Appendix G

Water Supply Assessment

Water Supply Assessment for the

Chandler Grove Master Plan and Annexation Project Tulare County, California

SEPTEMBER 2022

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Printed on 30% post-consumer recycled material.

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AF	acre-feet
AFY	acre-feet per year
bgs	below ground surface
CEQA	California Environmental Quality Act
City	City of Tulare
CWC	California Water Code
DWR	California Department of Water Resources
gpm	gallons per minute
GKGSA	Greater Kaweah Groundwater Sustainability Agency
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
KGS	Kaweah Groundwater Subbasin
MKGSA	Mid-Kaweah Groundwater Sustainability Agency
project	Chandler Grove Master Plan and Annexation Project
PWS	public water system
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
UWMP	Urban Water Management Plan
WSA	Water Supply Assessment

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Executive Summary

The City of Tulare (City), acting as lead agency, has determined that the Chandler Grove Master Plan and Annexation Project (project) requires preparation of an environmental impact report pursuant to the California Environmental Quality Act (CEQA). The City has determined that a Water Supply Assessment (WSA), consistent with the requirements of Senate Bill 610, is needed to support preparation of the environmental impact report, as well as the discretionary land use decision that will be undertaken by the City's Planning Commission. The project proposes an annexation of 231 acres of active agricultural land in Tulare County for a mixed-use development consisting of approximately 1,197 total units of low-, medium-, and high-density residential housing (163.1 acres), a central park (14.1 acres), a neighborhood commercial center (10.8 acres), a school (4.9 acres), and a community center (0.78 acres).

This WSA has estimated the water demand for the project to be 629 acre-feet per year (AFY), to be served by municipal water from the City, with the option to use one or more existing on-site wells for irrigation of the central park and public landscaped areas. This WSA evaluates water availability and sufficiency for the project based on an evaluation of (1) existing and proposed on-site water use, (2) current and expected future groundwater conditions, (3) consistency with applicable water plans and programs (i.e., Urban Water Management Plan and Groundwater Sustainability Plans), and (4) analysis of potential impacts to groundwater resources. Because the project would change the on-site land use from agriculture to urban, the project results in a decrease in water use of at least 70 AFY relative to baseline conditions. The project would shift the source of water from being entirely from on-site wells under existing conditions to being primarily from the City's 27 groundwater wells, which are widely distributed. Based on review of applicable documents, this WSA has concluded that there are sufficient water supplies to serve the project's construction and operational water demands under normal-year, single-dry-year, and multiple-dry-year conditions over a 20-year period, even when accounting for future growth. Furthermore, because the project results in a decrease in groundwater use overall and would draw groundwater from a wider and more flexible network of wells, it would not have adverse impacts on groundwater resources.

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1 Introduction

1.1 Purpose of Document

Senate Bill (SB) 610 was passed on January 1, 2002, amending the California Water Code (CWC) to require detailed analysis of water supply availability for certain types of development projects. The primary purpose of SB 610 is to improve the linkage between water and land use planning by ensuring greater communication between water providers and local planning agencies and ensuring that land use decisions for certain large development projects are fully informed as to whether a sufficient water supply is available to meet project demands. SB 610 requires preparation of a Water Supply Assessment (WSA) for a project that is subject to the California Environmental Quality Act (CEQA) and meets certain requirements. SB 610 is codified in CWC Division 6, Part 2.10 (Sections 10910–10915).

The Chandler Grove Master Plan and Annexation Project (project) has been determined to be subject to CEQA by the City of Tulare (City), acting as lead agency. The project satisfies the statutory definition of a "project" for the purpose of determining SB 610 applicability because it is a proposed residential development of more than 500 dwelling units, per CWC Section 10912(a). Furthermore, because the project will be within the service area of a public water system (PWS), as defined in CWC Section 10912(c), the City, as the CEQA lead agency and water supplier, is responsible for the preparation of a WSA, which will be included in the CEQA documentation for consideration. The City will make an independent determination as to whether there is adequate water supply for the project, having considered the entire administrative record. In compliance with SB 610, this WSA examines the availability of the identified water supply under normal-year, single-dry-year, and multiple-dry-year conditions over a 20-year projection, accounting for the projected water demand of the project plus other existing and planned future uses of the identified water supply.

1.2 Project Description and Location

The project consists of a mixed-use development on approximately 231 acres of active agricultural land in Tulare County, California (Figure 1, Project Location Map). Approximately 10.3 acres of perimeter right-of-way would be dedicated as part of the project, leaving approximately 220 acres for development. Once developed, the project site would include approximately 1,197 total units of low-, medium-, and high-density residential housing (163.1 acres), a central park (14.1 acres), a neighborhood commercial center (10.8 acres), a school (4.9 acres), and a community center (0.78 acres). Parks would act as natural areas; provide stormwater detention; and include playgrounds, plazas and shelters, open turf areas for field sports, and trails for recreation. Trails throughout the site would connect to schools, parks, the community center, and the commercial center. An open irrigation canal currently passes through the property from the north to the south and would be piped underground within the same general alignment during project development and flow through the channel would not be changed. Housing would include approximately 364 units of low-density single-family units, 281 units of medium-density single-family units and townhomes, and 552 high-density apartments.

The project site is currently located within unincorporated Tulare County but is planned to be annexed to the City as part of the project. The project site is composed of four separate parcels and includes Assessor's Parcel Numbers 184-050-007, 184-050-034, 184-050-035, and 184-050-010. The project site is bound by South Oakmore Street

(Road 124) to the west, the East Tulare Villa community to the east, Avenue 228 to the north, and East Bardsley Avenue to the south (Figure 1). The proposed project includes approximately 1,197 total units of low , medium-, and high-density housing; a neighborhood commercial center; a community center; a kindergarten-through-eighth-grade public school; and a central park.

1.3 Water Supply Assessment Applicability

SB 610 amended CWC Sections 10910 and 10912 to create a direct relationship between water supply and land use. SB 610 establishes the legal framework for assessing the sufficiency of water supply for new development that qualifies as a "project." Per CWC Section 10912(a), the project must prepare a WSA because it is a proposed residential development of more than 500 dwelling units. The primary question to be answered in a WSA per the requirements of SB 610 is "Will the total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection meet the projected water demand of the proposed project, in addition to existing and planned future uses of the identified water supplies, including agricultural and manufacturing uses?"

Under SB 610, WSA reports must be prepared and furnished to local governments by the water utility serving that community for inclusion in any environmental documentation for projects meeting the specified requirements under Section 10912(a) of the CWC and subject to CEQA. According to CWC Section 10910(g)(1), "the governing body of each public water system, or the city or county if either is required to comply with this act [...], shall approve the assessment prepared pursuant to this section at a regular or special meeting." According to SB 610, the PWS serving the project area is required to prepare the WSA report.

This WSA has also been prepared to substantiate responses to several CEQA Appendix G checklist questions relating to hydrology and water quality, as well as utilities and service systems. These include (1) Would the project "have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?" and (2) Would the project "substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?"

The CWC, as amended by SB 610, requires that a WSA address the following questions:

- Is there a PWS that will service the project?
- Is there a current Urban Water Management Plan (UWMP) that accounts for the project demand?
- Is groundwater a component of the supplies for the project?
- Are there sufficient supplies to serve the project over the next 20 years?

These questions are addressed in the following subsections.

1.3.1 Public Water System to Serve Project

Section 10912 of the CWC defines a "public water system" (PWS) as a system that has 3,000 or more service connections and provides piped water to the public for human consumption. Figure 2, Water Agencies and Districts, shows the two PWSs in proximity to the project site, which consist of the City to the west and the East Tulare Villa area to the east. The East Tulare Villa area is serviced by the Tulco PWS, which is part of the Visalia District of California Water Service, an investor-owned water utility regulated by the California Public Utilities Commission

(CalWater 2021). The City has an emergency interconnection with California Water Service (but does not supply it water as a customer) and operates a groundwater well on the south side of East Bardsley Avenue (also shown in Figure 2). Therefore, there is a City water line along East Bardsley Avenue that would likely serve as the project's point of connection for water service. On-site groundwater wells currently serve the irrigation and domestic water needs of the project site, and thus the site is not currently being served by the City's municipal water distribution system. However, the project would amend the City's jurisdictional boundary to include the project site and an adjacent property (College of Sequoias).

Therefore, the project would be supplied with water from the City's PWS (Water Division of the Public Works Department). The City's 2020 UWMP Update summarizes the water system as follows:

> The City's service area covers the city limits as well as two unincorporated communities adjacent to the western city limit line, Matheny Tract and Soults Mutual Water Company. The combined service area includes an estimated population of 69,086 in 2020 with a projection to 92,615 individuals by 2040 (assumed 1.5 percent annual growth rate).
>
> The City provides water supplies to the customer base through multiple groundwater wells located throughout the City; the system uses groundwater as its sole water supply source. However, it does use surface water and treated wastewater for percolation to offset the groundwater extraction. […]
>
> The City is the only municipal water purveyor within the City limits and provides service to 67,834 City residents and 1,252 customers outside the City limits. The City provides water service to two communities adjacent but outside the City limits, the Matheny Tract and Soults Mutual Water Company. The […] anticipated growth within the service area [is] a 1.5% growth rate for the City and no growth for the Matheny and Soults areas.
>
> The existing land uses within the city limits include 4,895 acres of residential, 1,501 acres of commercial, 2,308 acres of industrial, 309 acres of Parks and Recreation, and 1,646 acres of Public facilities. (City of Tulare 2021a)

Depending on the ultimate design of the project, the central park, public right-of-way landscaping, and/or other irrigation demands may be served by one or more of the existing on-site groundwater wells. This would minimize the demand on the City's water system and would avoid using water treated to potable/sanitary standards for a use that does not require it.

1.3.2 Urban Water Management Plan Coverage

UWMPs are prepared by California's urban water suppliers to support long-term resource planning and ensure adequate water supplies. UWMPs must be updated and submitted to the California Department of Water Resources (DWR) every 5 years for review and approval. The DWR has identified the UWMP as a foundational document in the preparation of a WSA, noting that a thorough UWMP can provide the required information to fulfill the standards set forth by SB 610. Every urban water supplier that either delivers more than 3,000 acre-feet per year (AFY) of water annually or serves more than 3,000 connections is required to assess the reliability of its water sources over a 20- year period under normal-year, dry-year, and multiple-dry-year scenarios; these are the same requirements of a WSA, as specified by SB 610. A WSA may also rely on additional water supply data beyond the information in the UWMP.

The City's 2020 UWMP Update accounts for the project. Although the project is not within the City's existing water service area (see Figure 2), it is within the City's urban development boundary, which is included in the service area boundary evaluated in the UWMP (City of Tulare 2021a, p. 3-1). The method of accounting for future growth in the UWMP is a continuation of existing population trends within the City, corresponding to annual 1.5% growth rate out to 2040 (City of Tulare 2021a). It is projected that the City's service area will have an increase in population from 69,086 persons in 2020 to 92,615 persons in 2040. Because the project-related increase in population is considered within the 1.5% annual growth rate, and because the UWMP includes land uses within the urban development boundary in its service area description, it is appropriate for this WSA to rely on the City's 2020 UWMP in its assessment of water supply sufficiency.

1.3.3 Groundwater as a Component of Project Water Supplies

If groundwater is considered as a potential water supply source for the project, SB 1610 requires additional data acquisition and analysis (CWC 10910). Groundwater would be the sole source of water supply for the proposed project. The project overlies the San Joaquin Valley Groundwater Basin—Kaweah Groundwater Subbasin (KGS). This groundwater resource is described in detail in Section 4, Water Resources Inventory, and water supply availability is discussed in Section 5, Water Demand and Supply Comparison.

