights have not been curtailed as of August 2022.

The Project is located partially in the CVP service area of the BBID and the WSSA. Because no curtailments are currently in order, the assumed water supply and water usage will not consider the groundwater and water transfer sources. Therefore, BBID's available water supply in relation to the Project is 23,100 AFY and the water usage is 3,601 AFY.

4.2 TRACY SUBBASIN

4.2.1 GROUNDWATER DEMAND

The Project's total annual indoor water demand will be 58 AFY, less than 50% of the annual rainfall totals for the area. Project water demands are not expected to change based on year type (wet, normal, dry). The target depth for the two potable wells will be approximately 450 below grade based on the water quality results of the test wells drilled onsite. The fire well is anticipated to draw from all zones as treatment is not necessary.

4.2.2 GROUNDWATER SUPPLY

The Tracy Subbasin has been divided into two management areas, Delta and Non-Delta. About one half of the Subbasin consists of a mix of Delta islands and waterways (Delta areas) while the other half is comprised of urban and agricultural communities (Non-Delta areas). See Attachment 8 for the Delta and Non-Delta Area boundaries.

The Project is located within the Non-Delta Management Area, which includes a majority of the agricultural, domestic, and municipal wells in use within the Subbasin. About 2,400 wells are present in the Subbasin and provide about 12,000 acre-feet annually for drinking water and irrigation; this constitutes about 3 percent of the total water supplies for the Subbasin (DWR 2019a). Surface water is available to most areas of the Subbasin accounting for the other 97 percent of water supplies. Historically, groundwater levels in the Subbasin have been relatively stable and recover after periods of pumping with only a few areas in the Non-Delta Management Area indicating declining groundwater levels.

A water budget for the Tracy Subbasin was modeled in the Tracy Subbasin GSP using DWR's California Central Valley Groundwater-Surface Water Simulation Model (C2VSim-FG_v1.0), released in November 2020. The past, present, and future groundwater conditions (including the effect of climate change) were modeled. The model results indicate the Tracy Subbasin has been and will continue operating at a surplus. Although, a slight deficit (724 AFY) was noted in the future condition considering climate change within the Non-Delta Management Area. The Tracy Subbasin GSP notes that the model does not currently allow for accurate confirmation of the water budget results due to several uncertainties and improvements still needed. For instance, the model indicates that the groundwater pumping for the entire subbasin ranges from 150,000 to 220,000 AFY. However, Basin Prioritization files indicate the actual groundwater use is much lower, roughly 12,000 AFY (check of the urban pumping generally agrees with the Basin Prioritization volumes) – with the groundwater expected to only increase to 16,400 AFY by 2040. Moreover, the modeled future condition does not include likely water improvement projects and management actions. The GSAs have listed 18 initial projects that could be implemented to resolve shortfalls. The first listed project involves the expansion of distribution facilities to provide surface water to areas previously reliant on groundwater, resulting in a groundwater pumping reduction of 1,000 AFY (Potential Project Cost = $1,500,000).

4.2.2.1 PROJECTED WATER BUDGET

Table 3 summarizes the annual average Projected Water Budget for the entire Tracy Subbasin from 2016 to 2065 – referred to in this report as the PWBT scenario. The PWBT scenario is shown operating at a surplus of 4,806 AFY, which grows substantially when the modeled pumping rate (199,549 AFY) is replaced with actual groundwater pumping data.

In 2021, the actual groundwater pumping rate was approximately 12,000 AFY and projected to increase to 16,400 AFY by 2040. The projected groundwater pumping of 16,400 AFY by year 2040 represents a 35 percent increase from the 12,000 AFY of pumping in year 2021. To illustrate pumping rates out to the year 2065 (as depicted in Table 3), a 35 percent increase was assumed, resulting in an amended groundwater pumping rate of approximately 22,140 AFY.

The projected water budget surplus increases from 4,806 AFY to 182,215 AFY using the amended pumping rate – representative of actual pumping volumes – instead of the pumping rate predicted in the model. Note, increasing another 35 percent from the 2040 projection is a conservate planning measure that does not include the planned water improvement projects and groundwater management actions (as part of the Tracy Subbasin GSP) intended to curtail net groundwater outflows.

Table 3 - Projected Water Budget
(Tracy Subbasin Annual Averages, 2016-2065)

INFLOWS (AFY)		OUTFLOWS (AFY)	
Streams/Rivers	58,633	Streams/Rivers	93,446
Deep Percolation	180,334	Pumping	199,549
Small Watersheds	6,458		
Diversion Recharge	74,015		
Subsidence	608		
Subsurface	107,290	Subsurface	129,538
Total IN	**427,338**	**Total OUT**	**422,532**
Modeled Budget (AFY)	**+4,806**		
Amended Budget (AFY)	**+182,215**		

← 22,140 AFY by 2065, according to Basin Prioritization files (~11 percent of modeled groundwater pumping result)

Source: Table 7-5 from the Tracy Subbasin Groundwater Sustainability Plan 2021

4.2.3 PROJECTED WATER BUDGET WITH CLIMATE CHANGE

Table 4 summarizes the average annual Projected Water Budget considering climate change for the entire Tracy Subbasin from 2016 to 2065 – referred to in this report as the PWBCT scenario. The projected pumping rate (221,393 AFY) shown in the PWBCT model increases by 11 percent from the projected pumping rate shown in the PWBT model (199,549 AFY). Therefore, it is assumed that the amended pumping rate determined in Section 4.2.1 (22,140 AFY) would also increase by 11 percent, yielding an amended pumping rate of 24,575 AFY for the entire Tracy Subbasin area when considering climate change conditions.

Table 4 - Projected Water Budget with Climate Change
(Tracy Subbasin Annual Averages, 2016-2065)

INFLOWS (AFY)		OUTFLOWS (AFY)	
Streams/Rivers	65,375	Streams/Rivers	85,610
Deep Percolation	176,342	Pumping	221,393
Small Watersheds	6,458		
Diversion Recharge	73,972		
Subsidence	1,552		
Subsurface	107,543	Subsurface	123,251
Total IN	**431,242**	**Total OUT**	**430,254**
Modeled Budget (AFY)	**988**		

Source: Table 7-6 from the Tracy Subbasin Groundwater Sustainability Plan 2021

As shown in Table 4, the PWBCT scenario predicts a pumping rate of 221,393 AFY. Table 5 summarizes the Projected Water Budget considering climate change for the Non-Delta Management Area from 2016 to 2065 – referred to in this report as the PWBCD scenario. The PWBCD scenario predicts a groundwater pumping rate of 80,586 AFY, which is approximately 37 percent of the pumping rate predicted in the PWBCT scenario. Therefore, it could be assumed that 37 percent of the newly amended

pumping rate of 24,575 AFY for the entire Tracy Subbasin (based on actual pumping records) is representative of actual pumping data for the Non-Delta Management Area. This results in an average annual pumping rate of 9,093 AFY, which alters the water budget from a deficit of 724 to a surplus of 70,769 AFY.

