APPENDIX F

Friant-Kern Canal Middle Reach Capacity Correction Project

Biological Resources Assessment

BUREAU OF RECLAMATION

Friant WATER AUTHORITY

Bureau of Reclamation
Interior Region 10 California-Great Basin
California*, Nevada*, Oregon*
***Partial**

May 2020

Stantec

Friant-Kern Canal Middle Reach Capacity Correction Project

Biological Resources Assessment

March 27, 2020

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Executive Summary

On behalf of Friant Water Authority, Stantec Consulting Services Inc. (Stantec) prepared this biological resources assessment report to do the following: (1) document special-status species and other sensitive biological resources that may occur in or near the Friant-Kern Canal (FKC) Middle Reach Capacity Correction Project (Project) area; (2) provide an assessment of the potential for the Project to adversely impact sensitive biological resources; and (3) identify mitigation measures (MMs) to avoid or reduce the potential for Project-related impacts. The biological resources assessment is based on information gathered from a review of desktop resources, including published literature, data, and maps, and from biological field surveys conducted by Stantec biologists.

The study area for the biological resources assessment includes the section of the FKC beginning at Avenue 208 just north of the community of Strathmore in Tulare County, stretching approximately 33 miles south-southwest to Lake Woollomes, approximately 0.5 mile north of Pond Road to the southeast of the city of Delano in Kern County. The study area includes all project components and potential staging areas and areas of ground disturbance for both the Canal Enlargement Alternative (CE Alternative) and Canal Enlargement and Realignment Alternative (CER Alternative).

The natural habitat communities present within the study area include non-native annual grassland, California buckwheat scrub, allscale saltbush scrub, Fremont cottonwood forest, mulefat thickets, red willow thickets, shining willow groves, smartweed-cocklebur patches, and valley oak woodland. Managed plant crops within the study area include irrigated row crops, vineyards, orchards, and herbaceous field crops. Other land designations in the study area include urban, ruderal, and barren.

Valley oak woodland, red willow thickets, shining willow groves, and Fremont cottonwood forest are considered sensitive natural communities. Other natural communities of concern in the study area include wetlands and other aquatic habitats. Aquatic habitats in the study area include Friant-Kern Canal, intermittent stream (Porter Slough, Tule River, Deer Creek, White River), pond, fresh emergent wetland, riparian wetland, seasonal wetland, irrigation canal, irrigation ditches, and groundwater recharge basins.

Based on the desktop review and biological field surveys, the study area does not provide suitable habitat for any federal- or state-listed plants, but does provide suitable habitat for 10 other special-status plant species. These species include Earlimart orache (*Atriplex cordulata* var. *erecticaulis*), Lost Hills crownscale (*Atriplex coronata* var. *vallicola*), brittlescale (*Atriplex depressa*), lesser saltscale (*Atriplex minuscula*), subtle orache (*Atriplex subtilis*), recurved larkspur (*Delphinium recurvatum*), Hoover's eriastrum (*Eriastrum hooveri*), spiny-sepaled button-celery (*Eryngium spinosepalum*), Munz's tidy-tips (*Layia munzii*), and California alkali grass (*Puccinellia simplex*).

The study area provides suitable habitat for 18 special-status animal species, including federal- and state-listed species. The species include: Kern brook lamprey (*Entosphenus hubbsi*), San Joaquin roach (*Lavinia symmetricus*), western spadefoot (*Spea hammondii*), northern California legless lizard (*Anniella pulchra*), California glossy snake (*Arizona occidentalis*), San Joaquin coachwhip (*Masticopus flagellum ruddocki*), coast horned lizard (*Phrynosoma blainvillii*), golden eagle (*Aquila chrysaetos*), burrowing owl

(*Athene cunicularia*), Swainson's hawk (*Buteo swainsoni*), northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), western mastiff bat (*Eumops perotis californicus*), Buena Vista Lake shrew (*Sorex ornatus relictus*), American badger (*Taxidea taxus*), and San Joaquin kit fox (*Vulpes macrotis mutica*).

Construction of both the CE Alternative and the CER Alternative has a potential to result in impacts on special-status species, sensitive natural communities, aquatic habitats, and other sensitive biological resources. Operational impacts from implementation of both the CE Alternative and CER Alternative would generally be equivalent to existing conditions because both Project alternatives would result in ongoing operations and maintenance of the FKC comparable to existing conditions. A discussion of potential impacts and recommended MMs is provided in this biological resources assessment.

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Acronyms and Abbreviations

°F	degrees Fahrenheit
BRMMP	Biological Resources Management and Monitoring Plan
BVLS	Buena Vista Lake shrew
Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
CE Alternative	Canal Enlargement Alternative
CER Alternative	Canal Enlargement and Realignment Alternative
CESA	California Endangered Species Act
CMM	Compensatory Mitigation Measure
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
ESA	Endangered Species Act
ESAs	environmentally sensitive areas
FKC	Friant-Kern Canal
FWA	Friant Water Authority
MMs	mitigation measures
MP	mile post
OHWM	ordinary high water mark
Project	Friant-Kern Canal Middle Reach Capacity Correction Project
Reclamation	Bureau of Reclamation
Regional Water Board	Regional Water Quality Control Board
SJKF	San Joaquin kit fox
Stantec	Stantec Consulting Services Inc.
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WEAT	worker environmental awareness training

1.0 INTRODUCTION

This biological resources assessment report has been prepared to do the following: (1) document special-status species and other sensitive biological resources that may occur in or near the Friant-Kern Canal (FKC) Middle Reach Capacity Correction Project (Project) area; (2) provide an assessment of the potential for the Project to adversely impact sensitive biological resources; and (3) identify mitigation measures (MMs) to avoid or reduce the potential for Project-related impacts.

The study area for the biological resources assessment includes the section of the FKC beginning at Avenue 208 just north of the community of Strathmore in Tulare County, stretching approximately 33 miles south-southwest to Lake Woollomes, approximately 0.5 mile north of Pond Road to the southeast of the city of Delano in Kern County. The study area is located within the following sections, townships, and ranges (Table 1) of the Mount Diablo Base and Meridian in the *Lindsay, Porterville, Ducor, Sausalito School, Delano East*, and *McFarland* California, U.S. Geological Survey (USGS) 7.5-minute series topographic quadrangles (Figure 1). (Figures are located at the back of this report.)

Table 1. Project Ranges, Townships, and Sections

Range	Township	Sections
27 East	20 South	28, 33
	21 South	3, 4, 9, 16, 20, 21, 29, 30, 31
	22 South	6, 7, 18, 19, 30, 31
	23 South	6
26 East	23 South	1, 11, 12, 14, 15, 22, 23, 26, 27, 34
	24 South	3, 9, 10, 15, 16, 21, 22, 28, 33
	25 South	4, 9, 16, 21, 28

This biological resources assessment is based on information gathered from a review of desktop resources including published literature, data, and maps, and from biological field surveys of the study area by Stantec Consulting Services Inc. (Stantec) biologists. The study area includes all project components and potential staging areas and areas of ground disturbance for both the Canal Enlargement Alternative (CE Alternative) and Canal Enlargement and Realignment Alternative (CER Alternative) (Figure 2).

The purposes of this biological resources assessment are to do the following:

- characterize the habitats and vegetation communities present;
- evaluate the potential for special-status plant and animal species to occur;
- identify the locations and approximate boundaries of other sensitive biological resources (e.g., streams, wetlands, and riparian areas);

- provide an analysis of the potential for each Project alternative to result in impacts on special-status species and other sensitive biological resources; and
- identify MMs to avoid or reduce the potential for Project-related impacts.