1.3.4 Sufficiency of Supply over the Next 20 Years

As described in Sections 4 and 5, and consistent with the findings of the City's 2020 UWMP Update, there is adequate water available to supply the project, in addition to other existing and planned future uses, under normal- year, single-dry-year, and multiple-dry-year conditions over a 20-year projection.

2 Project Water Demand

The project's water demand will be lower than the existing water demand associated with the site's current use. As shown in Table 1, the water demand of the project is estimated to be approximately 629 AFY, a decrease of about 70 AFY compared to the project site's existing irrigation and domestic water demand (699 AFY). This decrease in water demand is a minimum because the methods used to estimate existing water demand were very conservative (i.e., lower than actual), whereas the methods to estimate the proposed project's water demands were liberal (i.e., higher than actual).

Table 1. Existing and Proposed Water Demand

Land Use	Demand Coefficient (gpd/acre)[1]	Acreage[2]	Water Demand	
			gpd	AFY
Existing Water Demand (Source: combination of canal water and groundwater)				
Agricultural Irrigation[3]	N/A	207	619,465	694
Rural Residential	1,200	3	4,099	5
	Existing Totals	210	623,564	699
Proposed Water Demand (Source: City of Tulare Water Division)				
Low-Density Residential	2,400	109	260,880	292
Medium-Density Residential[4]	3,000	46	136,500	153
High-Density Residential	4,000	33	133,600	150
Neighborhood Commercial	1,300	11	14,040	16
Public/Quasi-Public[5]	800	6	4,544	5
Irrigated Areas/Landscaping[6]	N/A	24	11,652	13
	Proposed Totals	228	561,216	629
	Estimated Post-Project Water Demand Reduction	–	62,348	70

Notes: gpd = gallons per day; AFY = acre-feet per year; N/A = not applicable.

1 Demand coefficients are from the City of Tulare Water Master Plan (City of Tulare 2009, Table 3.8).

2 Total project site is 231 acres. Only acreage with water demands is included in this table (e.g., existing and proposed roads, perimeter areas, and others are excluded).

3 This is an estimate of the average yearly irrigation based on the last 6 years of crop-specific monthly evapotranspiration minus monthly precipitation records. This is a low (conservative) estimate, since it is assumed that precipitation occurs evenly (no runoff), and irrigation is 100% efficient.

4 Inclusive of single-family detached lots and townhomes.

5 Inclusive of school and community center.

6 Inclusive of central park and perimeter right-of-way. Outdoor water demands for other land uses are included in their demand coefficients, and natural areas are assumed to be non-irrigated. Maximum applied water allowance under the Model Water Efficient Landscape Ordinance is used because a landscape plan has not been developed.

2.1 Existing Water Demand

The current water demand for the project site consists of orchard irrigation from two wells located in the center of the site and domestic water sourced from two wells located on the residential properties (Figure 3, Existing Land Uses and On-Site Wells). As shown in Table 1, it is estimated that the existing site has a water demand of 699 AFY, all from on-site groundwater wells.

The project site has been used for a variety of agricultural purposes from at least 1937 to the present, and specifically for orchards since at least 1969 (Dudek 2022). The water demand of the existing walnut/almond orchards was determined using 6 years (2016–2021) of evapotranspiration data specific to each of the seven orchard fields from OpenET, which employs several well-established methods to generate daily, monthly, and annual satellite-based evapotranspiration estimates at the field scale (OpenET 2022). A simplified water balance approach was used to determine the volume of groundwater pumped for applied irrigation, whereby total monthly precipitation (as recorded at the Visalia station) was subtracted from the monthly evapotranspiration estimates obtained from OpenET. The last 2 years of the period include an abnormally low evapotranspiration estimate because four of the fields were cleared and replanted with young saplings. This method of estimating applied irrigation assumes 100% irrigation efficiency and, more notably, assumes all precipitation is infiltrated without any field runoff. For these reasons, the average applied irrigation estimate of 694 AFY more likely represents the low end of the range for the existing irrigation water demand on the project site.

Three residential structures and multiple outbuildings are located on the subject property (Dudek 2022). A demand coefficient of 1,200 gallons per day per acre from the City of Tulare Water Master Plan for rural residential properties was used to estimate the existing domestic water demand of 5 AFY (City of Tulare 2009, Table 3.8).

2.2 Proposed Water Demand

Municipal water service for the project will be provided by the City, with the option for irrigation of public spaces (i.e., central park and public rights-of-way landscaped areas) to be from one or more of the existing on-site wells. As shown in Table 1, the water demand for the project is estimated to be 629 AFY, based on demand coefficients from the City of Tulare Water Master Plan as well as maximum applied water allowance under the state's model water efficient landscape ordinance (Section 65593, Government Code). Both methods of estimating the proposed water demand bias the result high. This is because demand coefficients in the City's Water Master Plan were established in 2009 prior to implementation of California's updated plumbing code, which requires low-flow fixtures, and are designed to assist in planning the water system to meet maximum daily demands. The City has seen a steady decrease in per capita water use over the last 20 years,[1] so water demand coefficients from 2009 likely overstate the actual water demands of various uses (City of Tulare 2009, 2021a). In addition, because a landscape plan has not been developed, it was assumed that the central park and public right-of-way landscaped areas would use their maximum water allowance, whereas landscaping is likely to utilize drought-tolerant species and minimize water use, consistent with current development practices.

For these reasons, the water demand estimate of the project is a conservative planning-level estimate and is likely to be significantly lower when ultimately developed and occupied.

1 The City had a high of 334 gallons per capita per day in 2004, which steadily decreased to 219 gallons per capita per day in 2020.

3 Water Resources Plans and Programs

Aside from SB 610 described in Section 1.3, Water Supply Assessment Applicability, there are a number of water resource plans and programs that are relevant to the water supply sufficiency and groundwater impacts of the project. These are described below.

3.1 Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) is a package of three bills (Assembly Bill 1739, SB 1168, and SB 1319) and provides local agencies with a framework for managing groundwater basins in a sustainable manner. The SGMA establishes minimum standards for sustainable groundwater management, roles and responsibilities for local agencies that manage groundwater resources, priorities, and timelines to achieve sustainable groundwater management within 20 years of adoption of a Groundwater Sustainability Plan (GSP). Central to the SGMA are the identification of critically overdrafted basins; prioritization of groundwater basins; establishment of Groundwater Sustainability Agencies (GSAs); and preparation and implementation of GSPs for medium-priority, high-priority, and critically overdrafted basins. The SGMA required GSAs to be formed by June 30, 2017. GSPs must consider all beneficial uses and users of groundwater in the basin, as well as include measurable objectives and interim milestones that ensure basin sustainability. A basin may be managed by a single GSP or multiple coordinated GSPs. At the state level, DWR has the primary role in the implementation, administration, and oversight of the SGMA, with the State Water Resources Control Board stepping in should a local agency be found to not be managing groundwater in a sustainable manner.

At its core, the SGMA is intended to achieve sustainability for DWR-defined groundwater basins over a 20-year planning horizon. Sustainable management is defined under the SGMA as the absence of undesirable results, which consist of:

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply
- Significant and unreasonable reduction of groundwater storage
- Significant and unreasonable seawater intrusion
- Significant and unreasonable degradation of water quality
- Significant and unreasonable land subsidence
- Groundwater-related surface water depletions that have significant and unreasonable adverse impacts on beneficial uses of surface water

The GSPs developed for each groundwater basin subject to the SGMA must individually or in combination (depending on whether a single or multiple GSAs exist within the same subbasin) outline how the basin is to achieve sustainability within 20 years, through establishment of sustainable management criteria (i.e., minimum thresholds and measurable objectives) and implementation of projects and management actions.

As shown in Figure 4, Groundwater Basins and Groundwater Sustainability Agencies, the project is within the San Joaquin Valley–KGS (DWR Basin No. 5-022.11), which is designated by DWR as a high-priority basin in a state of critical overdraft (see Section 4.2.2, Department of Water Resources Basin Prioritization). The KGS is collectively managed by three GSAs consisting of the East Kaweah GSA, the Mid-Kaweah GSA (MKGSA), and the Greater

Kaweah GSA (GKGSA). Although the project site is currently within the boundaries of the GKGSA, once annexed by the City as proposed, it will be governed by the MKGSA. The MKGSA was formed September 14, 2015, through execution of a joint powers agreement between the City of Tulare, City of Visalia, and Tulare Irrigation District to establish the Mid-Kaweah Groundwater Subbasin Joint Powers Authority (MKGSA 2019). The GKGSA and the MKGSA GSPs were submitted to DWR on January 31, 2020.

Although each GSA prepared an individual GSP, certain technical efforts (e.g., development of a coordinated water budget) were cooperatively developed through a coordination agreement. The three GSAs within the KGS determined a subbasin-wide sustainable yield of 660,000 AFY, which was further apportioned among the GSAs in the Kaweah Subbasin Coordination Agreement (MKGSA 2019). Projects and management actions described in the MKGSA GSP include groundwater recharge projects and programs, surface reservoir projects, leveraged surface water exchange programs, a groundwater extraction measurement implementation program, a conceptual groundwater marketing program, and future urban and agricultural conservation. The MKGSA GSP states that the GSA will work during the period from 2020 to 2025 to develop a pumping allocation program to achieve, along with neighboring GSAs, the KGS's sustainable yield by 2040. The MKGSA plans to prioritize the projects/programs above to serve as the first means to achieve sustainability, but by 2026, it is anticipated that an allocation plan would be ready for implementation if necessary to achieve sustainability (MKGSA 2019).

3.2 Urban Water Management Planning Act

The Urban Water Management Planning Act (CWC Sections 10610–10657) requires urban water suppliers to prepare a UWMP every 5 years and to submit it to the DWR, the California State Library, and any city or county within which the supplier provides water supplies. All urban water suppliers, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet (AF) annually are required to prepare a UWMP (CWC Section 10617).

The Urban Water Management Planning Act was enacted in 1983. Over the years, it has been amended in response to water resource challenges and planning imperatives confronting California. A significant amendment was made in 2009 as a result of the governor's call for a statewide 20% reduction in urban water use by 2020, referred to as "20x2020," the Water Conservation Act of 2009, and "SB X7-7." This amendment required urban retail water suppliers to establish water use targets for 2015 and 2020 that would result in statewide water savings of 20% by 2020. Beginning in 2016, urban retail water suppliers were required to comply with the water conservation requirements in SB X7-7 in order to be eligible for state water grants or loans.

A subsequent substantial revision to the Urban Water Management Planning Act was made in 2018 through a pair of bills (i.e., Assembly Bill 1668 and SB 606), described below in Section 3.3, Water Use Efficiency Standards. These changes include, among other things, additional requirements for Water Shortage Contingency Plans, expansion of dry-year supply reliability assessments to a 5-year drought period, establishment of annual drought risk assessment procedures and reporting, and new conservation targets referred to as "annual water use objectives," which will require retailers to continue to reduce water use beyond the 2020 SB X7-7 targets. The Urban Water Management Planning Act contains numerous other requirements that a UWMP must satisfy.