Table 5 - Projected Water Budget with Climate Change
(Non-Delta Water Management Area Annual Averages, 2016-2065)

INFLOWS (AFY)		OUTFLOWS (AFY)	
Streams/Rivers	26,665	Streams/Rivers	37,682
Deep Percolation	19,255	Pumping	80,586
Small Watersheds	6,398		
Diversion Recharge	60,928		
Subsidence	723		
Subsurface	101,912	Subsurface	98,337
Total IN	**215,881**	**Total OUT**	**216,605**
Modeled Budget (AFY)	**-724**		
Amended Budget (AFY)	**+70,769**		

← 9,093 AFY by 2065, according to Basin Prioritization files (~11 percent of modeled groundwater pumping result)

Source: Table 7-8 from the Tracy Subbasin Groundwater Sustainability Plan 2021

4.2.4 GROUNDWATER SUFFICIENCY

The projected water budgets discussed in the previous sections were obtained from the 2021 Tracy Subbasin GSP. Basin Prioritization files indicate that actual groundwater use is substantially lower, approximately 11 percent of the groundwater pumping rate predicted by the year 2065 in each scenario. Table 6 provides the water budgets for the entire Tracy Subbasin and the Non-Delta Management Area specifically, considering the discrepancy between the modeled groundwater pumping rate versus the amended groundwater pumping rate based on actual pumping data.

Table 6 – Summary of Groundwater Supply (AFY)

		Pumping Rate	Annual Average Water Budget (2016-2065)
Entire Tracy Subbasin	Modeled	199,549	4,806
	Amended	22,140	182,215
Non-Delta Management Area (considering climate change)	Modeled	80,586	- 724
	Amended	9,093	70,769

A sustainable yield of 178,000 AFY and 62,100 AFY were modeled for the entire Subbasin and just the Non-Delta Management Area, respectively[2]. Note, the sustainable yield can be

[2] The sustainable yield of a groundwater basin is defined by SGMA as the maximum quantity of water, calculated over a base period, representative of long-term conditions in the basin, and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result (i.e., lowering of groundwater levels, depletion of interconnected surface water, significant and unreasonable loss of storage, subsidence,

increased if conjunctive use projects are implemented to increase recharge to the Tracy Subbasin. Given the actual groundwater pumping rate is approximately 11 percent of the modeled pumping rate – ranging from 9,093 AFY in the Non-Delta Management Area up to 22,140 AFY for the entire Tracy Subbasin – it can be assumed the sustainable yield will not be exceeded when considering the project's groundwater pumping rate of 58 AFY.

5 IMPACT ANALYSIS AND CONCLUSION

The goal of this WSA is to analyze the sufficiency of the BBID and Tracy Subbasin to meet the Project's projected future water demands, under all hydrologic conditions (Normal Years, Single Dry Years, and Multiple Dry Years), in addition to the existing and future water uses of the area within a 20-year planning horizon. Due to limited information regarding the water supply of the BBID and the groundwater supply in the Tracy Subbasin, it was not possible to present the individual water supplies for the normal, single dry, and multi-year drought in a single 20-year time frame.

The Project's irrigation water demands will be sufficiently served for the normal, single dry, and multi-year drought in a single 20-year time frame. This is understood as the Project is actually reducing the existing water demand of 1,500 AFY to 20 AFY. This positively impacts the BBID by providing an additional 1,480 AFY back into the water supply. Additionally, only approximately 16% of the water allocated to the CVP service area is being used annualy. It should be noted that as irrigational technologies increase, water usage will continue to decrease. Therefore, there is plenty of supply to serve the Projects 20 AFY in varying hydrologic conditions.

The groundwater supply sufficiency may be observed through the analysis of the Projected Water Budget. The Projected Water Budget scenarios were used as a general representation of the hydrologic conditions from year 2016 to year 2065. It is assumed that the PWBT scenario represents normal hydrologic conditions until year 2065. The PWBCT and PWBCD scenarios are assumed to be representative of frequent dry hydrologic conditions that occur due to climate change and result in an increase in groundwater pumping. Therefore, the Projected Water Budget scenarios demonstrates abundant water supplies in varying hydrologic conditions until year 2065.

When observing the Projected Water Budgets with the amended pumping rates, the water budget surpluses are significant (see Table 7). When observing the Projected Water Budgets without the application of the amended pumping rates, the pumping rates exceed the sustainable yield and thus result in a significantly smaller surplus and even a deficit of 724 AFY in the PWBCD scenario. However, the water budget models do not consider the additional future SGMA compliance efforts made by the six GSAs, which are separate from the current efforts detailed in the Tracy Subbasin GSP. The one groundwater reduction project detailed in the Tracy Subbasin GSP is estimated to yield approximately 1,000 AFY in groundwater reduction by expanding surface water services with a potential implementation time between 2023 and 2030 (See Attachment 9). When applying 1,000 AFY in groundwater reduction efforts, the pumping rate decreases (by 1,000 AFY) and the groundwater budget changes from a slight deficit to a surplus. Therefore, water budgets in all modeled scenarios are surpluses when considering even just one of the planned SGMA compliance efforts.

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saltwater intrusion, and degradation of water quality). Note, none of these undesirable results have been observed in the Tracy Subbasin in the recent past.

The Projects indoor water demand of 58 AFY is not anticipated to increase in the future. Based on the water budget results, the Tracy Subbasin is more than sufficient in serving the Project's current and future water demands as shown in Table 7.

Table 7 – Final Water Budgets with Project Demands Applied (AFY)

		Final Water Budget Results[1]	Water Budget after Project Demands
Entire Tracy Subbasin	Projected	5,806	5,748
	Amended	183,215	183,157
Non-Delta Management Area (considering climate change)	Projected	276	218
	Amended	71,769	71,711

[1] Water budgets shown in Table 6 with the account of one SGMA groundwater reduction project, resulting in a reduction of 1,000 AFY.

It should be noted that the Project will result in the cessation of irrigation of the existing orchard, thus making the amount of surface water that has been historically applied to the orchard available for use within the Subbasin, and likely offsetting existing groundwater pumping that has been occurring due to insufficient surface water supplies. The net benefit to the Subbasin would likely equal a reduction in groundwater pumping in an amount equal to the orchards' prior surface water use (~1,500 AFY according to BBID) less the Project's total groundwater use (58 AFY).

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Attachment 1 – Water District Jurisdictional Areas