2.0 PROJECT ALTERNATIVES

2.1 CANAL ENLARGEMENT ALTERNATIVE

The CE Alternative would restore the capacity of the 33-mile Middle Reach using two methods: (1) raising portions of the embankments in the existing FKC; and (2) raising and widening the canal embankments and adding concrete lining. Raising the embankments would be accomplished by increasing the height of the earthen canal banks and extending the lining by adding a 1- to 4-foot-high concrete lining at a 1.5 to 1 slope above the existing lining. The canal would be raised in Segment 1 from mile post (MP) 88.2 (at Avenue 208) to MP 95.7 (immediately south of Tule River) and in Segment 4 from MP 119 (south of State Highway 155) to MP 121.5 (at the Lake Woollomes check).

Raising and widening the embankments would be accomplished by removing the uppermost extent of the existing concrete lining and excavating a horizontal bench at the level of the demolished lining (approximately 14 feet wide on each embankment or a total of 28 feet wide) into the existing grade and constructing new (i.e., wider) upper embankments, which would receive new concrete linings. This alternative would require up to four miles of new bypass canal segments around existing turnouts and changes to or replacement of existing turnouts, road crossings, check structures, utilities, and other facilities adjacent to the canal such as irrigation systems, private wells, and control buildings. Approximately 170 acres of new right-of-way would be required to accommodate this alternative.

2.2 CANAL ENLARGEMENT AND REALIGNMENT ALTERNATIVE

The CER Alternative would restore the capacity of the 33-mile Middle Reach using two methods: (1) raising portions of the embankments in the existing FKC (similar to what is described for the CE Alternative); and (2) constructing a realigned canal east of the existing FKC. The canal would be raised in Segment 1 from MP 88.2 (at Avenue 208) to MP 95.7 (immediately south of Tule River) and in Segment 4 from MP 116 (at Avenue 8) to MP 121.5 (at the Lake Woollomes check).

The realigned canal would be constructed immediately east of the FKC beginning on the south side of the Tule River at MP 95.7 and extending approximately 20 miles to MP 116, which encompasses all of Segments 2, 3, and a portion of Segment 4.

The CER Alternative would ultimately result in abandoning about 19 miles of the 33-mile Middle Reach of the FKC. In the abandoned segments, the concrete lining from the embankments would be demolished and could be reused as roadway base material as needed. The remainder would be abandoned in place along with the concrete lining on the bottom of the canal. Abandonment of the FKC would allow the bank material to be used to construct the realigned canal. The centerline distance between the abandoned segment and the realigned canal varies but would average 127 feet.

The FKC parallels County Road 192 near MP 115.3 for approximately 1.7 miles. There is insufficient room for the realigned canal between the existing FKC and County Road 192, so the realigned canal would be located approximately 120 feet east of the road (from centerline of the road to centerline of the canal). A similar situation occurs adjacent to County Road 184, beginning south of Avenue 40 at approximately MP 111.5 and continuing south for approximately 2 miles to Avenue 24. To accommodate water deliveries in the area of the realigned canal, new turnouts consisting of new cast-in-place concrete structures and delivery piping would be constructed as needed. Additionally, small segments of the FKC would be left in place to accommodate existing turnouts and maintain water deliveries to existing distribution systems. Maintaining existing turnouts and deliveries within the realigned canal would be accomplished by creating delivery pools within approximately 100 to 200 feet of the FKC upstream of existing pump stations. This would allow water to be delivered from the realigned canal to a controlled water level in the delivery pool without affecting existing pumps and distribution systems. Approximately 510 acres of new right-of-way would be required to accommodate this alternative.

2.3 ELEMENTS COMMON TO BOTH PROJECT ALTERNATIVES

For both Project alternatives, replacement of the existing check structures, wasteways, and siphons would be required at Deer Creek and White River. Control buildings and associated electrical, mechanical, and control equipment at these facilities would also be replaced as required. Up to 25 bridges would be removed and replaced with new, inverted siphons. Up to 10 miles of existing utility crossings would be removed, modified, or replaced to accommodate the alternatives. Both alternatives would also require modification, relocation, abandonment, or removal of existing facilities on lands adjacent to the FKC and realigned canal. Affected facilities could include but are not limited to wells, irrigation systems, farm roads, miscellaneous structures (such as small control buildings), and power lines.

A cement batch plant would be built onsite and would be primarily used for preparation of the lining material. The batch plant would be located within a 30-acre parcel on Avenue 56 near the FKC in Tulare County. The property would also be used for contractor staging, offices, and equipment and material storage. New 24-foot-wide operations and maintenance roads would be developed on the realigned canal segment. One side of the new canal operations and maintenance roads would have an all-weather finish (i.e., gravel with chip-seal). The other side would be a drivable dirt road (i.e., no gravel). The side of the new canal road with an all-weather versus drivable dirt finish may alternate along the canal reach. Aggregate for the new all-weather road finishes would be obtained from regional commercial sources.

2.4 CONSTRUCTION SCHEDULE

Construction is anticipated to begin in 2021 but would depend on the timeline for completing environmental review and obtaining required authorizations and funding. Construction of the CER Alternative would be ongoing for approximately 3 years and would be staged to minimize or eliminate the potential for disruption in delivery of water to Central Valley Project long-term water contractors. Construction of the CE Alternative would be ongoing for more than 10 years and would require intermittent shutdown periods (up to 3 months at a time during the non-irrigation season [December to February]) of the FKC to accommodate construction.

Construction would begin with relocation of existing facilities adjacent to the FKC (e.g., utilities, wells) and mass-excavation associated with replacement check structures, siphons, and the realigned canal (CER

Alternative only). Construction activities would not be continuous at any individual location throughout the entire construction period. It is expected that the maximum duration of construction for any one project element would be 7 months.

Approximate durations for construction of major facilities are expected as follows:

- Existing utility relocation and well abandonment: four months
- Deer Creek and White River check structures: seven months each (14 months total)
- Siphons: four siphons constructed concurrently over approximately three-month periods (19 months total for all 25 siphons)
- Realigned Canal: 16 months
- Canal raising: 16 months
- Canal raising and widening: 24-month total duration in three-month increments during the non-irrigation season

Construction would generally occur between 7 a.m. and 7 p.m. Monday through Friday. Occasional evening and weekend work could occur, as needed; however, work would be conducted to minimize disturbance to neighboring properties (e.g., lighting would be pointed away from residences) and would occur in coordination with Tulare County, Kern County, and the City of Porterville, as appropriate. Work crews would consist of up to nine construction teams with 15 to 30 people per team. Depending on project construction requirements, up to 150 workers could be onsite during peak construction periods.

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3.0 METHODS

The information provided in this assessment was obtained from a desktop-level review of biological resources and from biological field surveys conducted by Stantec biologists and Stantec's subconsultant H.T. Harvey & Associates. A discussion of special-status species and the approach to the desktop-level and field investigations is provided below.

3.1 DEFINITIONS

3.1.1 Special-Status Species

For the purpose of this assessment, special-status plant species include plants that are: (1) listed as threatened or endangered under the California Endangered Species Act (CESA) or the federal Endangered Species Act (ESA); (2) proposed for federal listing as threatened or endangered; (3) state or federal candidate species; (4) designated as rare by the California Department of Fish and Wildlife (CDFW); and (5) California Rare Plant Rank (CRPR) 1A, 1B, 2A 2B, or 4 species. Special-status animal species include species that are: (1) listed as threatened or endangered under the CESA or ESA; (2) proposed for federal listing as threatened or endangered; (3) state or federal candidate species; and (4) identified by the CDFW as species of special concern or fully protected species.