3.3 Water Use Efficiency Standards

The Water Conservation legislation of 2018 (SB 606 and Assembly Bill 1668)— referred to as “Making Water Conservation a California Way of Life” or the “2018 Water Conservation Legislation”— established a new foundation for long-term improvements in urban water supplier conservation and drought planning in order to adapt to climate change and the longer more intense droughts in California. Together, Assembly Bill 1668 and SB 606 lay out a new long-term water conservation framework for California. This new framework is far-reaching for both the urban and agricultural sectors of California and represents a major shift in focus. Programs and initiatives are organized around four primary goals:

1. Use water more wisely
2. Eliminate water waste
3. Strengthen local drought resilience
4. Improve agricultural water use efficiency and drought planning

Collectively, this legislation provides a road map for all Californians to work together to ensure that we will have enough water now and in the years ahead. One of the major outcomes of the legislation is the adoption of long-term standards for the efficient use of water and performance measures for commercial, industrial, and institutional water use on or before June 30, 2022. The bill establishes a standard for indoor water use of 55 gallons per capita daily to be reached by 2025, 52.5 gallons per capita daily beginning in 2025, decreasing to 50 gallons per capita daily beginning in 2030, or an alternative to this standard as determined jointly by DWR and State Water Resources Control Board in accordance with necessary studies and investigations.

3.4 Executive Order N-7-22

California’s Governor Gavin Newsom released Executive Order N-7-22 on March 28, 2022, in response to the state’s ongoing drought conditions. The executive order includes limitations on building new wells or altering existing ones, as long as the well at issue provides at least 2 AF per year of groundwater. The general limitation requires findings that extracting the groundwater (1) would not interfere with nearby wells and (2) is “not likely to cause subsidence that would adversely impact or damage nearby infrastructure.” The executive order also includes a separate requirement for wells in a medium- or high-priority basin under the SGMA. There, the GSA must make written findings that the well would not (1) be inconsistent with the applicable GSP and (2) decrease the likelihood of achieving an applicable sustainability goal.

Although groundwater (either directly from on site or indirectly via the City PWS) is the sole source of water for the project, this water will rely on existing wells and will not require drilling any new ones.

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4 Water Resources Inventory

A WSA is required to identify and describe the water supply sources of the public water supplier that may serve the proposed project. CWC Section 10910(d) requires a WSA to include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water supplier.

4.1 Local Surface Water

Local surface water is not proposed as a source of water for the project.

The project site has a concrete-lined drainage ditch (Bates Slough Ditch) that transects the approximate center of the subject property. The ditch drains across the subject property to the south until reaching East Bardsley Avenue, where it changes course to the east along the southern property boundary, flowing through a culvert that crosses East Bardsley Avenue (Dudek 2022). The site also has an empty storage pond adjacent to two irrigation wells in the center of the property. As part of the project, the irrigation ditch will be reconstructed as an underground pipe, and the storage pond will be removed. These water features consist of irrigation infrastructure and are not suitable as a source of water for municipal or potable uses.

4.2 Groundwater

Based on the information gathered below, the underlying aquifer has sufficient yields to support the project's water demands over the next 20 years regardless of the water year type. Furthermore, although the KGS is in a state of critical overdraft, the project's water demand can be met without exacerbating this condition because (1) the project would decrease groundwater use relative to existing conditions, and (2) the City and the applicable GSAs are implementing projects and programs, including a Water Shortage Contingency Plan, to address the overdraft conditions (MKGSA 2019; City of Tulare 2021b).

4.2.1 Groundwater Basin Description

The KGS, shown in Figure 4, is a 446,000-acre subbasin (696 square miles) located within the central portion of the Tulare Lake Hydrologic Region of the San Joaquin River Basin and is bounded by the Kings River Subbasin to the north, the Tulare Lake Subbasin to the west, the Tule River Subbasin to the south, and the Sierra Nevada Mountains to the east. The general description of water bearing formations from DWR Bulletin 118 (California's Groundwater) is as follows:

> The sediments that comprise the Kaweah Subbasin aquifers are unconsolidated deposits of Pliocene, Pleistocene, and Holocene age. On the east side of the subbasin, these deposits consist of arkosic material derived from the Sierra Nevada and are divided into three stratigraphic units: continental deposits, older alluvium and younger alluvium. In the western portion of the subbasin, near Tulare Lake bed, unconsolidated deposits consisting of flood-subbasin and lacustrine and marsh deposits interfinger with east side deposits.

> The continental deposits of Pliocene and Pleistocene age are divided into oxidized and reduced deposits based on depositional environment. The oxidized deposits, which crop out along the eastern margin of the valley, consist of deeply weathered, poorly permeable, reddish-brown sandy silt and clay with well-developed soil profiles. The reduced deposits are moderately permeable and consist of micaceous sand, silt, and clay that extend across the trough in the subsurface to the west side of the valley.
>
> Older alluvium, which overlies the continental deposits, is moderately to highly permeable and is the major aquifer in the subbasin. Younger alluvium consists of arkosic beds, moderately to highly permeable consisting of sand and silty sand. Flood-basin deposits consist of poorly permeable silt, clay, and fine sand. Ground water in the flood-basin deposits is often of poor quality. Lacustrine and marsh deposits consist of blue, green, or gray silty clay and fine sand and underlie the flood-subbasin deposits. Clay beds of the lacustrine and marsh deposits form aquitards that control the vertical and lateral movement of ground water. The most prominent clay bed is the Corcoran clay which underlies the western half of the Kaweah Subbasin at depths ranging from about 200 to 500 feet. In the eastern portion of the subbasin, ground water occurs under unconfined and semi-confined conditions. In the western half of the subbasin, where the Corcoran Clay is present, ground water is confined below the clay. (DWR 2004)

The project site is located within the GKGSA but will be governed under the MKGSA once it is annexed by the City. The MKGSA, shown in Figure 4, covers an area of approximately 104,320 acres in the central to southwestern side of the KGS. The GKGSA, also shown in Figure 4, covers an area of approximately 217,600 acres across the KGS. As defined under the SGMA, sustainable yield means “the maximum quantity of water, calculated over a base period representative of long-term conditions in a basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing undesirable results” (MKGSA 2019). The three GSAs within the KGS determined a subbasin-wide sustainable yield of 660,000 AFY, which was further apportioned among the GSAs in the Kaweah Subbasin Coordination Agreement (MKGSA 2019).

4.2.2 Department of Water Resources Basin Prioritization

Basin prioritization is a technical process that utilizes the best available data and information to classify California’s 515 groundwater basins into one of four categories high-, medium-, low-, or very low-priority. The technical process is based on eight components that are identified in CWC Section 10933(b). The KGS is designated as “high priority” by DWR (DWR 2019). This designation requires the preparation of a GSP under the SGMA (see Section 3.1, Sustainable Groundwater Management Act). The eight components that are used to determine basin priority include factors such as existing population and anticipated population growth; groundwater well density; agricultural demands; and the historical and current documented impacts to water levels and storage, groundwater quality, subsidence, or groundwater-dependent ecosystems. DWR defaulted to a high ranking for the KGS because it has been determined to be in a state of critical overdraft,[2] which means it gets a high priority ranking regardless of the scoring for other factors in the basin prioritization process (DWR 2019).

[2] A basin is subject to critical overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts. Overdraft occurs where the average annual amount of groundwater extraction exceeds the long-term average annual supply of water to the basin.

However, individual components of the priority determination where the KGS scored highly, as well as data on average water uses and well densities, are still useful for providing context against which to compare the project's proposed water demand. The main factors driving the designation in the KGS include irrigated acreage per square mile (5 out of 5 possible points), population growth (5 out of 5 possible points), and groundwater reliance (5 out of 5 possible points). Additional factors include documented impacts including declining groundwater levels and subsidence (4 out of 5 possible points) and total well density (4 out of 5 possible points). The average yearly groundwater use within the KGS is 2.62 AF/acre (DWR 2019).

4.2.3 City of Tulare Water Supply

Based on the City's 2020 UWMP Update as well as the City's 2009 Water System Master Plan, the City's current water system consists of the following (City of Tulare 2009, 2021a):

- **Source and Capacity:** Groundwater from the KGS is pumped from a network of about 24 wells widely distributed throughout the City with a total capacity of approximately 25,760 gallons per minute (gpm). These wells access the confined groundwater beneath the Corcoran Clay of the Tulare Lake Basin. The exact number and location of active wells may change as the City adapts to changing groundwater conditions and water quality constraints.
- **Distribution and Storage:** Groundwater from the City's wells are stored in a 125,000-gallon water storage tower, two 2-million-gallon concrete storage tanks, and one 1.5-million-gallon concrete storage tank, which are interconnected by at least 277 miles of water transmission and distribution mains.
- **Treatment:** Groundwater pumped from the KGS is treated as needed to potable standards using a combination of chlorine disinfection and additional treatment where needed. The City's groundwater source can have elevated arsenic and nitrate concentrations, as well as some wells with 1,2,3-tricholoropropane detections. There are at least seven well sites with granulated activated carbon treatment filters to address 1,2,3-tricholoropropane.

The City's annual groundwater production between 2001 and 2020 has varied from a low of 14,550 AF in 2001 to a high of 19,524 AF in 2013 (City of Tulare 2021a). Between 2013 and 2015, water use decreased sharply down to 15,351 AF despite a continued increase in population and stayed generally below 16,879 AF since then (City of Tulare 2021a). The volume of groundwater pumped by the City in year 2020 was 16,937 AF and projected to be 22,820 AF in 2040 (City of Tulare 2021a). The 2020 water use equates to an average day demand of approximately 10,500 gpm, and 2040 projected water use equates to approximately 14,150 gpm. The City's wellfield has a combined capacity of approximately 25,760 gpm, which is more than double the current average day demand and would be sufficient to serve the City's projected water demands (City of Tulare 2021a).

4.2.4 On-Site Well Inventory and Groundwater Levels

Although no on-site groundwater wells are mapped on the California State Water Resources Control Board's Groundwater Ambient Monitoring and Assessment Program, multiple domestic and irrigation supply groundwater wells were observed during the site reconnaissance (Dudek 2022). Two irrigation supply wells were observed approximately in the center of the subject property. Three domestic wells were observed during the site reconnaissance—two were located at the inhabited properties located at 12905 Avenue 228 and 12609 Avenue 228. The third domestic well appeared in a cleared paddock located on the western side of the subject property (Dudek 2022). The locations of these wells are shown on Figure 3.

A review of DWR's well completion database was completed to gather data on well counts and depths by township and range in all sections that intersect or border the project. The results are shown in Figure 5, Groundwater Monitoring Wells and Well Logs, and Table 2. The database reveals a number of wells on site and in the surrounding area, consisting of a mix of agricultural, municipal and domestic wells, with completion depths that average about 326 feet below ground surface (bgs), up to a maximum of 1,041 feet bgs (DWR 2022a). Where static water levels were noted, they ranged from 26 feet bgs to 194 feet bgs, with an average of 136 feet bgs (DWR 2022a). Where well yields were estimated, they varied from a low of 30 gpm to a high of 1,200 gpm, with an average of 204 gpm (DWR 2022a). Well yield is dependent on well construction and pump capacity so well yields were typically lowest for domestic wells and highest for municipal and agricultural wells. It should be noted that the records shown in Table 2 are a minimum, since some wells may not have an associated well completion report, depending on a variety of factors such as when and for what purpose they were drilled, who the driller was, database/transcription errors, among others. Lithological logs of the wells generally indicate thick sequences of sand and gravel interbedded with silts and clays.