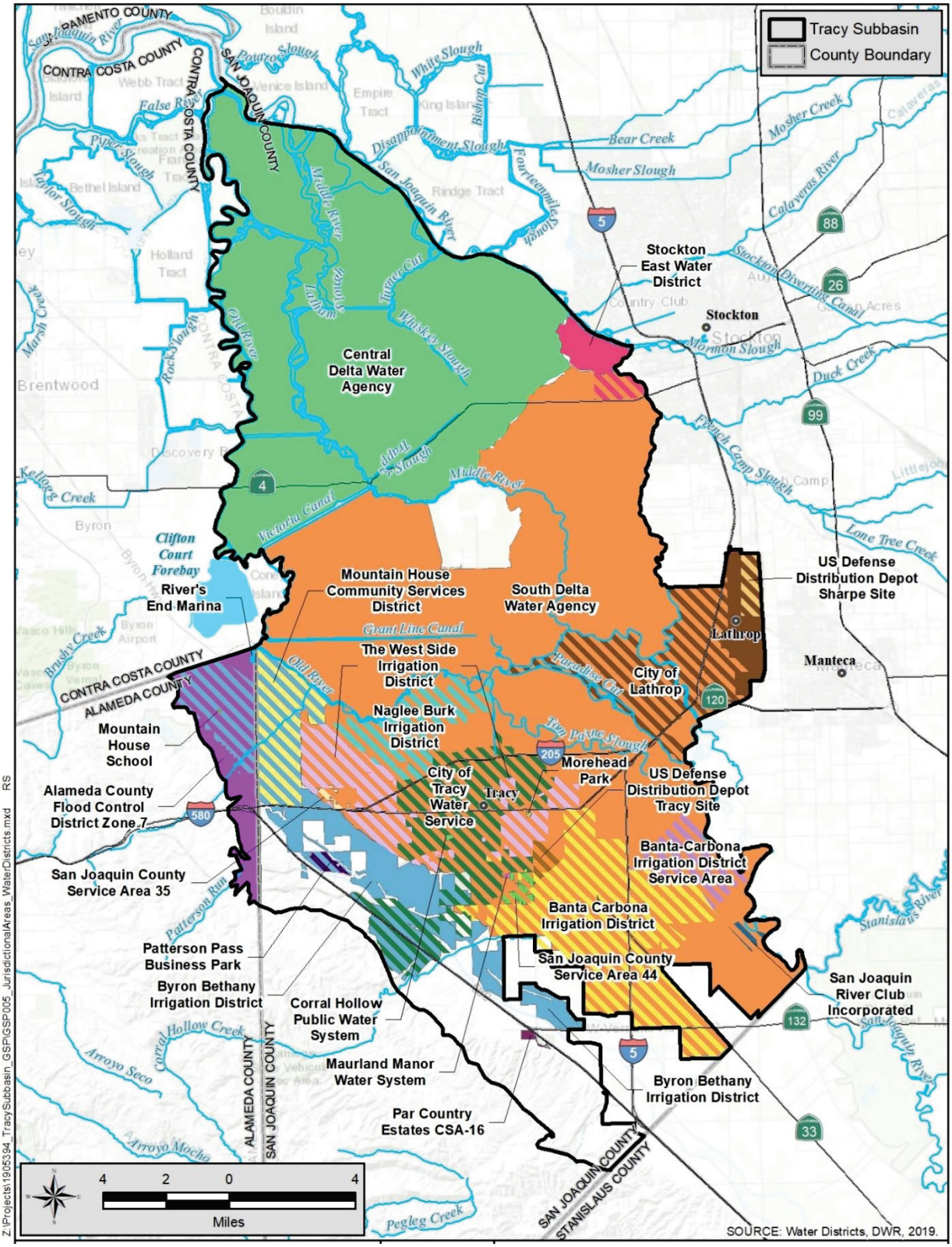
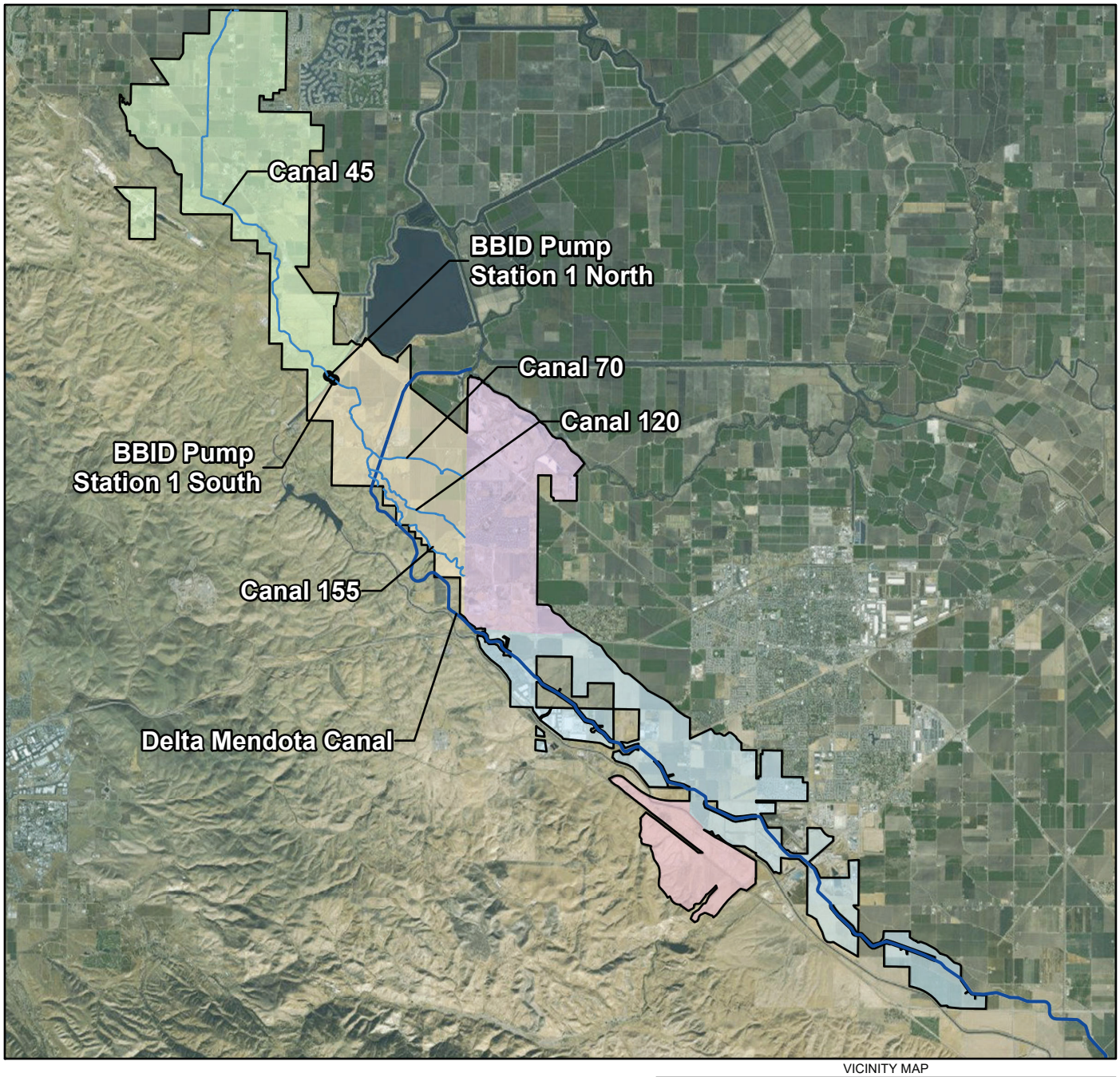


Figure 3-3. Water Districts Jurisdictional Areas

Attachment 2 – Areas within BBID



LEGEND

- BBID Pump Stations
- BBID Canals
- RWSA 2
- RWSA 1
- CVP Service Area
- Byron Division
- Bethany Division
- Delta-Mendota Canal