3.1.2 Potential to Occur

The potential for special-status species to occur within the study area was assigned to one of four categories as described below. Special-status species with a potential to occur in the study area are evaluated in Section 6 of this assessment.

- **High:** The species has been recently (i.e., within the last 5 years) documented in the study area, and potential habitat for the species is present.
- **Moderate:** The Project is located within the range of the species, or there are nearby documented occurrences, and potential habitat for the species exists in the study area.
- **Low:** The Project is located within the range of the species, and low-quality habitat is present in the study area.
- **None:** The study area is located outside of the species range, or potential habitat to support the species is not present in the study area.

3.2 LITERATURE AND DATABASE REVIEW

Special-status plant and animal species and sensitive habitats that may occur in the study area were determined, in part, by reviewing natural resource agency databases, relevant literature, and other relevant sources. The following information sources were reviewed:

- USGS *Lindsay, Porterville, Ducor, Sausalito School, Delano East*, and *McFarland California* 7.5-minute topographic quadrangles;
- Aerial photographs of the study area and vicinity;
- U.S. Fish and Wildlife Service (USFWS) list of endangered and threatened species that may occur in the vicinity of the Project (USFWS 2019a) (Attachment A);
- The CDFW California Natural Diversity Database (CNDDB) plant and animal records for the *Lindsay, Porterville, Ducor, Sausalito School, Delano East*, and *McFarland California* and surrounding 7.5-minute quadrangles (CDFW 2020) (Attachment B);
- The California Native Plant Society (CNPS) online Inventory of Rare and Endangered Plants (California Native Plant Society 2020) records for the *Lindsay, Porterville, Ducor, Sausalito School, Delano East*, and *McFarland California* and surrounding quadrangles (Attachment B);
- California Wildlife Habitat Relationships System (CDFW 2014); and
- Other pertinent databases and literature, including the online *Inventory of Rare and Endangered Vascular Plants of California* (California Native Plant Society 2019) and *The Jepson manual: vascular plants of California*, *Second Edition* (Baldwin et. al. 2012).

A preliminary list of special-status species that could occur or are known to occur in the study area and vicinity was developed based on background research. The list was further refined based on the biological field surveys.

3.3 FIELD VISITS AND BIOLOGICAL STUDIES CONDUCTED

On April 23, 2019, representatives from the Bureau of Reclamation (Reclamation), Friant Water Authority (FWA), USFWS, CDFW, and Stantec attended a tour of the study area to view the habitats present and discuss potential special-status species and other biological resources of concern.

On October 30, 2019, Reclamation, FWA, USFWS, and Stantec attended an additional tour of the study area to discuss federally listed species and compliance with Section 7 of the ESA.

From September 30 to October 3, 2019, Stantec biologists Brendan Cohen, Chariss Femino, Jacqueline Phipps, Yura Shimko, Cristian Singer, and Gabe Youngblood conducted biological field surveys of the study area including a detailed mapping of habitats. From December 10 to 11, 2019, Stantec biologists Chariss Femino and Gabe Youngblood conducted additional biological field surveys for private parcels that were not subject to prior surveys. Surveys were completed by walking meandering transects on both sides of the FKC, and all adjacent agricultural and other lands were viewed to the degree necessary to characterize habitat types present.

Stantec conducted a delineation of potential waters of the United States within the study area from September 30 to October 3, 2019 and from December 10 to 11, 2019 (Stantec 2019a). The waters of the United States delineation report is included as Attachment C.

From November 8, 2019, to December 17, 2019, Stantec's subconsultant, H.T. Harvey & Associates, conducted San Joaquin kit fox (SKJF) (*Vulpes macrotis mutica*) surveys along each side of the FKC within the study area using ecological scent-detection dogs trained to recognize the specific scent of SJKF scat and alert their handler to the location of the scat (H.T. Harvey & Associates 2020).

From December 2, 2019, to December 9, 2019, Stantec deployed two arrays of remotely operated cameras enhanced with scent attractants (e.g., cans of cat food or tuna with small punctures to promote long-lasting scent dispersal) to detect the presence of SJKF in two locations within the study area: the first (northern) array included 10 cameras beginning adjacent to the Tulare County Mid-Valley Disposal site Teapot Dome at Avenue 128 south along the eastern embankment of the FKC from approximately 2.76 miles to about 0.5 mile south of Avenue 112. The second (southern) array included eight cameras beginning near the Kern County/Tulare County border and extending 2.5 miles south to the north end of Lake Woollomes. In both arrays, cameras were placed at 0.25- to 0.5-mile intervals facing east of and down the outboard embankment of the canal with scent attractants in view of the camera. Arrays were left in operation for seven nights of continuous monitoring, resulting in 126 camera-nights (Stantec 2019b).

From December 2, 2019, to December 9, 2019, Stantec conducted remote camera trap surveys in and near the Deer Creek portion of the study area to detect the presence of Buena Vista Lake shrew (*Sorex ornatus relictus*). Four close-focus automated Reconyx camera stations, baited with live and dried mealworms, were deployed per the methodology described in the *Conservation of Endangered Buena Vista Lake shrews (Sorex ornatus relictus) through Investigation of Taxonomic Status, Distribution, and Use of Non-Invasive Survey Methods* (Cypher et al. 2017) for a total of 28 trap nights (Stantec 2019c).

From March 16, 2020 to March 19, 2020, Stantec botanists conducted botanical surveys for the early blooming special-status plant species that have a potential to occur within the study area. (Stantec 2020) Potentially occurring special-status plants that typically bloom early in the season (e.g., March and April) include recurved larkspur (*Delphinium recurvatum*), Hoover's eriastrum (*Eriastrum hooveri*), spiny-sepaled button-celery (*Eryngium spinosepalum*), Munz's tidy-tips (*Layia munzii*), and California alkali grass (*Puccinellia simplex*). Surveys were conducted by walking transects through all suitable habitat for these species.

4.0 ENVIRONMENTAL SETTING

4.1 SITE CONDITIONS AND LAND USE

4.1.1 Local Setting and Existing Land Use

The study area encompasses approximately 33 linear miles (2,696 acres for the CER Alternative and 2,317 acres for the CE Alternative) and includes all areas proposed for construction, staging, and borrow activities for both the CE Alternative and CER Alternative. The study area primarily consists of the FKC and adjacent Reclamation right-of-way. Land uses surrounding the immediate vicinity primarily consist of agriculture. The dominant crops include grapes, citrus, kiwis, almonds, and pistachios. There are isolated areas adjacent to the FKC that are zoned for light manufacturing, residential, and rural residential.

4.1.2 Physical Conditions

The FKC runs along the eastern edge of the southern Central Valley in nearly level terrain. Elevations in the study area range from approximately 400 to 422 feet above mean sea level.

Regionally, the study area has a Mediterranean climate characterized by hot, dry summers and moderate winters with average annual temperatures ranging from 31 to 98 degrees Fahrenheit (°F) (Western Regional Climate Center 2019). Historical data used to describe the climate were collected at the Delano station, approximately 4.5 miles west of the southern extent of the study area (Western Regional Climate Center 2019). Precipitation in the study area primarily occurs as rain, with rare snowfall. Average annual rainfall is 7.23 inches and primarily occurs from November to April.

Twenty-six soil map units occur in the study area and are described in the soil survey of Kern County, California, and the soil survey of Tulare County, California (Natural Resources Conservation Service 2019). The soil map units that occur in the study area are summarized in Table 2 below.