There was only one well completion report for wells within the project site, which consisted of one 270-foot deep domestic well with an 8-inch diameter steel casing drilled in 1993. The well is screened between 220 and 260 feet bgs and likely supplies water for one of the existing on-site residences (Parcel No. 184-050-10). The domestic well record indicates it is screened outside of the Corcoran Clay layer, but there is no information on static water level, yield, or pump tests. This well log is included in Appendix A for reference.

Table 2. Well Completion Report Data in the Vicinity of the Project Site

PLSS Section	No. of Records	Average	Minimum	Maximum
Completion Depths (feet bgs)				
T20S/R25E Sec. 7	17	310	110	576
T20S/R25E Sec. 8	16	345	170	450
T20S/R25E Sec. 9	26	324	44	800
T20S/R25E Sec. 10	17	325	25	460
All Sections	**76**	**326**	**25**	**800**
Static Water Levels (feet bgs)				
T20S/R25E Sec. 7	9	123	93	167
T20S/R25E Sec. 8	6	171	140	194
T20S/R25E Sec. 9	13	119	36	170
T20S/R25E Sec. 10	14	146	89	180
All Sections	**42**	**136**	**36**	**194**
Well Yields (gpm)				
T20S/R25E Sec. 7	8	129	30	400
T20S/R25E Sec. 8	6	115	60	250
T20S/R25E Sec. 9	8	446	65	1,200
T20S/R25E Sec. 10	14	146	60	400
All Sections	**36**	**204**	**30**	**1,200**

Source: DWR 2022a.
Notes: PLSS = Public Land Survey System; bgs = below ground surface; gpm = gallons per minute.

In addition to records of well completion reports, groundwater level monitoring wells in the vicinity of the project site were reviewed for information on depth to first groundwater, and hydrographs that show trends over time were examined (DWR 2022b). As shown in Figure 5, there are numerous groundwater monitoring wells in the vicinity of the project site, seven of which have sufficient groundwater level data available to establish trends, even if some only span a few years in time (DWR 2022b). Hydrographs of relevant monitoring wells are presented in Appendix B. The hydrographs indicate that groundwater levels in the broader vicinity of the project currently range between 160 and 200 feet bgs, with the direction of groundwater flow being generally towards the west and northwest (DWR 2022b). For all hydrographs examined, the overall trend is of long-term decline, though the rates and severity of the measured decline varies by location.

These local groundwater monitoring wells are consistent with the overall KGS finding that the continued pumping of groundwater has resulted in an overdraft, that is, more water has been pumped from the basin than has been recharged into the basin on a long-term basis (DWR 2019). Even though over 3 million AF of surface water has been imported into the KGS over the past 30 years in an effort to supplement local surface water supply and reduce dependence on groundwater, the average depth to groundwater within the KGS has continued to drop (DWR 2019).

4.2.5 Groundwater Quality

Available water quality data from the Groundwater Ambient Monitoring and Assessment database was reviewed for municipal groundwater wells on adjoining properties, one to the south and one to the east. Consistent detections of nitrate and 1,2,3-tricholoropropane were reported above State Water Resources Control Board maximum contaminant levels and action levels respectively, for both groundwater wells (Dudek 2022). Due to the proximity of these wells to both the south and east, it is possible these constituents could be present in any groundwater accessed at the subject property. While nitrate is not considered a hazardous material, water quality could be impacted. 1,2,3-Tricholoropropane is a hazardous material as defined by the U.S. Environmental Protection Agency; therefore, the potential for these constituents above screening levels in groundwater beneath the site would need to be addressed as part of the planned development.

The following is an excerpt from the City's 2020 UWMP Update regarding groundwater quality (City of Tulare 2021a):

> The quality of water obtained from a surface water or groundwater source can be a limiting factor on the amount of water that can be obtained from that source. […] The City's current groundwater supply is capable of reliably meeting City demands and water quality standards. The City does have concerns with regards to certain wells showing elevated arsenic and nitrate concentrations. Additionally, certain City wells have shown evidence of contamination 1,2,3-Tricholoropropane (TCP). In 2021, the City completed the final phase of a wellhead treatment project that installed Granular Activated Carbon systems at 7 of the contaminated wells. Given the mitigation efforts the City is taking, at present the City does not foresee a quality related constraint on water supply. In the future, the City will continue to take the steps necessary to comply with all existing and future groundwater quality regulations to continue to provide reliable water service to its residents.

Although groundwater quality issues can constrain water supplies, the City's UWMP provides sufficient evidence that it is adequately managing this issue by installing treatment systems at wellheads with elevated contaminant concentrations (City of Tulare 2021a). In accordance with State regulations, the City will continue to be required to release consumer confidence reports on a yearly basis demonstrating that the water it delivers continues to meet applicable water quality standards.

4.3 Imported/Reclaimed Water

There are no sources of imported/reclaimed water that would be available to the project. Imported surface water is used to recharge the underlying groundwater basin, and all treated effluent from the City's wastewater treatment plant is discharged to evaporation/percolation ponds or to farmland for irrigation of crops. The City's wastewater is considered un-disinfected secondary-treated water and does not meet California Code of Regulations Title 22 requirements for disinfected secondary- or tertiary-treated water. While these aid in recharging the underlying groundwater basin, 100% of the project's water supply would be from groundwater pumped either on site or from the City's wellfield.

5 Water Demand and Supply Comparison

As discussed in Section 4.2, Groundwater, the KGS is in critical overdraft; however, the basin is unadjudicated and does not have legal limitations on groundwater pumping. However, in recognition of the overdraft condition, the City has committed to achieving sustainability through continued intentional recharge and other efforts noted in the GSPs for the KGS (MKGSA 2019; GKGSA 2020). Although the City relies 100% on groundwater to supply its customers, it has an agreement with Tulare Irrigation District to receive surface water that it uses for intentional groundwater recharge. Additionally, the City treats and uses its wastewater effluent for either percolation or agriculture uses. Between the surface water and wastewater effluent, the City is replenishing the aquifer to offset its groundwater extractions. Finally, the City is also working cooperatively with the MKGSA and the Tulare Irrigation District to implement additional projects and management actions identified in the GSP to offset the City's groundwater pumping impacts (City of Tulare 2021a; MKGSA 2019).

Table 3 shows the City's current and projected water use by type in 5-year increments through 2040. This projection is based on a continuation of current population growth trends as well as consideration of the urban development boundary that includes the project site. Because the project is anticipated to be constructed in phases over the course of 9 to 10 years, the project's estimated water demand would incrementally increase to the full buildout demand of 629 AFY sometime in the early 2030s. Although the City's UWMP does not consider individual Master Plans in its method of analyses, population growth is a reasonable proxy. Given much of the City limits are already built out, much of the projected population growth would occur within the urban development boundary. As shown in Table 3, the projected increase in supply by 2030 from the actual (measured) water use in 2020 is 2,768 AFY, which is more than sufficient to accommodate the expected water demand of the project as well as the overall anticipated growth within the service area.

The Urban Water Management Planning Act also requires consideration of multiple-dry-year scenarios in water supply planning. For a water purveyor that relies entirely on groundwater, the available water supply for the City is not affected as much by drought as would be if it had a significant portion of its portfolio as surface water. Table 4 shows the multiple-dry-year supply and demand comparison in the 2020 UMWP Update, which indicates the groundwater supply would be unaffected (the overall amount in storage, even if decreasing, would continue to be available, and pumping capacities are not expected to substantially decrease). Since the City only pumps the amount necessary to serve its customers, there is no difference between supply and demand in any case. However, recognizing the increased pressure on the KGS and the increased need to conserve during droughts, the City has developed a Water Shortage Contingency Plan, and it will be implemented as needed (City of Tulare 2021b).

Table 3. Current and Projected Water Use (City of Tulare)

Use Type	2020 Actual Water Use (AF)	Projected Water Use (AF)			
		2025	2030	2035	2040
Single Family	7,921	8,565	8,378	9,016	9,701
Multi-Family	1,037	1,123	1,099	1,182	1,271
Commercial	2,526	3,008	3,238	3,483	3,747
Industrial	3,861	4,600	4,950	5,328	5,733
Landscape	761	905	973	1,046	1,126
Losses	835	994	1,071	1,154	1,240

Table 3. Current and Projected Water Use (City of Tulare)

Use Type	2020 Actual Water Use (AF)	Projected Water Use (AF)			
		2025	2030	2035	2040
Total	**16,937**	**19,196**	**19,705**	**21,206**	**22,820**

Source: City of Tulare 2021a.
Notes: AF = acre-feet; 1 acre-foot = 325,851 gallons.

Table 4. Multiple-Dry-Year Supply and Demand Comparison (City of Tulare)

Condition		2025	2030	2035	2040
First Year	Supply Total	19,196	19,705	21,206	22,820
	Demand Total	19,196	19,705	21,206	22,820
	Difference	0	0	0	0
Second Year	Supply Total	19,196	19,705	21,206	22,820
	Demand Total	19,196	19,705	21,206	22,820
	Difference	0	0	0	0
Third Year	Supply Total	19,196	19,705	21,206	22,820
	Demand Total	19,196	19,705	21,206	22,820
	Difference	0	0	0	0
Fourth Year	Supply Total	19,196	19,705	21,206	22,820
	Demand Total	19,196	19,705	21,206	22,820
	Difference	0	0	0	0
Fifth Year	Supply Total	19,196	19,705	21,206	22,820
	Demand Total	19,196	19,705	21,206	22,820
	Difference	0	0	0	0

Source: City of Tulare 2021a.
Notes: Units in acre-feet; 1 acre-foot = 325,851 gallons.

The City engages in a variety of strategies to ensure that adequate water resources are available throughout normal, dry, and multiple dry years. These strategies include a water conservation staging ordinance, which establishes five progressively more restrictive stages of water conservation to be implemented during dry and consecutive-dry years. The City also utilizes conjunctive use techniques, which involve diverting excess surface water for groundwater recharge during wet years so that it will be available during dry years. The project is planned to be consistent with the 2020 UWMP, which demonstrates adequate water supply to serve development in the City. Additionally, Tulare General Plan Policy LU-P11.3 requires all new development to be responsible for expansion of existing facilities, such as water systems, made necessary to serve the new development. The use of these strategies greatly improves the City's control over water supply and demand, which provides water supply flexibility and significantly reduces the City's vulnerability in the event of dry and multiple dry years.

Although the outcomes of SGMA-related projects and management actions, including the possible eventual implementation of an allocation plan, remain uncertain, the project has a beneficial impact with respect to groundwater resources within the KGS because it reduced overall water use compared to existing conditions.

6 Conclusion

Based on a review of available water supplies, groundwater conditions, and sustainability goals and objectives, this WSA has concluded the following:

- The project has enough water, through the City (for municipal/potable supply) and use of on-site groundwater (for landscape/central park irrigation), to support both the construction and operations and maintenance demands of the project over the next 20 years, even in multiple-dry-year conditions. Because the City's 2020 UWMP Update accounts for the project demand, this conclusion holds even when considering existing and planned future uses of the identified water supplies.
- The project does not conflict with the applicable goals and sustainability criteria identified in the GSP prepared by MKGSA (2019) because it would decrease water use compared to existing conditions. As part of GSP implementation, the City will be monitoring groundwater levels as a member of the MKGSA and will take corrective action if minimum thresholds are exceeded.

For the purposes of CEQA, this WSA supports less than significant conclusions regarding water supply availability and impacts to groundwater resources.