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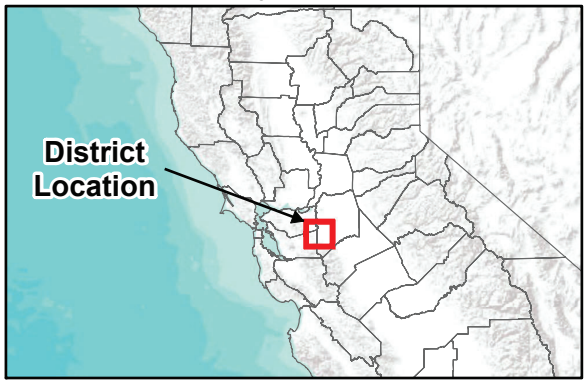
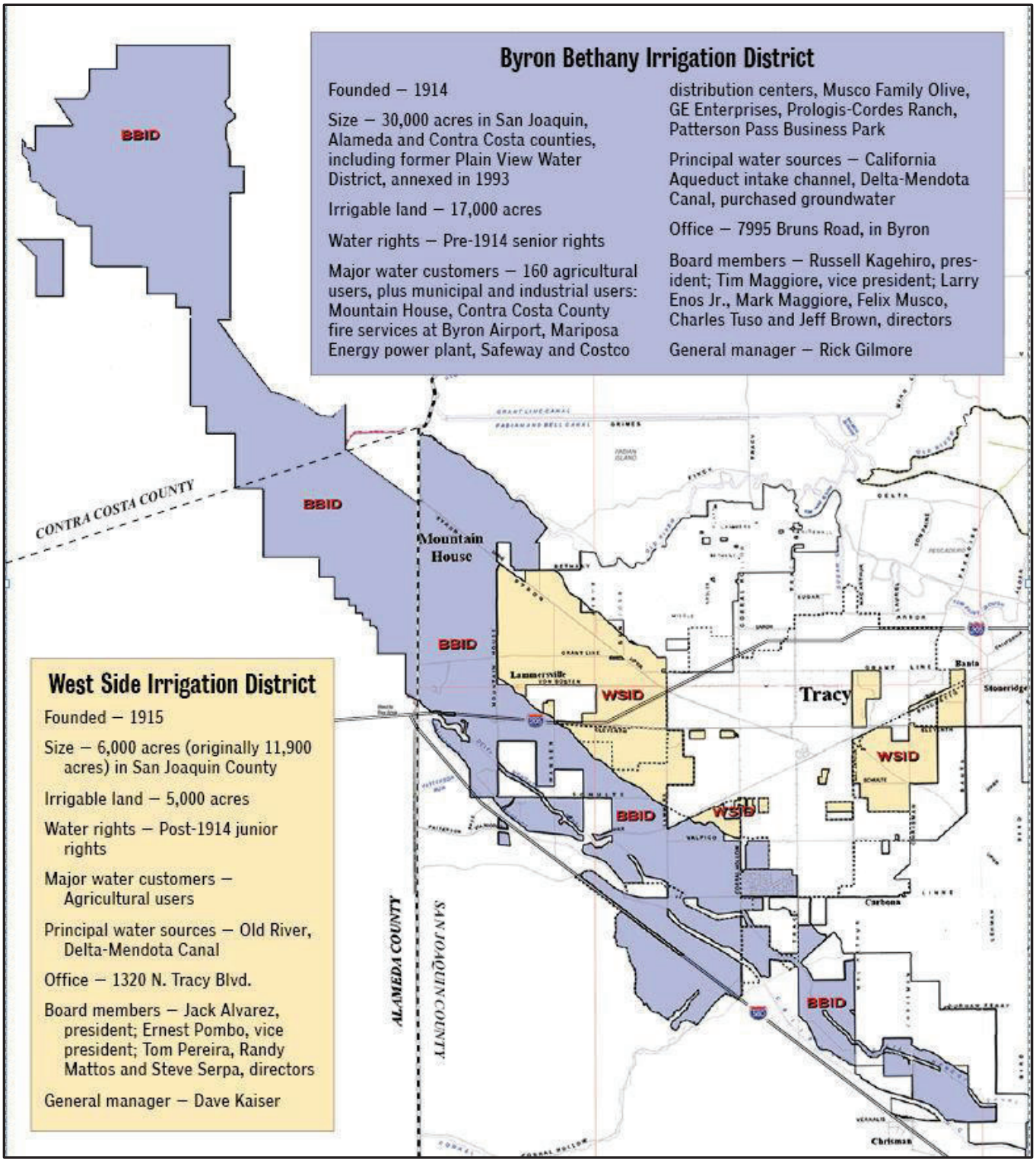
VICINITY MAP



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Sources: Esri, USGS, NOAA

Figure 2-1
Canals and Pump Stations
Agricultural Water Management Plan
Byron Bethany Irrigation District

Attachment 3 – WSID Service Area



Source: https://www.ttownmedia.com/tracy_press/news/water-districts-consider-merger/article_47f3c8a8-d131-11e5-8952-6b774e6c50e8.html