Table 2. Soil Map Units in the Study Area

Map Unit Name Taxonomy	Map Unit Reference Code	Drainage Class	Depth to Restrictive Layer	Hydric Soils
Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes Calcic Haploxerepts	101	Well drained	More than 80 inches	No, except depressions
Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes Typic Durixerepts	105	Moderately well drained	20 to 40 inches to duripan	No, except depressions
Centerville clay, 0 to 2 percent slopes Aridic Calcixererts	106	Well drained	48 to 60 inches to densic material	No, except depressions
Colpien loam, 0 to 2 percent slopes Calcic Pachic Haploxerolls	108	Moderately well drained	More than 80 inches	No
Dumps	112	N/A	N/A	N/A
Exeter loam, 0 to 2 percent slopes Typic Durixeralfs	114	Moderately well drained	20 to 40 inches to duripan	No, except depressions
Flamen loam, 0 to 2 percent slopes Calcic Pachic Haploxerolls	116	Moderately well drained	40 to 60 inches to duripan	No, except depressions
Hanford sandy loam, 0 to 2 percent slopes Typic Xerorthents	124	Well drained	More than 80 inches	
Nord fine sandy loam, 0 to 2 percent slopes Cumulic Haploxerolls	130	Well drained	Abrupt textural changes at around 38 and 50 inches	No, except flood plains, alluvial fans
Pits	131	N/A	N/A	No
Riverwash	134	N/A	N/A	Yes
San Joaquin loam, 0 to 2 percent slopes Typic Durixeralfs	135	Moderately well drained	About 15 inches to abrupt textural change; 20 to 40 inches to duripan	No

Map Unit Name Taxonomy	Map Unit Reference Code	Drainage Class	Depth to Restrictive Layer	Hydric Soils
Tagus loam, 0 to 2 percent slopes Calcic Haploxerolls	137	Well drained	More than 80 inches	No
Tujunga loamy sand, 0 to 2 percent slopes Typic Xeropsamments	138	Somewhat excessively drained	More than 80 inches	No, except flood plains, alluvial fans
Yettem sandy loam, 0 to 2 percent slopes Entic Haploxerolls	143	Well drained	More than 80 inches	No, except flood plains, alluvial fans
Water-perennial	145	N/A	N/A	N/A
Tulare County, California, Central Part (CA660)				
Exeter loam, 0 to 2 percent slopes Typic Durixeralfs	124	Well drained	20 to 40 inches to duripan	No, except depressions
San Joaquin loam, 0 to 2 percent slopes Abruptic Durixeralfs	154	Moderately well drained	About 20 inches to abrupt textural change; 20 to 40 inches to duripan	No, except depressions
San Joaquin loam, 2 to 9 percent slopes Abruptic Durixeralfs	155	Moderately well drained	About 20 inches to abrupt textural change; 20 to 40 inches to duripan	No, except depressions
Wyman loam, 0 to 2 percent slopes Typic Haploxeralfs	172	Well drained	More than 80 inches	No
Water	178	N/A	N/A	N/A
Kern County, California, Northwestern Part (CA666)				
Nord fine sandy loam, 0 to 2 percent slopes Cumulic Haploxerolls	130tw	Well drained	Abrupt textural changes at around 38 and 50 inches	No, except flood plains, alluvial fans
Exeter sandy loam, 0 to 2 percent slopes Typic Durixeralfs	154	Well drained	20 to 40 inches to duripan	No, except depressions
McFarland loam Typic Torriorthents	192	Well drained	More than 80 inches	No

Map Unit Name Taxonomy	Map Unit Reference Code	Drainage Class	Depth to Restrictive Layer	Hydric Soils
Wasco sandy loam Typic Torriorthents	243	Well drained	More than 80 inches	No
Water	257	N/A	N/A	N/A

Key: N/A = not applicable

4.2 BIOLOGICAL CONDITIONS

4.2.1 Habitat Communities

Habitat types in the study area were classified based on descriptions provided in *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988), as well as the *California Natural Community List* (CDFW 2019a), which is adapted from the technical approach and vegetation alliance classification system described in *A Manual of California Vegetation* (Sawyer et al. 2009). The natural habitat communities present within the study area include non-native annual grassland, California buckwheat scrub, allscale saltbush scrub, Fremont cottonwood forest, mulefat thickets, red willow thickets, shining willow groves, smartweed-cocklebur patches, and valley oak woodland. Agricultural production processes in the form of managed plant crops constitute the majority of land management practices within the study area. Managed plant crops within the study area include irrigated row crops, vineyards, orchards, and herbaceous field crops (alfalfa). Portions of the study area under agricultural management were not active at the time of the vegetation mapping efforts and were mapped as fallow lands (unsown). Additional designations utilized for the vegetation mapping effort reflect the interface of the study area with differing adjacent land uses and the fact that the study area is actively managed in order to facilitate the transportation and delivery of large volumes of water. These additional designations include the following: urban (residential housing), ruderal (recently and/or regularly disturbed areas), barren (unvegetated or nearly unvegetated areas including levee roads), and open water. Habitat maps of the study area are provided as Figure 3. Descriptions of each habitat are provided below.

Non-Native Annual Grassland

Non-native annual grassland occurs throughout the study area, the majority of which occurs on the landside slopes of the FKC embankment. Non-native annual grassland is an herbaceous vegetation community primarily consisting of introduced annual plant species, predominantly grasses. Commonly observed plant species identified within the non-native annual grassland in the study area include slender oat (*Avena barbata*), foxtail chess (*Bromus madritensis*), ripgut grass (*Bromus diandrus*), Russian thistle (*Salsola tragus*), prickly lettuce (*Lactuca serriola*), and cheeseweed (*Malva parviflora*). The foliar cover within this vegetation community ranges from approximately 15 to 35 percent, varying greatly with fluctuations in seasonal precipitation and temperatures and when microtopographic shifts and natural variations in plant species composition occur. A total of 230 acres of non-native annual grassland has been mapped within the study area.

California Buckwheat Scrub

California buckwheat (*Eriogonum fasciculatum*) scrub occurs within the study area in limited and discrete portions of the landside slopes of the FKC embankment (Figures 3S, 3AC, 3AO, and 3AP. California buckwheat, a perennial woody native plant species, is the dominant plant species occurring within this vegetation community. The foliar cover within this vegetation community ranges from approximately 50 to 60 percent. The understory of this vegetation community is composed of non-native annual grassland. A total of nine acres of California buckwheat scrub has been mapped within the study area.

Allscale Saltbush Scrub

Allscale saltbush (*Atriplex polycarpa*) scrub occurs within the study area in limited and discrete portions of the landside slopes of the FKC embankment (Figure 3T). Allscale saltbush, a perennial woody native plant species, is the dominant plant species occurring within this vegetation community. The foliar cover within this vegetation community ranges from approximately 50 to 60 percent. The understory of this vegetation community is composed of non-native annual grassland. A total of 1.4 acres of allscale saltbush scrub has been mapped within the study area.

Fremont Cottonwood Forest

Fremont cottonwood (*Populus fremontii* ssp. *fremontii*) forest occurs within the study area along the north and south banks of Deer Creek, located just west of the FKC, and north of Deer Creek, adjacent to a groundwater recharge basin east of and alongside the FKC (Figure 3X and 3AB). Fremont cottonwood, a perennial woody native plant species, is the dominant plant species occurring within this vegetation community. The cottonwood trees are large, mature trees measuring more than 60 feet tall. The understory of this vegetation community varies, and willow (*Salix* spp.) species commonly occur. The foliar cover within this vegetation community ranges from approximately 20 to 25 percent cover in the stand west of the FKC, and less than10 percent cover in the stand east of the FKC. A total of 1.8 acres of Fremont cottonwood forest has been mapped within the study area.