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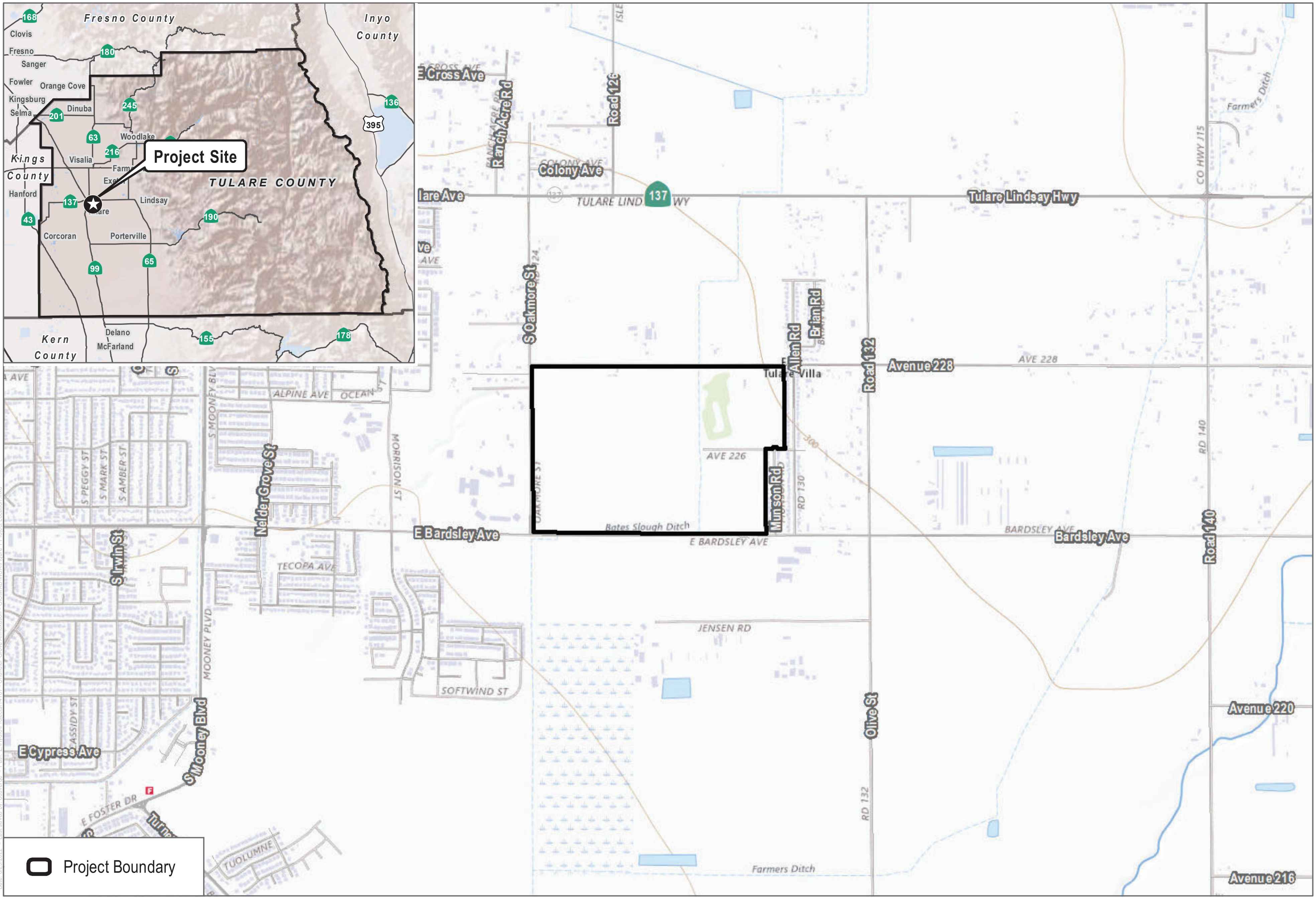

SOURCE: USGS 7.5-Minute Series Tulare Quadrangle

DUDEK

0 1,000 2,000 Feet

FIGURE 1

Project Location Map

Chandler Grove Master Plan and Annexation Project

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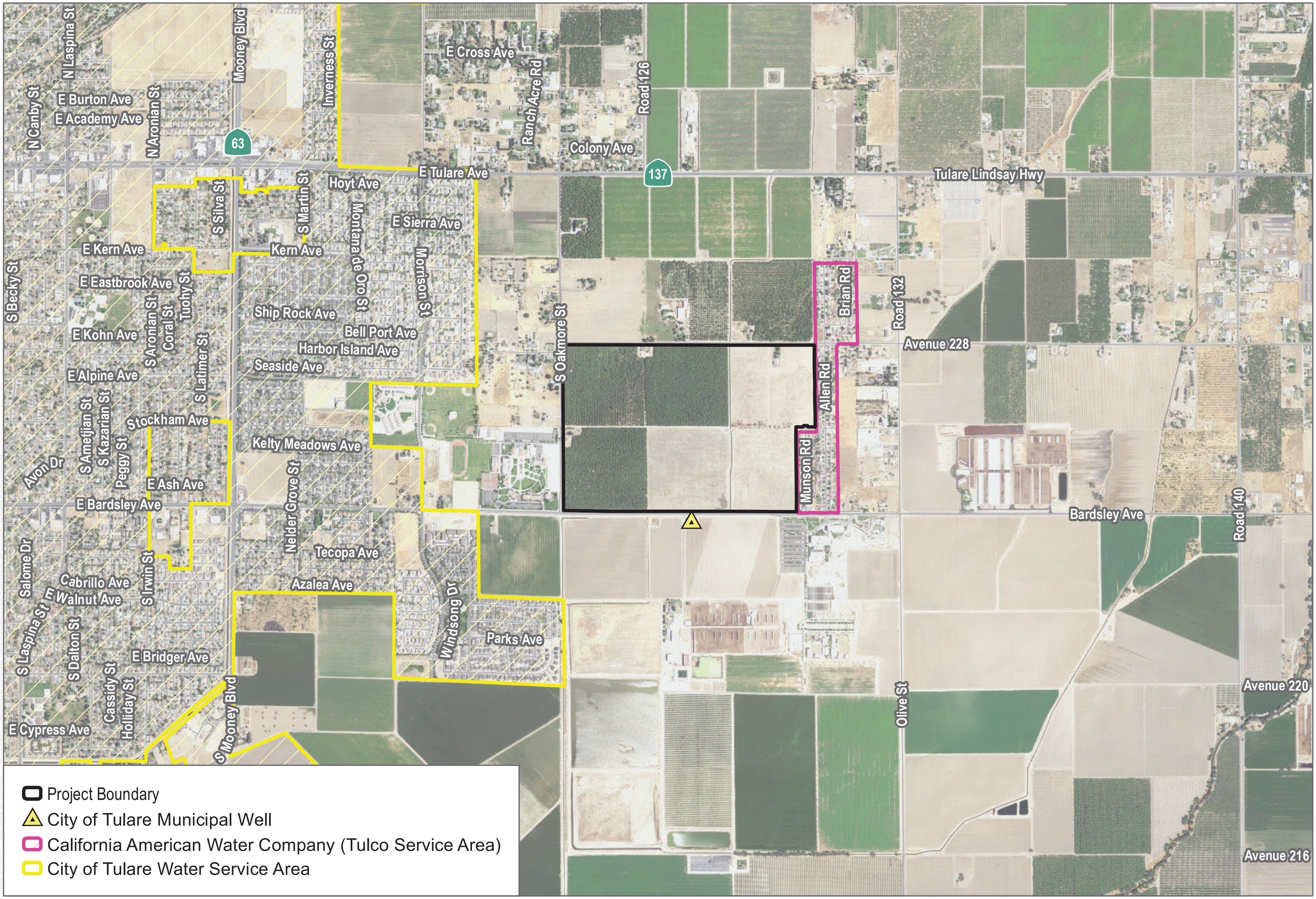

SOURCE: NAIP 2020

DUDEK

0 0.5 1 Miles

FIGURE 2

Water Agencies and Districts

Chandler Grove Master Plan and Annexation Project

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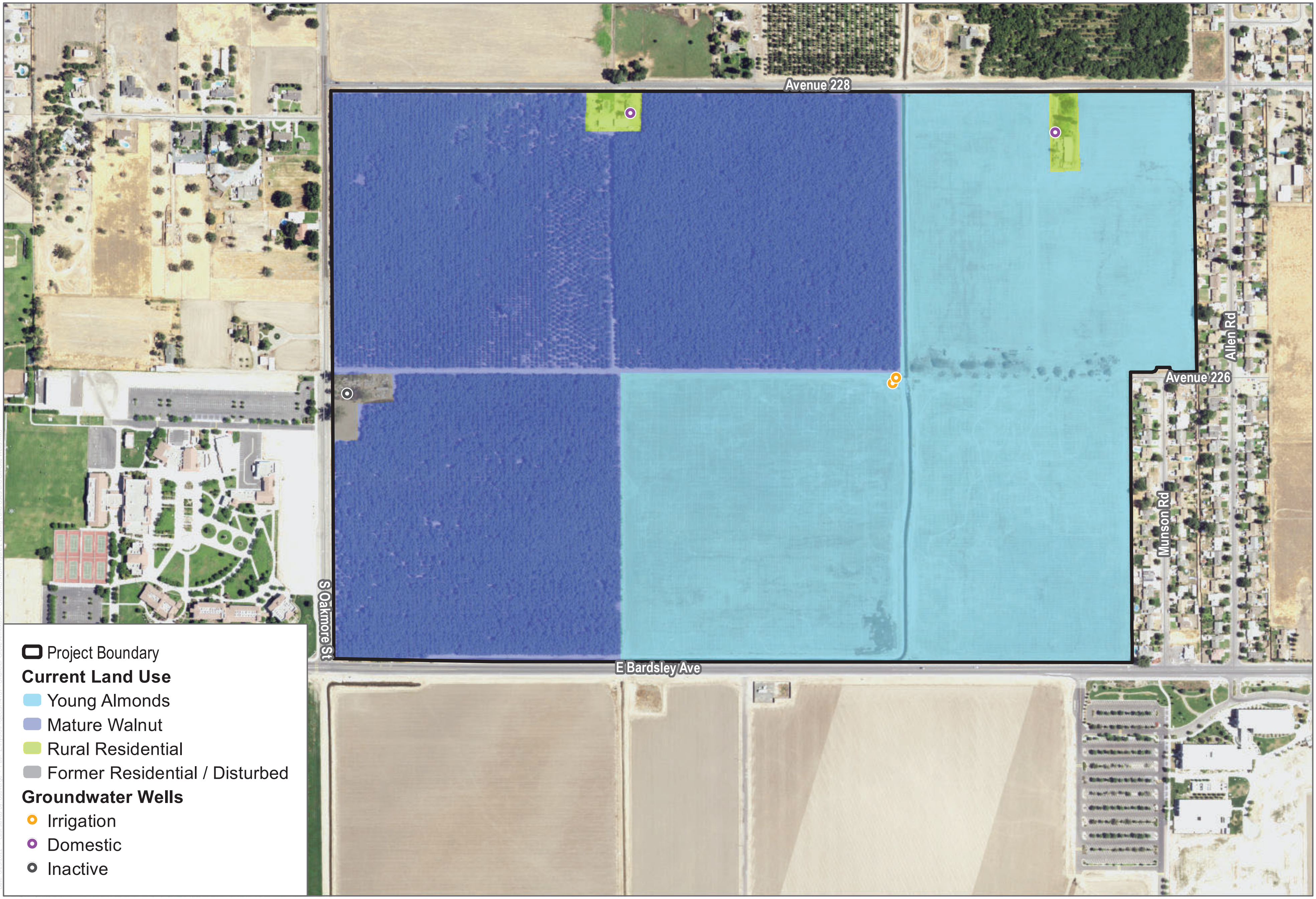