Attachment 4 – Tracy Subbasin and Project Location

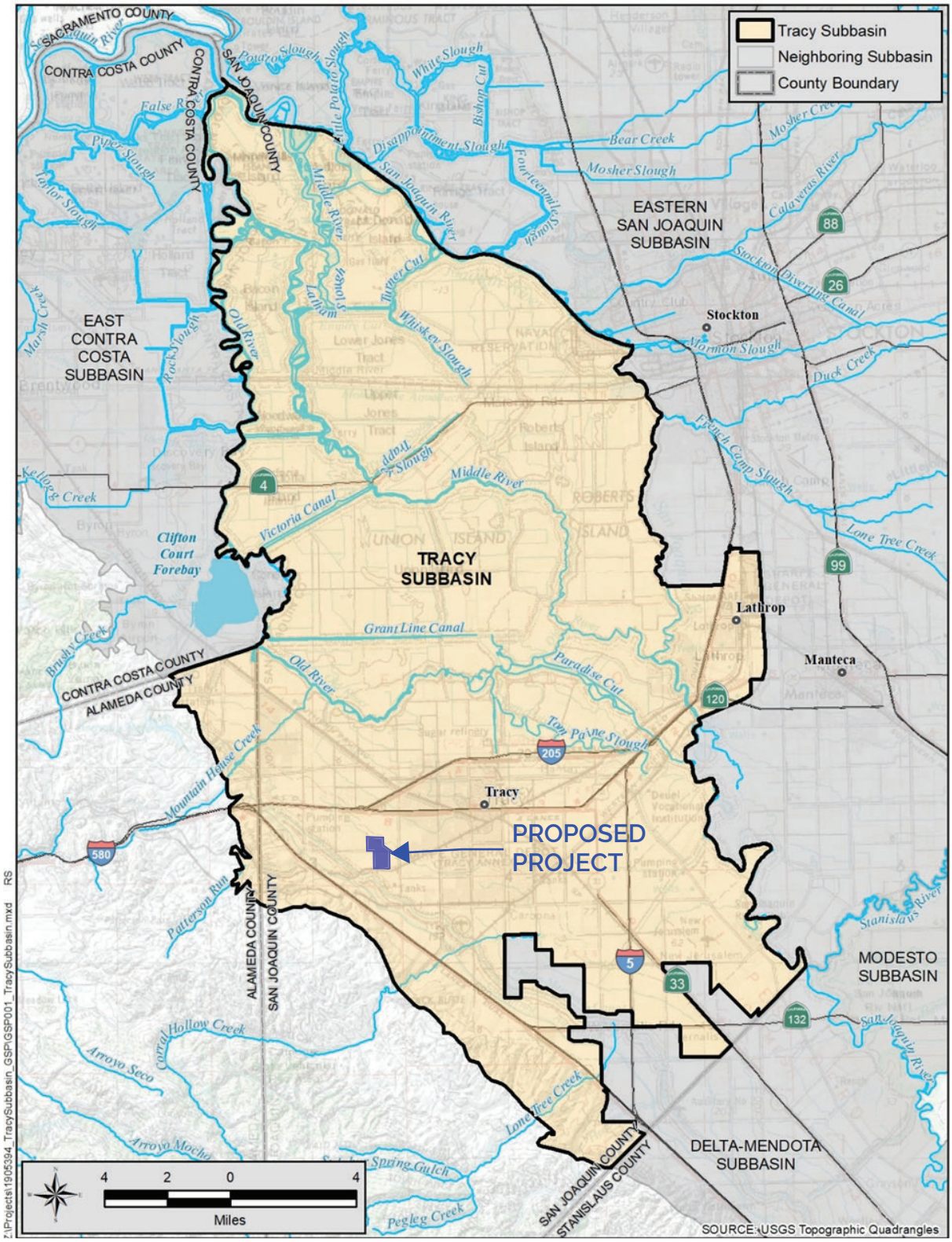


Figure 1-1. Tracy Subbasin

Attachment 5 – Geologic Location and Sections

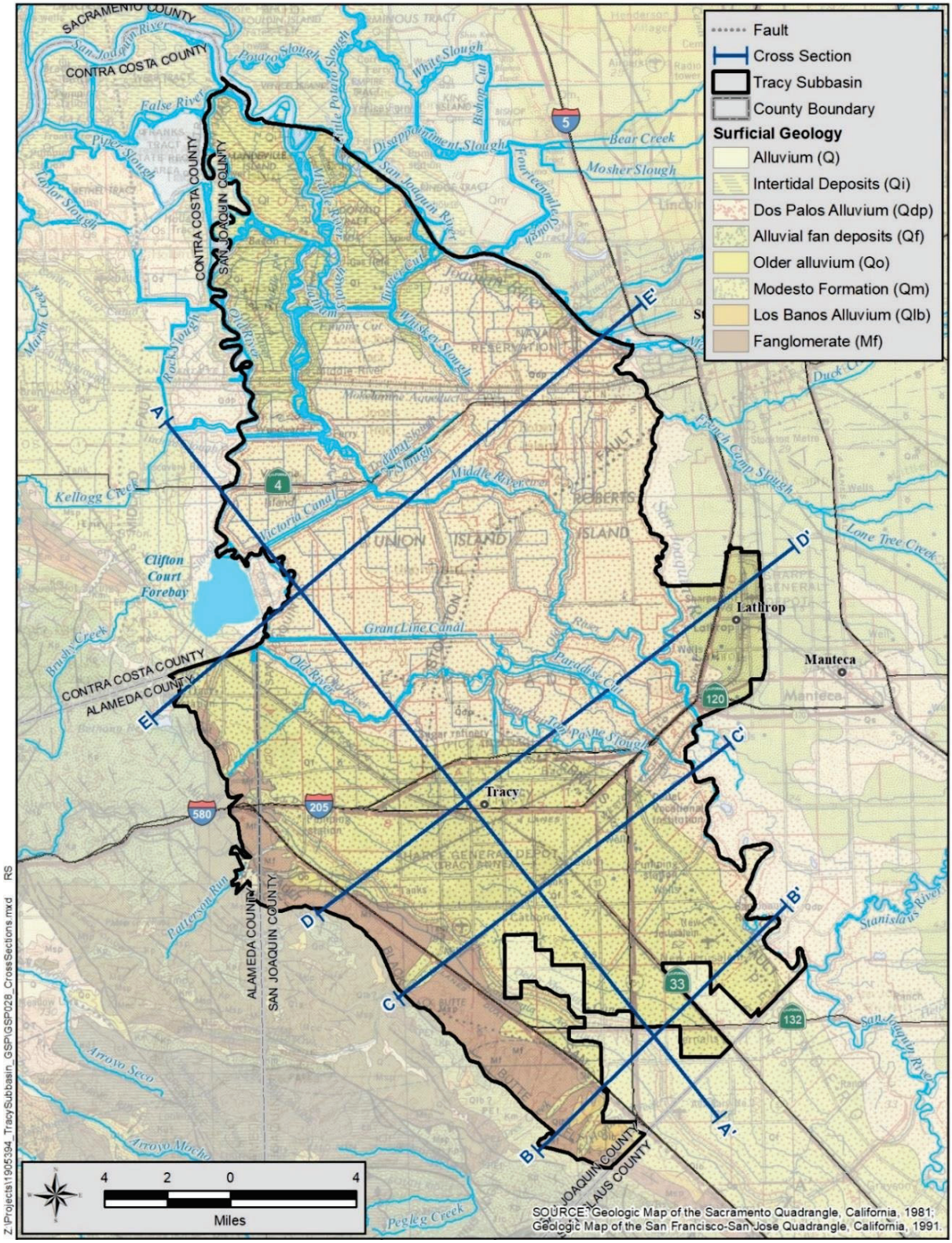


Figure 4-9. Geologic Section Locations

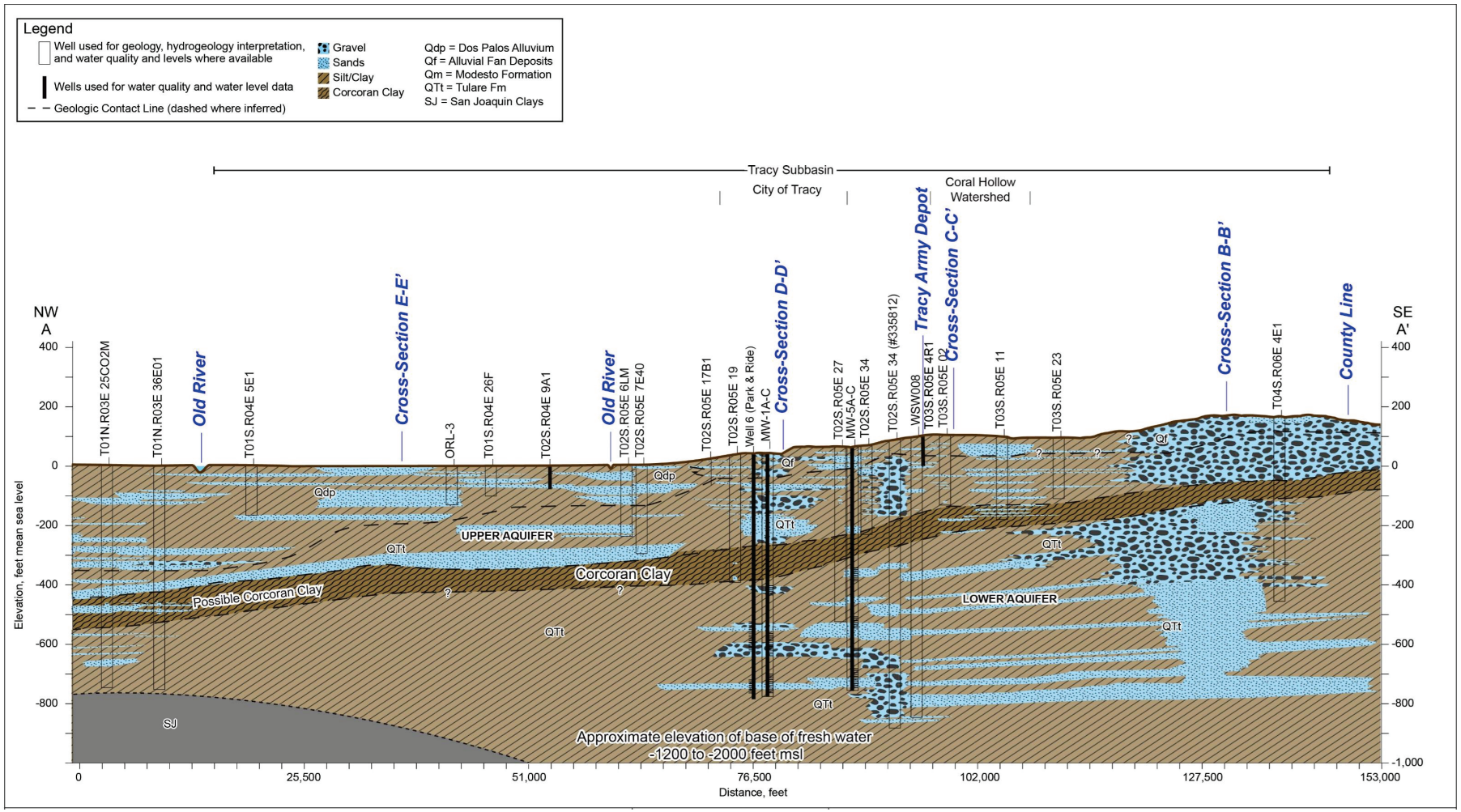


Figure 4-10. Geologic Section A-A'