Mulefat Thickets

Mulefat (*Baccharis salicifolia* ssp. *salicifolia*) thickets occur within the channel of Deer Creek in the northern portion of the study area (Figure 3AB). Mulefat, a perennial woody native plant species, is the dominant plant species occurring within this vegetation community. The sparse to very sparse understory of this vegetation community is largely composed of various annual and perennial herbaceous plant species. The foliar cover within this vegetation community ranges from approximately 5 to 10 percent, shrubs are generally well-spaced, and the canopy is discontinuous. A total of 1.5 acres of mulefat thicket has been mapped within the study area.

Red Willow Thickets

Red willow (*Salix laevigata*) thickets occur within the northern portion of the study area associated with Porter Slough, located just east of the FKC (Figure 3K). Red willow, a perennial woody native plant species, is the dominant plant species occurring within this vegetation community. The foliar cover within this vegetation community is approximately 20 percent. The understory of this vegetation type is variable; other willow (*Salix* spp.) species are commonly associated with this vegetation community. A total of 0.13 acre of red willow thickets has been mapped within the study area.

Shining Willow Groves

Shining willow (*Salix lasiandra*) groves occur within a portion of the study area associated with the Tule River, which bisects the FKC in the northern portion of the study area (Figure 3M). Shining willow, a perennial woody native plant species, is the dominant plant species within this vegetation community. The understory of this vegetation type is variable, bur marigold (*Bidens laevis*), cattail (*Typha* sp.), and cocklebur (*Xanthium strumarium*) are common associate plant species. The foliar cover within this vegetation community ranges from approximately 25 to 30 percent. A total of 0.57 acre of shining willow groves has been mapped within the study area.

Smartweed-Cocklebur Patches

A single smartweed (*Persicaria* sp.)-cocklebur (*Xanthium strumarium*) patch occurs within a groundwater recharge basin along the east side of the FKC, located in the northern portion of the study area (Figures 3X and 3AB). Cocklebur, an annual native herbaceous plant species, is the dominant plant species within this vegetation community. There was no understory within this vegetation community at the time of the vegetation mapping efforts; the groundwater recharge basin was inundated during that time (October 1 to 3, 2019). The foliar cover within this vegetation type is approximately 50 percent. Foliar cover within this vegetation type varies greatly depending on seasonal fluctuations in precipitation and temperature, and the timing during which surveys are conducted as related to the annual growth cycle of this plant species. A total of 5 acres of smartweed-cocklebur patches has been mapped within the study area.

Valley Oak Woodland

Valley oak (*Quercus lobata*) woodland occurs as a single stand associated within Porter Slough, located in the northern portion of the study area just west of and adjacent to the FKC (Figure 3K). Valley oak, a perennial woody native plant species, is the dominant plant species within this vegetation community. The understory of this vegetation community consists of non-native annual grassland. The foliar cover within this vegetation community is approximately 35 percent. A total of 1 acre of valley oak woodland has been mapped within the study area.

Barren/Ruderal

Barren areas are areas in which vegetation is either absent or so infrequent as to reasonably apply that designation (less than three percent foliar cover). Barren areas are present on the dirt and paved roads and associated road shoulders. The ruderal habitat type was primarily used to designate those portions within the study area that have been recently disturbed or are regularly disturbed in the course of maintaining and operating the FKC system. Vegetation in these areas consists primarily of non-native annual forbs and grasses similar to those described in the annual non-native grasslands land cover type. A total of 830 acres of barren/ruderal land has been mapped within the study area.

Agriculture – Vineyard

Vineyards occur throughout the study area. The vineyards consist of grape (*Vitis vinifera*) and kiwi (*Actinidia deliciosa*) vines planted in rows and supported by wood and wire trellises. The vines are intertwined in the rows, and open areas are present between the rows. The understory of the vineyards is open, and the ground is generally barren. A total of 257 acres of vineyard has been mapped within the study area.

Agriculture – Orchard

Both evergreen and deciduous orchards occur throughout the study area and represent the most dominant type of agricultural acreage within the study area. Each orchard consists of a single plant species planted in rows, most commonly almond (*Prunus dulcis*), pistachio (*Pistacia vera*), and citrus (*Citrus* sp.). Some orchards within the study area have sparse herbaceous vegetation growing in the understory, while others are barren. A total of 455 acres of agriculture-orchard has been mapped within the study area.

Agriculture – Field Crop

Agriculture-field crop is a designation applied to herbaceous plant crops, generally planted on an annual basis and harvested within a single growing season. As with orchards, herbaceous field crops consist of a single plant species planted in rows. Herbaceous field crops are often managed over a multiple year process of crop rotation. As a result, plant crop composition can vary from year to year. The most commonly cultivated herbaceous field crop observed within the study area was alfalfa (*Medicago sativa*) at approximately 125 acres. A total of 188 acres of agriculture-field crop has been mapped within the study area.

Agriculture – Fallow

Agriculture – fallow is a designation applied to those areas within the study area not currently managed for active agricultural production processes (but were used for this purpose in the recent past), or areas within which annual agricultural production process have ceased for the current growing year. These areas are currently unvegetated or are vegetated with annual plant species capable of colonizing recently and regularly disturbed land. A total of 341 acres of agriculture-fallow land has been mapped within the study area.

Urban

The urban designation was used to map developed areas within the study area that are devoid or nearly devoid of vegetation, including the many bridges that cross over the FKC. A total of 61 acres of urban land has been mapped within the study area.

Water

This designation was used for areas of standing or flowing water within the study area. Open water occurs in the FKC and associated water conveyance and storage structures such as human-made ponds and secondary irrigation canals. A total of 314 acres of water has been mapped within the study area.

4.2.2 Habitat Connectivity

Habitat corridors are segments of land that provide linkages between separated habitats while also providing cover. On a broader level, corridors also function as avenues along which wide-ranging animals can travel, plants can propagate, genetic interchange can occur, populations can move in response to environmental changes and natural disasters, and scarce populations can be replenished from other areas. Habitat corridors often consist of riparian areas along streams, rivers, or other natural features. Within the study area, Porter Slough, Tule River, Deer Creek, White River, and the FKC may provide dispersal and migration corridors for regionally occurring plant and animal species.

4.2.3 Invasive Species

Invasive plants (i.e., noxious weeds) are undesirable, non-native plants that commonly invade disturbed sites. Most species have been introduced from Europe or Asia and are known to degrade native wildlife habitat and plant communities. When disturbance results in the creation of habitat openings or in the loss of intact native vegetation, invasive plants may colonize the site and spread, often out-competing native species. Once established, they are very difficult to eradicate and could pose a threat to native species.

All non-native plant species identified within the study area were reviewed to determine their status as invasive plants according to the ratings in the California Invasive Plant Inventory produced by California Invasive Plant Council (Cal-IPC) and updated in February of 2017 (Cal-IPC 2017). Cal-IPC categorizes non-native invasive plants into three categories of overall negative ecological impact in California: High, Moderate, and Limited. Two invasive species with a Cal-IPC rating of High were observed in the study area: giant reed (*Arundo donax*) and tamarisk (*Tamarix chinensis*).