SOURCE: NAIP 2020

DUDEK

0 250 500 Feet

FIGURE 3

Existing Land Uses and On-Site Wells

Chandler Grove Master Plan and Annexation Project

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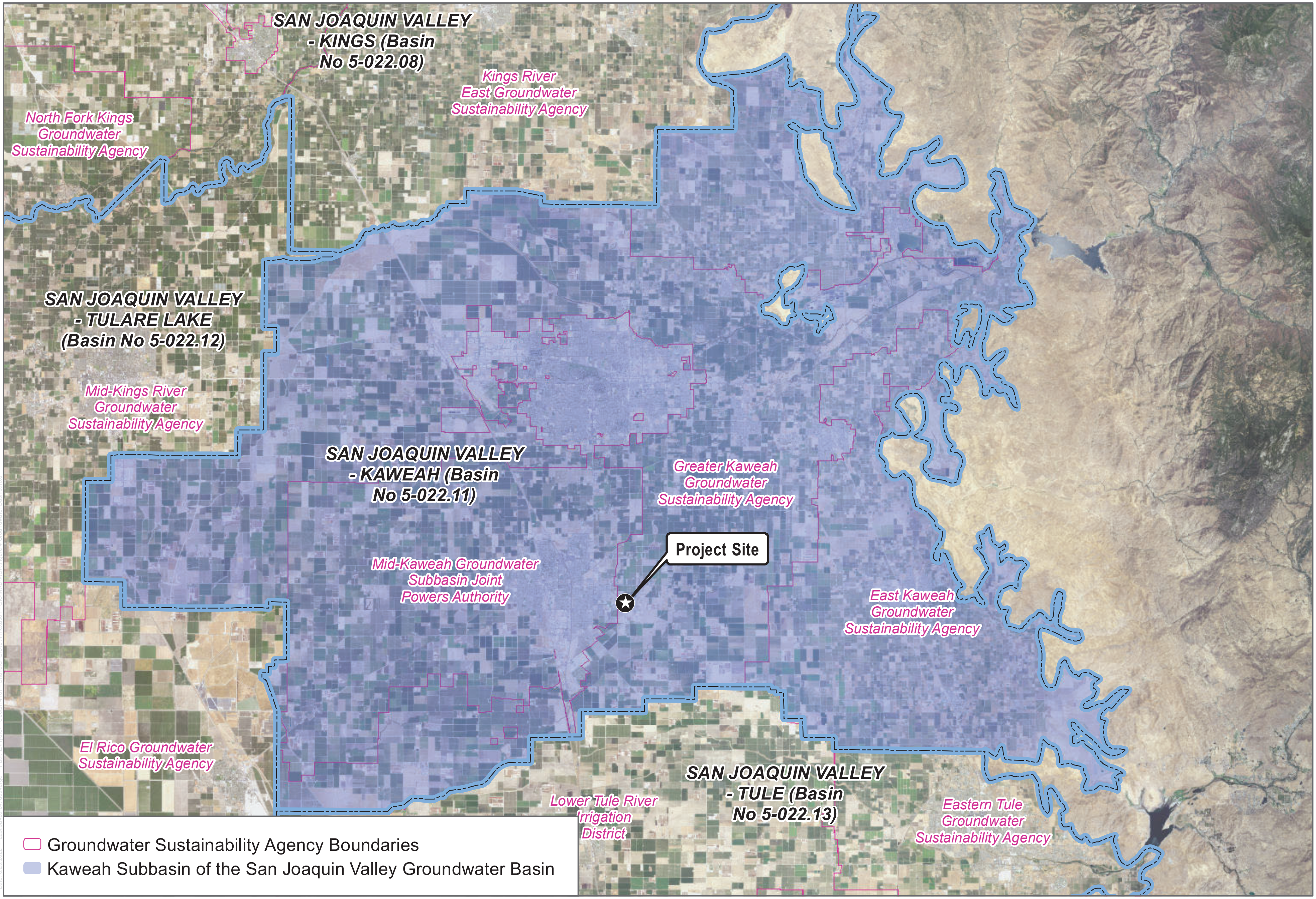

SOURCE: NAIP 2020

DUDEK

FIGURE 4

Groundwater Basins and Groundwater Sustainability Agencies

Chandler Grove Master Plan and Annexation Project

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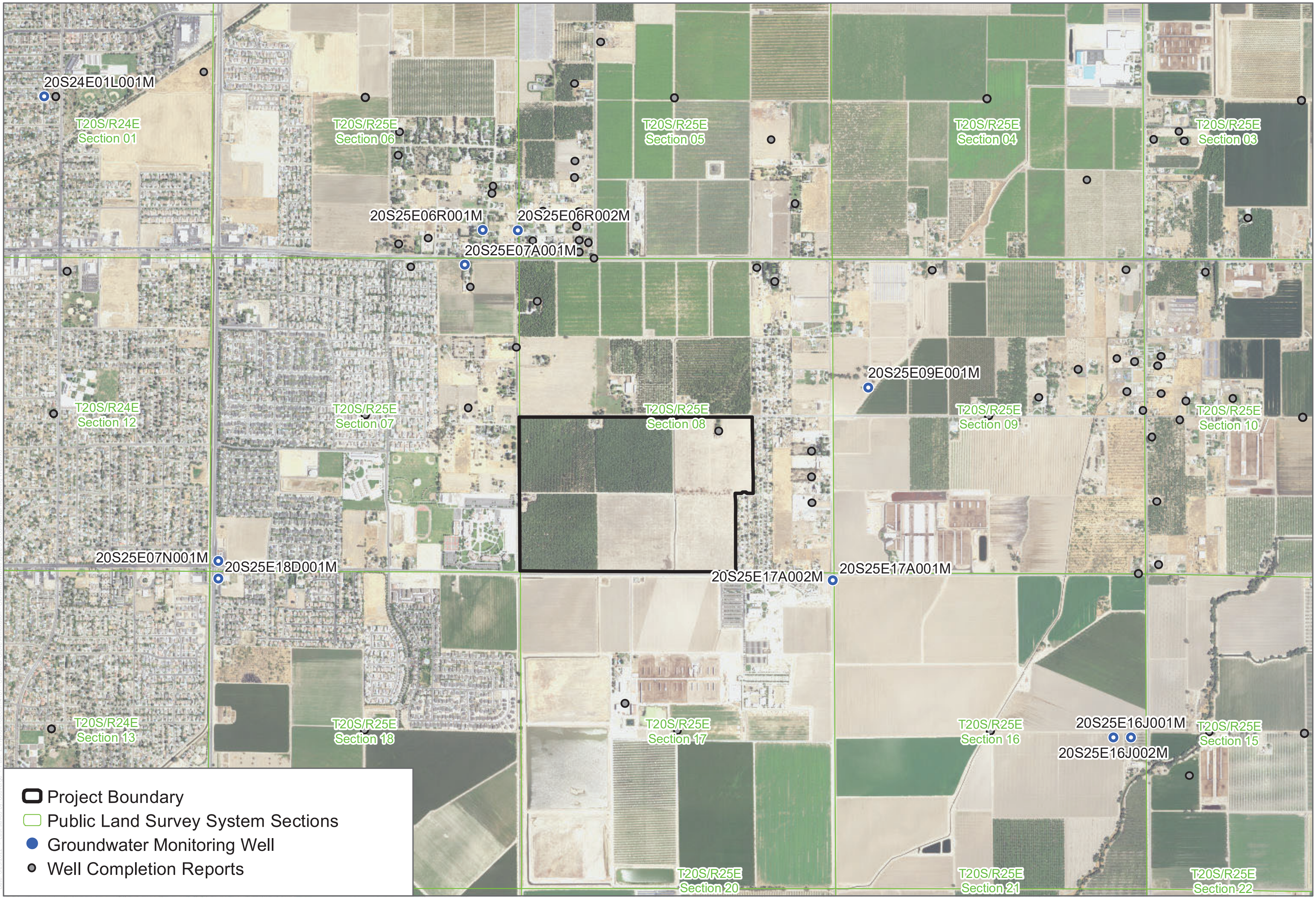

SOURCE: NAIP 2020

DUDEK

0 0.5 1 Miles

FIGURE 5

Groundwater Monitoring Wells and Well Logs

Chandler Grove Master Plan and Annexation Project

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Appendix A

On-Site Well Completion Reports

ORIGINAL
File with DWR 20/25-8

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 457627

Page ___ of ___
Owner's Well No. ___
Date Work Began 6-8-93, Ended 6-8-93
Local Permit Agency Tulare
Permit No. 96320 Permit Date 6-7-93

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION (Describe material, grain size, color, etc.)
0	4	Top Soil
4	7	Hard Pan
7	17	clay
17	40	sand
40	42	clay
42	48	sand
48	71	clay
71	74	sand
74	81	clay
81	86	sand
86	108	clay/hard pan
108	118	sand/gravel
118	125	clay
125	130	sand
130	139	clay
139	146	sand
146	170	clay
170	174	sand
174	178	clay
178	182	sand/fine
182	197	clay
197	207	sand
207	213	clay
213	262	sand/gravel
262	270	clay

OUTSIDE CORC. CLAY AREA

TOTAL DEPTH OF BORING 270 (Feet)
TOTAL DEPTH OF COMPLETED WELL 270 (Feet)

WELL OWNER

Name
Mailing
CITY STATE ZIP

WELL LOCATION

Address 12905 Ave 228
City Tulare
County Tulare
APN Book Echoe Page 53 Parcel 184-050-10
Township 20S Range 25E Section 8
Latitude ___ NORTH (DEG. MIN. SEC.) Longitude ___ WEST (DEG. MIN. SEC.)

LOCATION SKETCH

NORTH / WEST / EAST / SOUTH

Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc.
PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USE(S) (✓)

___ MONITORING
WATER SUPPLY
X Domestic
___ Public
___ Irrigation
___ Industrial
___ "TEST WELL"
___ CATHODIC PROTECTION
___ OTHER (Specify)

DRILLING METHOD Reverse FLUID Natural

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL ___ (Ft.) & DATE MEASURED ___
ESTIMATED YIELD* ___ (GPM) & TEST TYPE ___
TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
** May not be representative of a well's long-term yield.*

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	220	21	X				steel	8.281	.156	
220	260	21		X			slot	8.281	.156	.070
260	270	21	X				steel	8.281	.156	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	20	X			
20	200				5/16x16
200	213		X		Bentonite plug
213	270				5/16x16

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Grabow Well Drilling, Inc.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

12522 9th Ave. Hanford, CA 93230
ADDRESS CITY STATE ZIP

Signed Dean E. Grabow
WELL DRILLER/AUTHORIZED REPRESENTATIVE

6-11-93 DATE SIGNED
288489 C-57 LICENSE NUMBER

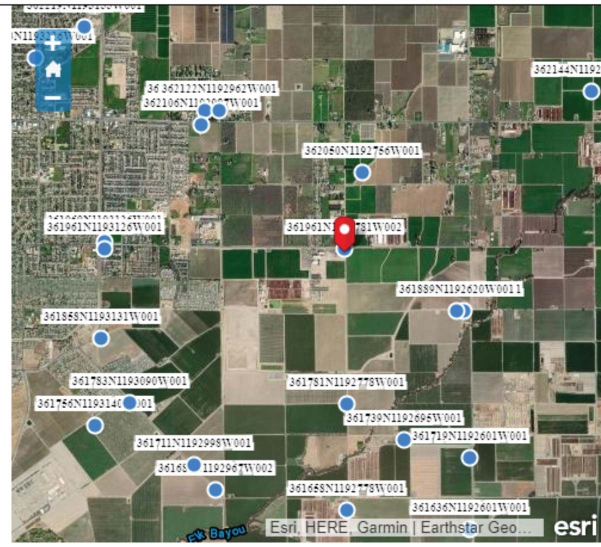
DWR 188 REV 7-90

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Appendix B
Local Groundwater Hydrographs