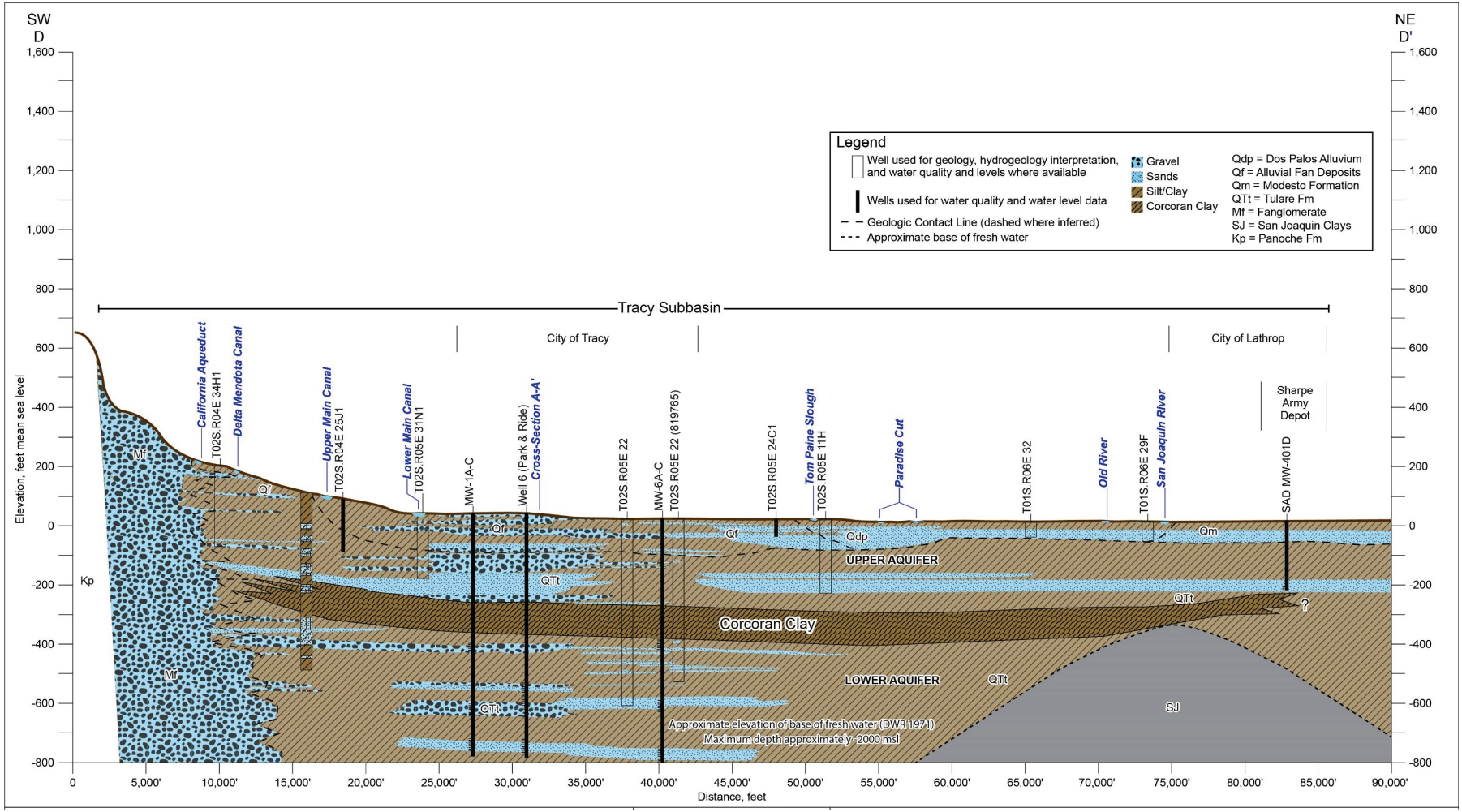


Figure 4-13. Geologic Section D-D'