4.2.4 Rare Natural Communities and Aquatic Resources

In addition to inventorying reported occurrences of special-status species, the CNDDB serves to inventory locations of rare natural communities. Rare natural communities are those communities that are of highly limited distribution, and may or may not contain rare, threatened, or endangered species. The CNDDB ranks natural communities according to their rarity and endangerment in California. Habitats are considered “sensitive” if they are identified on the CDFW List of Vegetation Alliances and Associations as being highly imperiled or classified by CDFW in the CNDDB as natural communities of special concern – Ranks S1 to S3 (S1 being the rarest ranking). Four sensitive natural communities are present in the study area and include: valley oak woodland (S3); red willow thickets (S3), shining willow groves (S3), and Fremont cottonwood forest (S3).

Other natural communities of concern include wetlands and other aquatic habitats. Aquatic habitats in the study area include intermittent stream (White River, Deer Creek, Porter Slough, and Tule River), pond, fresh emergent wetland, riparian wetland, seasonal wetland, irrigation canal, irrigation ditches, and groundwater recharge basins.

4.2.5 Special-Status Plant Species

Regionally occurring special-status plant species were identified based on a review of pertinent literature, the USFWS species list, CNDDB and CNPS database records, and the field survey results. CNNDB special-status plant species occurrences within 5 miles of the study area are detailed in Table 3 and Figure 4. The status of each special-status plant species was verified using the *State and Federally Listed Endangered, Threatened and Rare Plants of California* (CDFW 2019b) and the *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW 2019c). For each species, habitat requirements were assessed and compared to the habitats in the study area and immediate vicinity to determine if potential habitat occurs in the study area. Based on the habitat assessment, the study area does not provide suitable habitat for any federal- or state-listed plants, but does provide suitable habitat for 10 other special-status plant species. These species are further discussed in Section 6.

Table 3. Review of Regionally Occurring Special-Status Plant Species

Common Name *Scientific Name*	**Listing Status[1] (Fed/State/CRPR)**	**Habitat Requirements**	**Potential for Occurrence**
Earlimart orache *Atriplex cordulata* var. *erecticaulis*	—/—/1B.2	**Found** in valley and foothill grasslands. **Blooms:** Aug–Sep **Elevation:** 235 to 330 feet	**Low**. The study area is within the known range of this species, and there is a reported CNDDB occurrence within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.
Lost Hills crownscale *Atriplex coronata* var. *vallicola*	—/—/1B.2	**Found** in chenopod scrub, valley and foothill grassland, and vernal pools. Prefers alkaline soils. **Blooms:** Apr–Sep **Elevation:** 160–2,080 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.

Common Name ***Scientific Name***	**Listing Status[1] (Fed/State/CRPR)**	**Habitat Requirements**	**Potential for Occurrence**
Brittlescale *Atriplex depressa*	—/—/1B.2	**Found** in chenopod scrub, meadows, seeps, playas, and valley and foothill grasslands. **Found** in alkaline and clay soils. **Blooms:** Apr–Oct **Elevation:** 1–1,050 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.
Lesser saltscale *Atriplex minuscula*	—/—/1B.1	**Found** in chenopod scrub, playas, and valley and foothill grasslands, as well as alkaline or sandy soils. **Blooms:** May–Oct **Elevation:** 50–656 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.
Vernal pool smallscale *Atriplex persistens*	—/—/1B.2	**Found** in alkaline vernal pools. **Blooms:** Jun–Oct **Elevation:** 33–370 feet	**None**. The study area lacks suitable habitat. There are no vernal pools within the study area, and there are no reported CNDDB occurrences within 5 miles of the study area.
Subtle orache *Atriplex subtilis*	—/—/1B.2	**Found** in alkaline soils in valley and foothill grasslands. **Blooms:** Jun–Oct **Elevation:** 130–325 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.
Kaweah brodiaea *Brodiaea insignis*	—/E/1B.2	**Found** in openings in foothill woodland and in granitic or clay soils. **Blooms:** Apr–Jun **Elevation:** 490–4,600 feet	**None**. The study area is outside of the ecological range of this species, and the study area lacks suitable habitat. This species has not been documented to occur on the floor of the San Joaquin Valley. It is known only from the Kaweah and Tule River drainages. There are no reported CNDDB occurrences within 5 miles of the study area.
Alkali mariposa-lily *Calochortus striatus*	—/—/1B.2	**Found** in chenopod scrub, chaparral, Mojavean desert scrub, and alkali meadows and seeps. **Blooms:** Apr–Jun **Elevation:** 230–5,233 feet	**None**. The study area is within the known geographic range of this species, but the study area lacks suitable habitat. there are no reported CNDDB occurrences within 5 miles of the study area.

Common Name *Scientific Name*	**Listing Status[1] (Fed/State/CRPR)**	**Habitat Requirements**	**Potential for Occurrence**
California jewelflower *Caulanthus californicus*	E/E/1B.1	**Found** in flat, gentle slopes generally in non–alkaline grassland. Also found in open juniper woodland. **Blooms:** Feb–May **Elevation:** 200–328 feet	**None**. As of 1996, all of the natural occurrences of this species have been extirpated within the San Joaquin Valley. There are historic CNDDB occurrences within 5 miles of the study area dating from the 1930s.
Springville clarkia *Clarkia springvillensis*	T/E/1B.2	**Found** on granitic substrates in chaparral, cismontane woodlands, and valley and foothill grasslands. **Blooms:** Mar–Jul **Elevation:** 800–4,000 feet	**None**. The study area is outside of the ecological range of this species, and the study area lacks suitable habitat. This species has never been documented to occur on the floor of the San Joaquin Valley. There is one CNDDB reported occurrence within 5 miles of the study area in the foothills east of the northern portion of the study area.
Recurved larkspur *Delphinium recurvatum*	—/—/1B.2	**Found** in chenopod scrub, valley and foothill grassland, and cismontane woodland. Alkaline soils. **Blooms:** Mar–Jun **Elevation:**10–2,600 feet	**Low**. The study area is within the known range of this species, and there is a reported CNDDB occurrence within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality. Species was not observed during the March 2020 botanical survey.
Calico monkeyflower *Diplacus pictus*	—/—/1B.2	**Found** in broadleaved upland forests and cismontane woodlands. Often found in granitic soils and disturbed areas. **Blooms:** Mar–May **Elevation:** 330–4,700 feet	**None**. The study area lacks suitable habitat. This species occurs on granitic substrates at higher elevations. There are two reported CNDDB occurrences within 5 miles of the study area.
Kern mallow *Eremalche parryi* ssp. *Kernensis*	E/—/1B.2	**Found** in southern San Joaquin Valley and adjacent areas growing on eroded hillsides and alkali flats. Typically found in these habitats growing under and around saltbush (*Atriplex spinifera* or *A. polycarpa*) or desert tea (*Ephedra californica*) where shrub cover is less than 25 percent (USFWS 2013). **Blooms:** Mar–May **Elevation:** 230–4,230 feet	**None**. The study area is within the known range of this species. However, based on the Sept. 30–Oct. 3 field surveys, no suitable habitat is present within the study area. In addition, there are no reported CNDDB occurrences within 5 miles of the study area.