Site Code: 361961N1192781W001 **State Well Number:** 20S25E17A001M

Site Code: 361961N1192781W001
Local Well Name:
State Well Number: 20S25E17A001M
Station ID: 19044
WCR Number:
Latitude: 36.1961
Longitude: -119.2781
Station Organization ID:
Station Organization Name:
Well Location Description:
Well Use Type: Unknown
Well Completion Type: Unknown
Well Depth (feet bgs):
Top Perforation (feet bgs):
Bottom Perforation (feet bgs):
Ground Surface Elevation: 298.71
Reference Point Elevation: 298.91
Reference Point Description: None Provided
Station Comments:

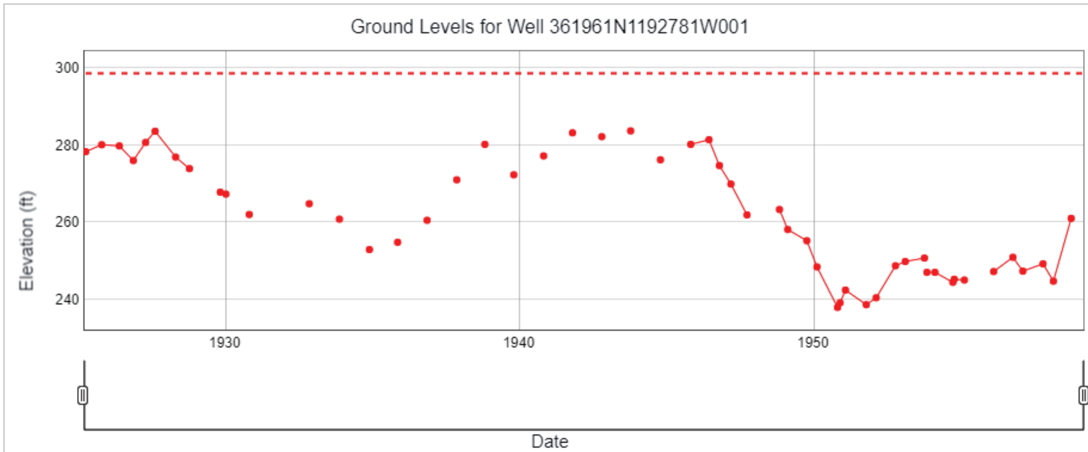


Water Level

Water Year Type

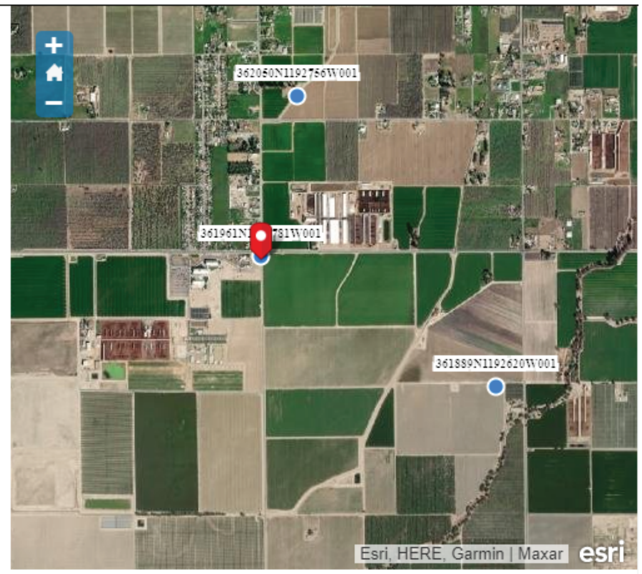
Date: (hover to see values)

- - GSE — WSE 361961N1192781W001 : 0



Site Code: 361961N1192781W002 **State Well Number:** 20S25E17A002M

Site Code: 361961N1192781W002
Local Well Name:
State Well Number: 20S25E17A002M
Station ID: 35128
WCR Number:
Latitude: 36.1961
Longitude: -119.2781
Station Organization ID:
Station Organization Name:
Well Location Description:
Well Use Type: Unknown
Well Completion Type: Unknown
Well Depth (feet bgs):
Top Perforation (feet bgs):
Bottom Perforation (feet bgs):
Ground Surface Elevation: 298.71
Reference Point Elevation: 300.71
Reference Point Description: None Provided
Station Comments:

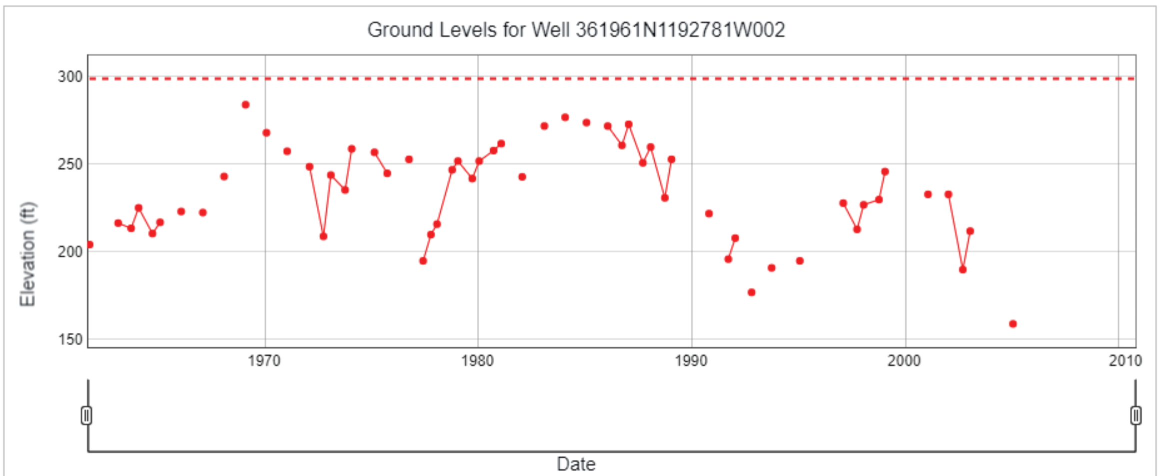


Water Level

Water Year Type

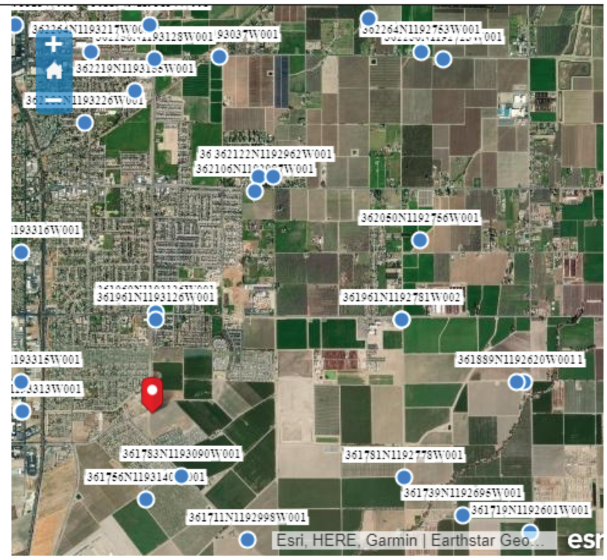
Date: (hover to see values)

- - GSE   — WSE 361961N1192781W002 : 0



Site Code: 361858N1193131W001 **State Well Number:** 20S25E18M001M **Local Well Name:** 20S25E18M001M

Site Code: 361858N1193131W001
Local Well Name: 20S25E18M001M
State Well Number: 20S25E18M001M
Station ID: 35299
WCR Number:
Latitude: 36.1858
Longitude: -119.3131
Station Organization ID:
Station Organization Name:
Well Location Description:
Well Use Type: Unknown
Well Completion Type: Single Well
Well Depth (feet bgs):
Top Perforation (feet bgs):
Bottom Perforation (feet bgs):
Ground Surface Elevation: 284.71
Reference Point Elevation: 285.71
Reference Point Description: None Provided
Station Comments:

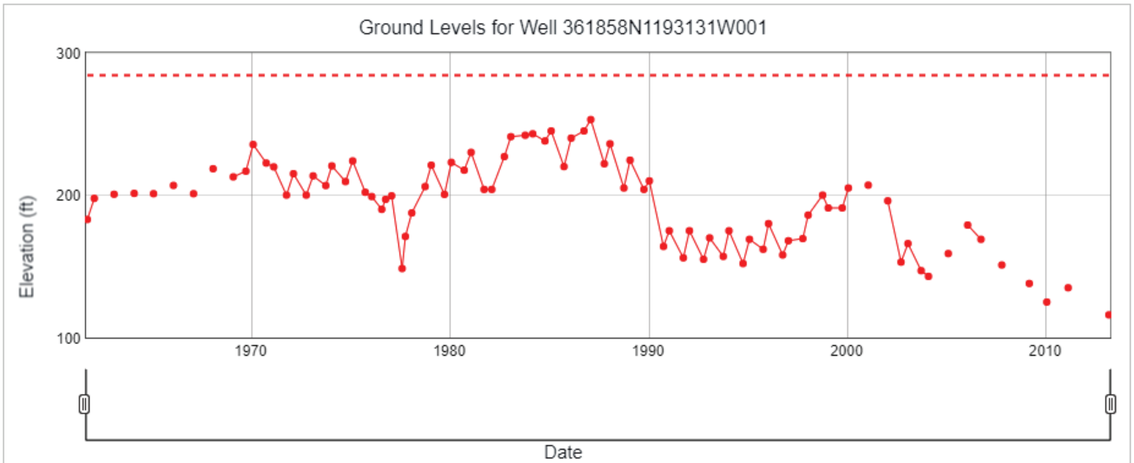


Water Level

Water Year Type

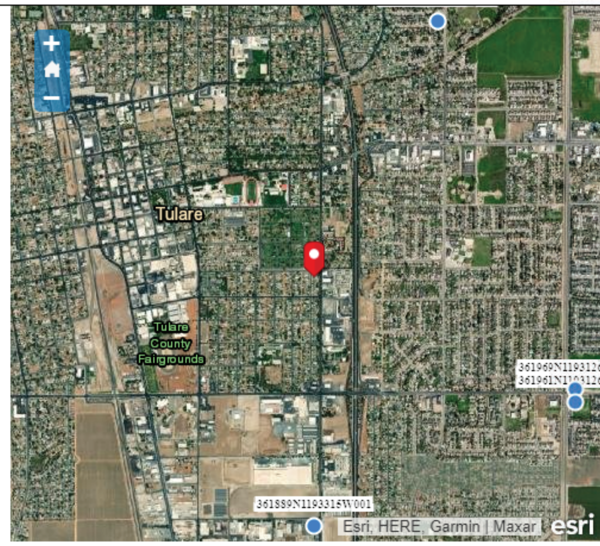
Date: (hover to see values)

- - GSE — WSE 361858N1193131W001 : 0



Site Code: 362036N1193316W001 **State Well Number:** 20S24E11J002M **Local Well Name:** KSB-1695