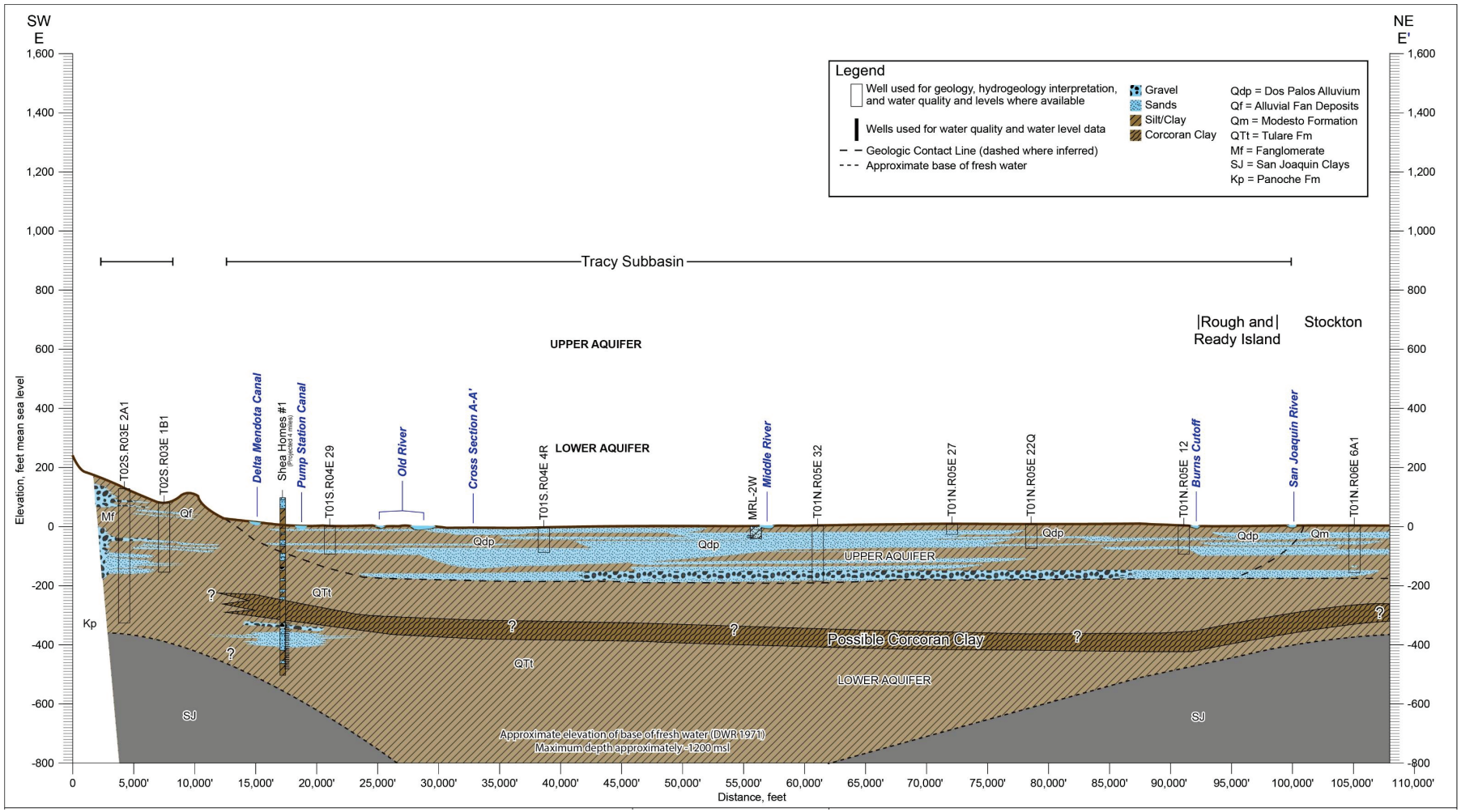


Figure 4-14. Geologic Section E-E'