Common Name *Scientific Name*	**Listing Status[1] (Fed/State/CRPR)**	**Habitat Requirements**	**Potential for Occurrence**
Hoover's eriastrum *Eriastrum hooveri*	—/—/4.2	**Found** in chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland. **Blooms:** Mar–Jul **Elevation:** 165 to 3,000 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality. Species was not observed during the March 2020 botanical survey.
Spiny-sepaled button-celery *Eryngium spinosepalum*	—/—/1B.2	**Found** in vernal pools, swales, and roadside ditches in valley and foothill grasslands. **Blooms:** Apr–Jun **Elevation:** 260–3,200 feet	**Low**. Suitable habitat occurs in the study area in the form of roadside ditches. However, the ditches have a high cover of upland species and there is a low potential for occurrence. There is one reported CNDDB occurrences within 5 miles of the study area. Species was not observed during the March 2020 botanical survey.
Striped adobe-lily *Fritillaria striata*	—/T/1B.1	**Found** in cismontane woodland and valley and foothill grasslands. Usually found on clay soils. **Blooms:** Feb–Apr **Elevation:**440–4,800 feet	**None**. The study area occurs outside of the contemporarily recognized ecological range of this species, and the study area lacks suitable habitat; there are no adobe clay soils within the study area. Although there are two historic collections of this plant species from the San Joaquin Valley floor dating from the 1920s, these occurrences have been extirpated via agricultural land conversion. There are no reported CNDDB occurrences within 5 miles of the study area.
Coulter's goldfields *Lasthenia glabrata* ssp. *Coulteri*	—/—/1B.1	**Found** in coastal salt marshes and swamps, playas, and vernal pools. **Blooms:** Feb–Jun **Elevation:** 1–4,000 feet	**None**. The study area does not support habitat typically associated with this species. The study area does not contain vernal pools, salt marshes, swamps, or playas.

Common Name ***Scientific Name***	**Listing Status[1] (Fed/State/CRPR)**	**Habitat Requirements**	**Potential for Occurrence**
Munz's tidy-tips *Layia munzii*	—/—/1B.2	**Found** in chenopod scrub and valley and foothill grasslands. Usually found on alkaline clay soils. **Blooms:** Mar–Apr **Elevation:**490–2,300 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality. Species was not observed during the March 2020 botanical survey.
Madera leptosiphon *Leptosiphon serrulatus*	—/—/1B.2	**Found** in cismontane woodlands and lower montane coniferous forest. **Blooms:** April–May **Elevation:** 980–4,250 feet	**None**. The study area lacks suitable habitat for this species. There are no reported CNDDB occurrences within 5 miles of the study area. Geographic locations of historical collections on the San Joaquin Valley floor are dubious.
San Joaquin woollythreads *Monolopia congdonii*	E/—/1B.2	**Found** in valley and foothill grassland and chenopod scrub. Sandy soils. **Blooms:** Feb–May **Elevation:** 200–2,600 feet	**None**. The study area is not within the current known range of this species. USFWS considers the species extirpated from Tulare County, and the extant populations in Kern County are over 20 miles south of the study area (USFWS 2010). There are reported CNDDB occurrences within 5 miles of the study area. However, those records are considered extirpated.
Shining navarretia *Navarretia nigelliformis* ssp. *Radians*	—/—/1B.2	**Found** in cismontane woodlands, vernal pools, and valley and foothill grasslands. Sometimes found in clay soils. **Blooms:** Mar–Jul **Elevation:** 210–3,280 feet	**None**. The study area lacks suitable habitat for this species. There are no reported CNDDB occurrences within 5 miles of the study area. An analysis of all known collections in the Consortium of California Herbaria database indicate that this species does not occur on the floor of the San Joaquin Valley (Calflora 2019).

Common Name *Scientific Name*	**Listing Status[1] (Fed/State/CRPR)**	**Habitat Requirements**	**Potential for Occurrence**
Bakersfield cactus *Opuntia basilaris* var. *treleasei*	E/E/1B.1	**Found** in chenopod scrub, cismontane woodland, and valley and foothill grasslands. **Found** in sandy or gravelly soils. **Blooms:** Apr–May **Elevation:** 390–4,760 feet	**None**. The study area is outside of the recognized range of this species. There are no reported CNDDB occurrences within 5 miles of the study area. The closest CNDDB reported occurrences are greater than 20 air miles south of the southernmost portion of the study area. In addition, a survey was conducted in October 2019 with negative results.
San Joaquin adobe sunburst *Pseudobahia peirsonii*	T/E/1B.1	**Found** in cismontane woodland and valley and foothill grasslands. **Found** in adobe clay soils. **Blooms:** Feb–Apr **Elevation:** 295–2,625 feet	**None**. The study area is within the known range of this species, and there are reported CNDDB occurrences within 5 miles of the study area. However, there is no suitable habitat (i.e., adobe clay soils) within the study area.
California alkali grass *Puccinellia simplex*	—/—/1B.2	**Found** in chenopod scrub, meadows and seeps, vernal pools, and valley and foothill grassland. Also found in alkaline soils, vernally mesic soils, sinks, flats, and lake margins. **Blooms:** Mar–May **Elevation:** 7–3,050 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality. Species was not observed during the March 2020 botanical survey.
Chaparral ragwort *Senecio aphanactis*	—/—/2B.2	**Found** in chaparral, cismontane woodlands, and coastal scrub. Sometimes found in alkaline soils. **Blooms:** Jan–May **Elevation:** 50–2,625 feet	**None**. The study area is outside of the recognized range of this species, and the study area lacks suitable habitat. There are no reported CNDDB occurrences within 5 miles of the study area.
Keck's checkerbloom *Sidalcea keckii*	E/—/1B.1	**Found** in cismontane woodland, valley and foothill grassland, vernal pools. Serpentine and clay soils. **Blooms:** Apr-–May **Elevation:** 250–2,100 feet	**None**. The study area is outside of the recognized range of this species, and the study area lacks suitable habitat. There are no reported CNDDB occurrences within 5 miles of the study area.

[1] Federal and State Status Codes: E = Endangered, T = Threatened;
CRPR Codes: List 1B – Plants rare, threatened, or endangered in California and elsewhere. List 2B – Rare or endangered in California, common elsewhere; List 4 – Limited distribution in California.
Extensions: x.1 – Seriously endangered in California; x.2 – Fairly endangered in California.

4.2.6 Special-Status Animal Species

Regionally occurring special-status animal species were identified based on a review of pertinent literature, the USFWS species list, CNDDB database records, a query of the California Wildlife Habitats Relationship system, and the field survey results. CNNDB special-status animal species occurrences within five miles of the study area are illustrated in Figure 4. The status for each special-status animal species was verified using the *Special Animals List* (CDFW 2019d) and the *State and Federally Listed Endangered and Threatened Animals of California* (CDFW 2019e). For each species, habitat requirements were assessed and compared to the habitats in the study area and immediate vicinity to determine the species' potential to occur in or near the study area. Based on the habitat assessment, 18 special-status animal species have the potential to occur. These special-status animal species are further discussed in Section 6. For the purposes of this review, all regionally occurring wildlife species listed under the ESA or CESA or designated by CDFW as fully protected are included in Table 4, regardless of whether the study area provides potential habitat.

Table 4. Review of Regionally Occurring Special-Status Animal Species

Common Name ***Scientific Name***	**Listing Status[1] (Fed/State)**	**Habitat Requirements**	**Potential for Occurrence**
Invertebrates			
Crotch bumble bee *Bombus crotchii*	–/CE	Endemic to the California Central Valley. Found in open grassland and scrub habitats. Utilizes abandoned rodent burrows and cavities for nesting and overwintering.	**None.** The study area is within the historic range of the species. (CDFW 2019f). There is one CNDDB-reported occurrence within five miles of the study area from 1963. However, the annual grassland habitat within the study area is highly fragmented, does not contain abundant wildflowers, and is immediately surrounded by agriculture. Due to the use of harmful agricultural pesticides and competitor non-native bees for agricultural pollination, the crotch bumble bee is not likely to be present in the study area.
Vernal pool fairy shrimp *Branchinecta lynchi*	T/–	Grass or mud-bottomed swales, earth slump or basalt-flow depression pools in grasslands. Claypan and duripan in alluvial fans and terraces. Winds transport cysts during dry season potentially spreading the species to nearby areas.	**None.** No suitable vernal pool habitat is present within the study area.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/–	Elderberry shrubs having stems with a basal diameter equal to or greater than 1 inch. Typically associated with riparian habitat.	**None.** The study area is outside the species' known range (USFWS 2019b).