Site Code: 362036N1193316W001
Local Well Name: KSB-1695
State Well Number: 20S24E11J002M
Station ID: 54645
WCR Number:
Latitude: 36.20363
Longitude: -119.33155
Station Organization ID:
Station Organization Name:
Well Location Description:
Well Use Type: Unknown
Well Completion Type: Single Well
Well Depth (feet bgs): 774
Top Perforation (feet bgs): 348
Bottom Perforation (feet bgs): 756
Ground Surface Elevation: 288
Reference Point Elevation: 288
Reference Point Description: Ground
Station Comments:

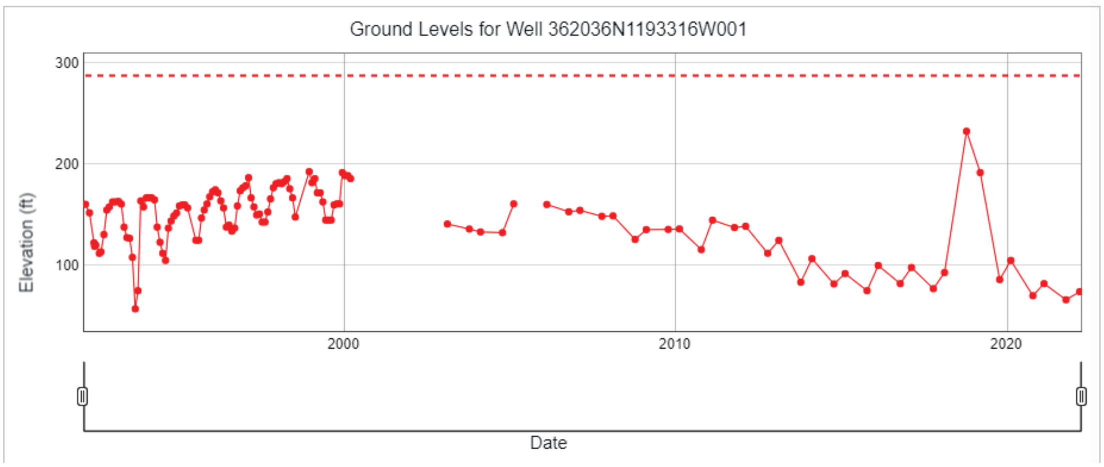


Water Level

Water Year Type

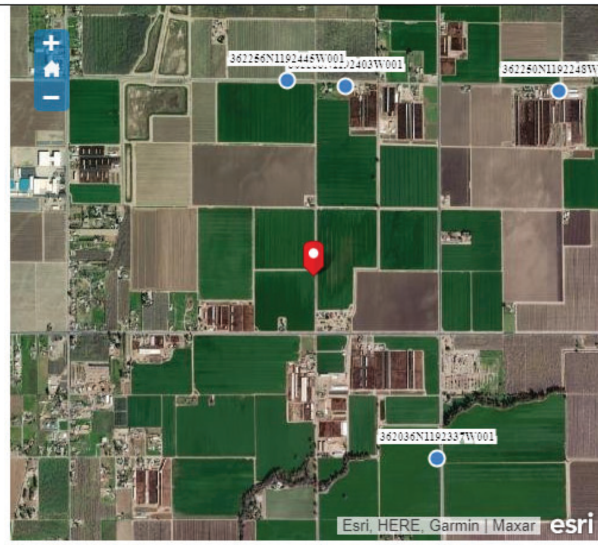
Date: (hover to see values)

- - GSE — WSE 362036N1193316W001 : 348.0 - 756.0



Site Code: 362144N1192426W001 **State Well Number:** 20S25E03R001M **Local Well Name:** KSB-2095

Site Code: 362144N1192426W001
Local Well Name: KSB-2095
State Well Number: 20S25E03R001M
Station ID: 35015
WCR Number:
Latitude: 36.2144
Longitude: -119.2426
Station Organization ID:
Station Organization Name:
Well Location Description:
Well Use Type: Unknown
Well Completion Type: Single Well
Well Depth (feet bgs):
Top Perforation (feet bgs):
Bottom Perforation (feet bgs):
Ground Surface Elevation: 307.5
Reference Point Elevation: 309
Reference Point Description: None Provided
Station Comments:

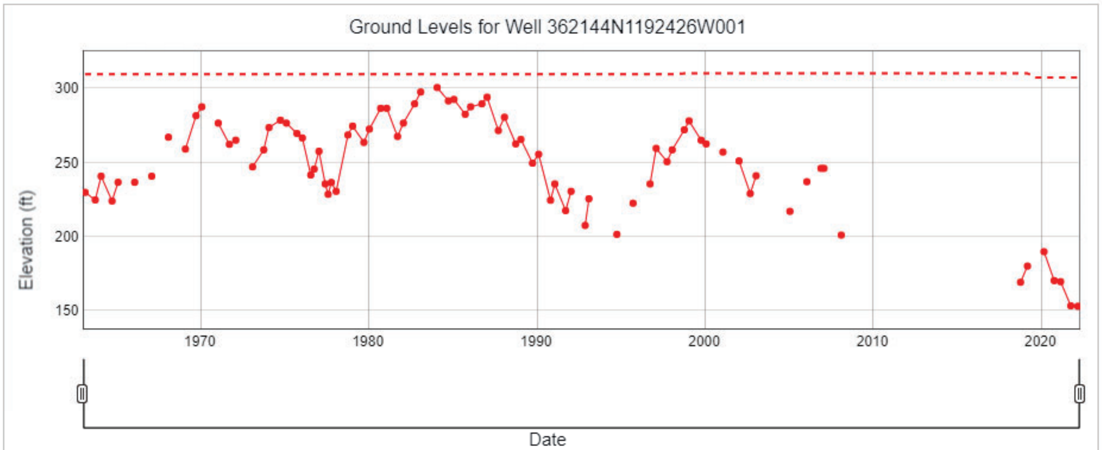


Water Level

☐ Water Year Type

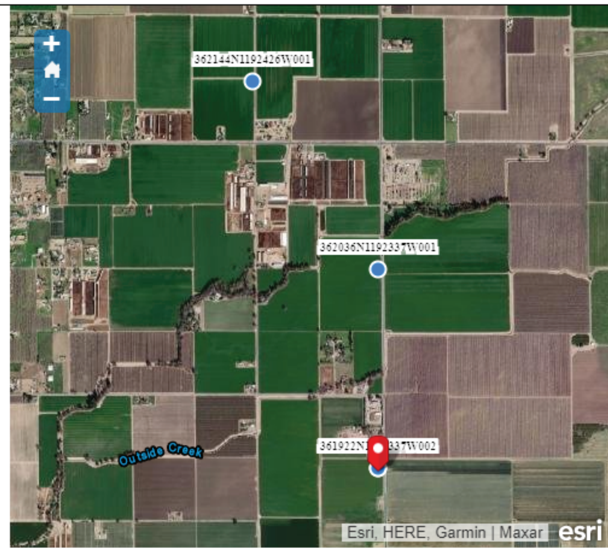
Date: (hover to see values)

☑ - - GSE ☑ — WSE 362144N1192426W001 : 0



Site Code: 361922N1192337W003 **State Well Number:** 20S25E14F004M **Local Well Name:** KSB-2114

Site Code: 361922N1192337W003
Local Well Name: KSB-2114
State Well Number: 20S25E14F004M
Station ID: 35126
WCR Number:
Latitude: 36.1922
Longitude: -119.2337
Station Organization ID:
Station Organization Name:
Well Location Description:
Well Use Type: Unknown
Well Completion Type: Single Well
Well Depth (feet bgs):
Top Perforation (feet bgs):
Bottom Perforation (feet bgs):
Ground Surface Elevation: 304
Reference Point Elevation: 304.5
Reference Point Description: None Provided
Station Comments:

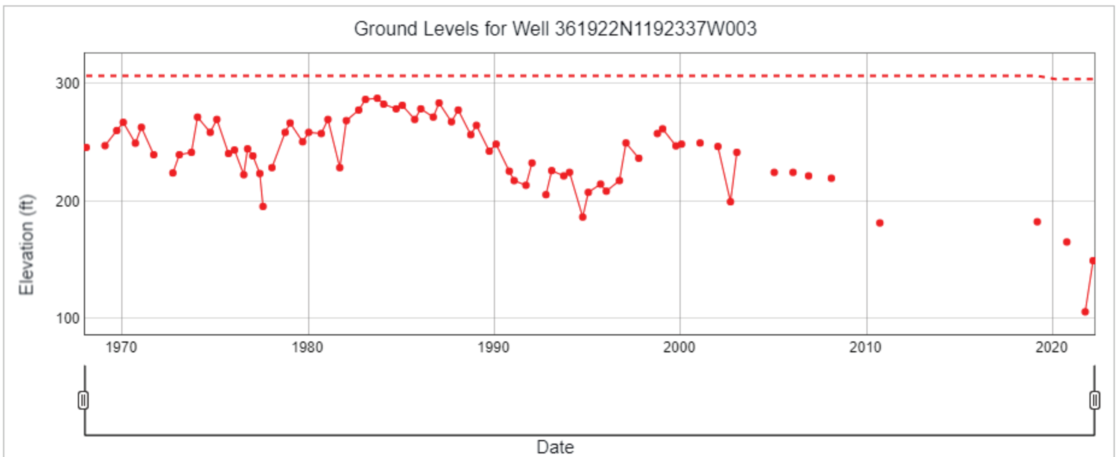


Water Level

Water Year Type

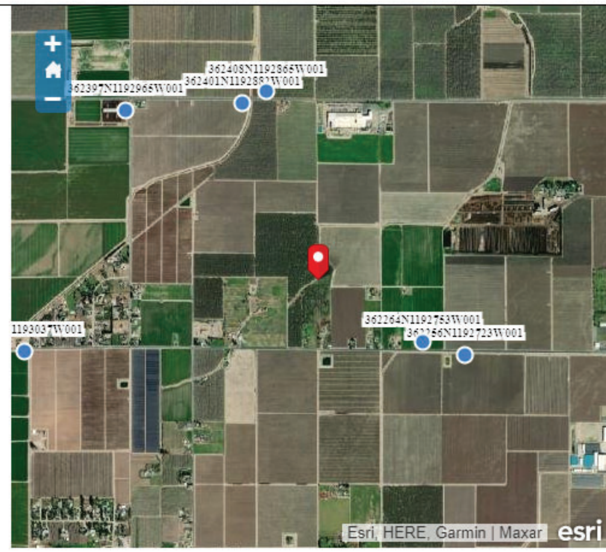
Date: (hover to see values)

- - GSE — WSE 361922N1192337W003 : 0



Site Code: 362301N1192828W001 **State Well Number:** 19S25E32J001M **Local Well Name:** KSB-1937

Site Code: 362301N1192828W001
Local Well Name: KSB-1937
State Well Number: 19S25E32J001M
Station ID: 47907
WCR Number: e036232
Latitude: 36.23011
Longitude: -119.28278
Station Organization ID: 5155
Station Organization Name: Kaweah Delta Water Conservation District
Well Location Description:
Well Use Type: Observation
Well Completion Type: Single Well
Well Depth (feet bgs): 115
Top Perforation (feet bgs): 85
Bottom Perforation (feet bgs): 115
Ground Surface Elevation: 312.7
Reference Point Elevation: 312.7
Reference Point Description: Monitoring Well Cover
Station Comments:



Water Level

Water Year Type

Date: (hover to see values)

- - GSE — WSE 362301N1192828W001 : 85.0 - 115.0