Attachment 6 – SJVB Subbasins

Groundwater Basin Boundary Assessment Tool

Attachment 7 – Groundwater Sustainability Agencies

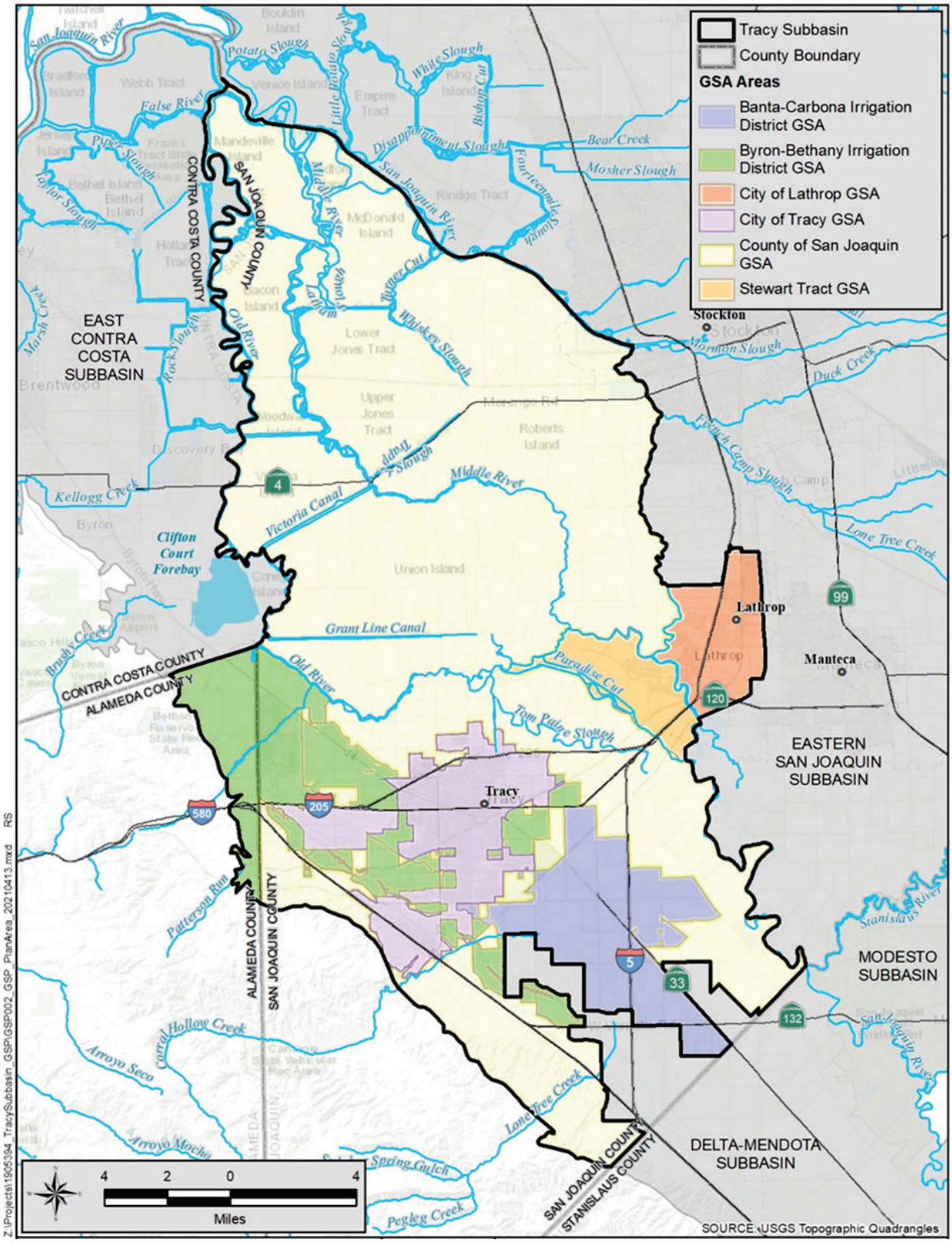


Figure ES-1. Tracy Subbasin GSAs

Attachment 8 – Delta and Non-Delta Areas

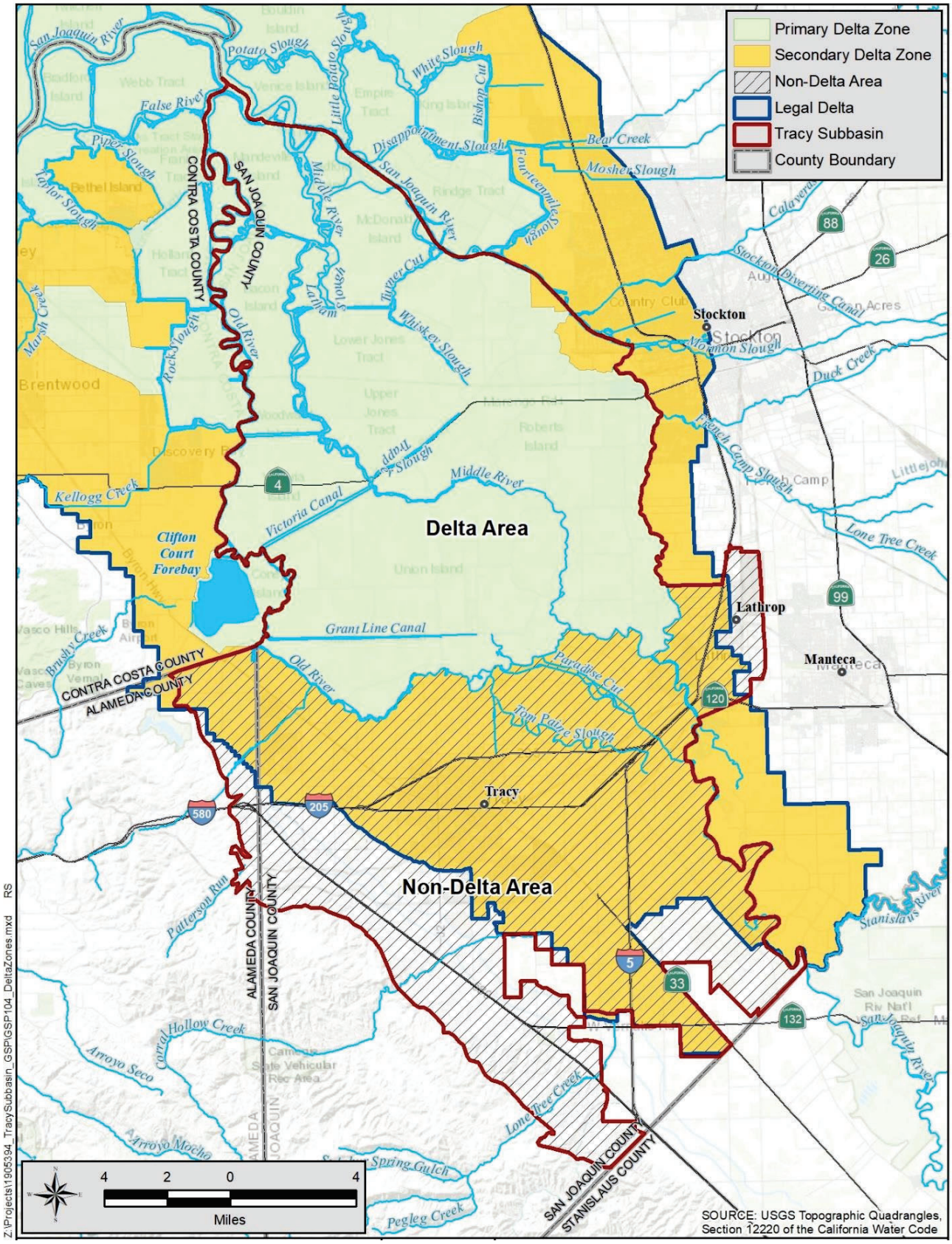


Figure 6-1. Delta and Non-Delta Areas

Attachment 9 – List of GSAs Projects

10.2 List of Projects and Management Actions

The GSAs created a list of 18 initial projects that were refined to the current list that could be implemented to resolve shortfalls in either the Upper or Lower aquifers. These projects or the ones contained in **Table 10-1** were not listed in the Westside-San Joaquin Integrated Regional Water Management Plan (Woodard and Curran 2019). Each GSA member agency listed as the Owner will manage the permitting, design, and construction and operation of the project or management action shown on **Table 10-1** along with their measurable objectives, potential implementation timeline, groundwater recharge potential, and estimated costs. The location of the projects is illustrated on **Figure 10-1**.

Table 10-1 Projects and Management Actions

Project or Management Action No.	Owner	Project or Management Action Description	Potential Implementation Time (yrs)	Measurable Objective	Potential Recharge (AFY)	Potential Cost
Projects						
P1	BCID	Conjunctive Use - Expansion of distribution facilities to provide surface water to areas previously reliant on groundwater. Benefits Upper Aquifer.	2023-2030	Chronic Lowering of Groundwater Levels	1,000	$1,500,000
Management Actions						
MA-1	County	Modify Well Ordinance - 1) Create surface water depletion protection zones near rivers and sloughs. Minimum sanitary seal and screen depth requirements to limit direct interconnection to surface water. Benefits Upper Aquifer and potentially to GDE's. 2) Well spacing requirements for high-capacity irrigation or municipal wells from domestic wells. Benefits domestic well owners.	2023-2025	Surface Water Depletion		$20,000

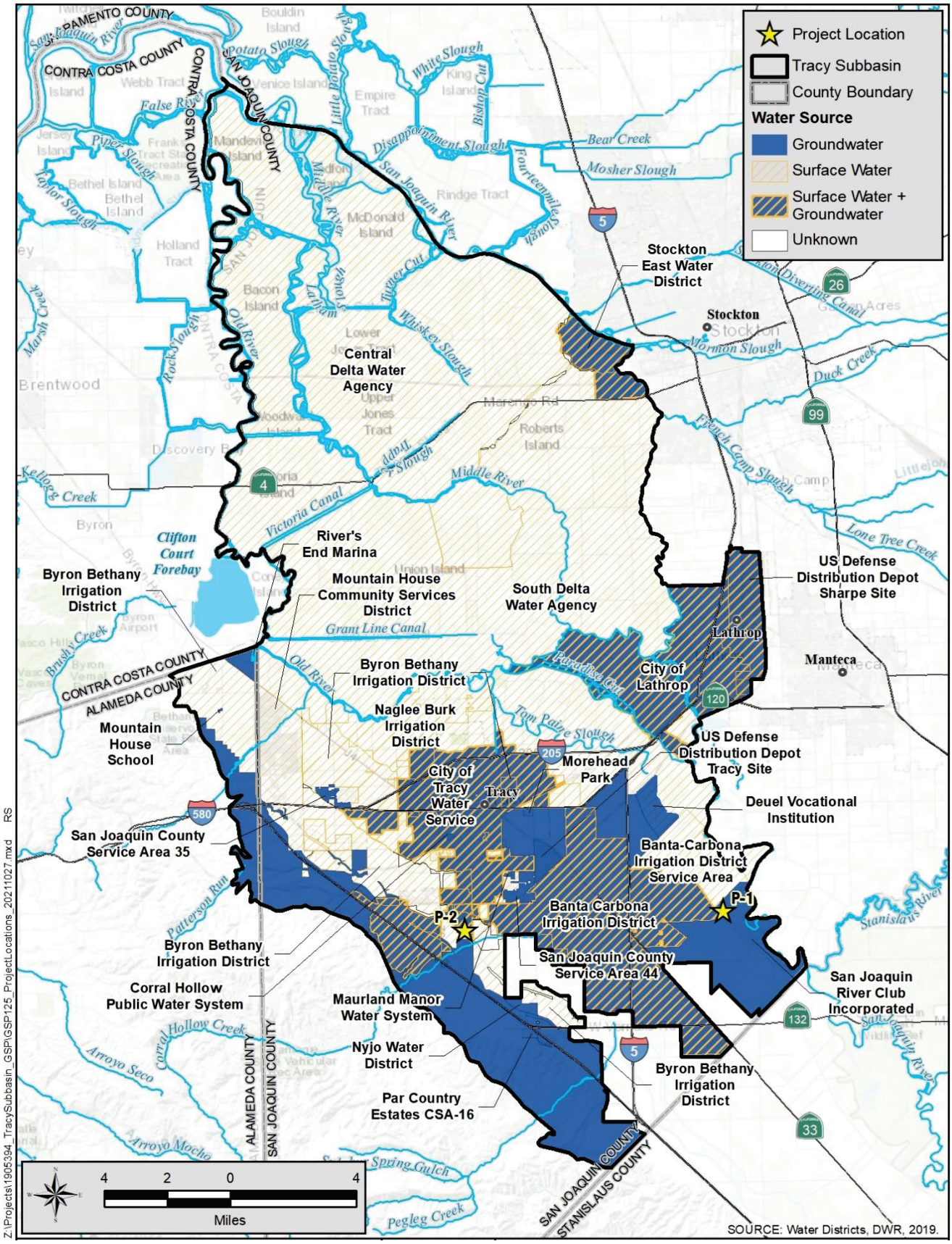


Figure 10-1 Locations of Projects