Common Name ***Scientific Name***	**Listing Status[1] (Fed/State)**	**Habitat Requirements**	**Potential for Occurrence**
Fish			
Kern brook lamprey *Entosphenus hubbsi*	–/SSC	Silty backwaters of large rivers. In summer, found in shallow pools along stream edges with minimal flow. Needs gravel-bottomed areas for spawning and muddy-bottomed areas where ammocoetes (larval stage) can burrow and feed. Has been documented in the FKC.	**High.** Species was first discovered in siphons of the FKC. Non-typical habitat is present within the FKC. However, given the general absence of spawning habitat, species is not likely to reproduce in the FKC. There is one CNDDB occurrence recorded in 1972 located within the FKC.
Delta smelt *Hypomesus transpacificus*	T/E	Inhabits the Sacramento-San Joaquin Delta estuary in open, shallow, low-salinity (<10 %) waters. Spawns in middle and upper reaches of Delta from late-winter to spring.	**None.** The study area is outside of the species' known range.
San Joaquin roach *Lavinia symmetricus*	—/SSC	Found in a variety of streams; well adapted to small, intermittent streams.	**Low.** Potential habitat is present in the streams in the study area. The species is known from the upper portions of the Kings, Kaweah, and Tule River watersheds and is typically limited to foothill and higher elevations, though occasionally can be found lower. No CNDDB occurrences are recorded within 15 miles of the study area.
Amphibians			
Foothill yellow-legged frog *Rana boylii*	—/CT, SSC	Requires perennial, partly shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Needs at least some cobble-sized substrate for egg laying.	**None.** No perennial streams are present in the study area.
California red-legged frog *Rana draytonii*	T/SSC	Requires perennial or near-perennial aquatic habitats, especially for breeding; streams, freshwater pools and ponds over 1-foot deep with overhanging vegetation.	**None.** The study area is outside of the species' known range.

Common Name *Scientific Name*	**Listing Status[1] (Fed/State)**	**Habitat Requirements**	**Potential for Occurrence**
Western spadefoot *Spea hammondii*	—/SSC	Requires shallow, temporary pools or streams during the breeding season and adjacent upland habitat (primarily in grasslands) for burrowing during the non–breeding season.	**High.** Potential breeding habitat may be present in small pools and streams throughout the study area. Flood irrigation of adjacent croplands and detention/recharge basins may also provide suitable habitat for the species. There are two CNDDB-reported occurrences located adjacent to the FKC (reported in 2005).
Reptiles			
Bakersfield legless lizard *Anniella grinnelli*	—/SSC	Occurs in sparsely vegetated areas of dunes, chaparral, pine–oak woodlands, desert scrub, sandy washes, and stream terraces.	**None.** The study area is not within the current known range of the species. No CNDDB occurrences have been documented within 5 miles of the study area.
Northern California legless lizard *Anniella pulchra*	—/SSC	Occurs in sparsely vegetated areas of dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces.	**Low.** Suitable habitat may be present within or adjacent to the four stream crossings. No CNDDB occurrences have been documented within five miles of the study area.
California glossy snake *Arizona occidentalis*	—/SSC	Inhabits open areas within arid scrub, rocky washes, grasslands, and chaparral habitats.	**Low.** Marginally suitable habitat is present within the study area. Suitable habitat within the project is limited to marginal arid scrub habitat and four stream crossings. These habitats are isolated with ruderal influences. The nearest reported CNDDB occurrence is located nine miles south of the study area.
Western pond turtle *Emys marmorata*	—/SSC	Slow water aquatic habitat with available basking sites. Hatchlings require shallow water with dense submergent or short emergent vegetation. Requires an upland oviposition site near the aquatic site.	**None.** Streams within the study area are typically seasonal. Detention and recharge basins within the study area are subject to frequent disturbance, variable flows, and are not likely suitable habitats. Little suitable habitat is present within the study area. The nearest CNDDB occurrence is recorded in 1988 about 15 miles east of the FKC.

Common Name ***Scientific Name***	**Listing Status[1] (Fed/State)**	**Habitat Requirements**	**Potential for Occurrence**
Blunt-nosed leopard lizard *Gambelia sila*	E/E	Resident of sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief.	**None.** Habitats within the study area are generally not suitable for the blunt-nosed leopard lizard. The small area of potentially suitable habitat within the study area is subject to ruderal influences and is generally of poor quality or fragmented. It is unlikely to support this animal within the relatively narrow suitable habitat areas, particularly without connectivity to larger, more contiguous blocks of suitable habitat. The majority of the study area is located to the northeast of the species current known range, with approximately nine miles of the southern portion extending into the range. There is one CNDDB occurrence recorded in 1946 approximately nine miles southeast of the FKC. All other CNDDB occurrences are recorded either west of State Route 99 or east of State Route 65.
San Joaquin coachwhip *Masticopus flagellum ruddocki*	—/SSC	Chaparral, cismontane woodland, coastal bluff scrub, coastal scrub, desert wash, pinon and juniper woodlands, riparian scrub, riparian woodland, valley and foothill grassland; Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes.	**Low.** Marginally suitable habitat is present within the study area. The species typically inhabits open arid lands. While suitable habitat types exist within the study area, these are limited in size and quality, and are isolated from adjacent suitable habitat areas. Two CNDDB occurrences were recorded in 1992 about nine miles west of the FKC.
Coast horned lizard *Phrynosoma blainvillii*	—/SSC	Chaparral, grasslands, woodland clearings, and riparian areas. Prefers open areas with sandy soil and low growing vegetation.	**Low.** Little suitable habitat is present within the study area. Arid scrub and other suitable habitats are limited in size, lack connectivity with other suitable habitats, and are subject to ruderal influences. No CNDDB occurrences have been documented within five miles of the study area.
Giant garter snake *Thamnophis gigas*	T/T	Freshwater marshes and low gradient streams with emergent vegetation; adapted to drainage canals and irrigation ditches with mud substrate. Requires upland habitat with small mammal burrows or crevices immediately adjacent to (within 200 feet) aquatic habitat.	**None.** The study area is not within the current known range of the species.

Common Name *Scientific Name*	**Listing Status[1] (Fed/State)**	**Habitat Requirements**	**Potential for Occurrence**
Birds			
Tricolored blackbird *Agelaius tricolor*	—/CE, SSC	Breeds near fresh water in dense emergent vegetation. Requires open water, protected nesting substrate, and foraging area with insect prey within a few kilometers of the colony.	**None.** Suitable dense emergent vegetation is absent from the study area and surrounding vicinity. This species may be observed as a migrant.
Golden eagle *Aquila chrysaetos*	—/FP	Breeds and winters in rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, and cliffs and rock outcrops. Typically nests in large trees in open areas and cliffs of all heights.	**Low.** The study area is within the year-round range of the species. However, no golden eagles or potential eagle-size nests have been observed during any of the field surveys.
Burrowing owl *Athene cunicularia*	—/SSC	Grasslands and ruderal habitats. Uses mammal burrows or other suitable underground cavities.	**Moderate.** Small mammal burrows present along the canal banks provide potential nesting habitat for the species. The species is known to use canal banks and other ruderal/impacted habitats as nesting and foraging grounds. The nearest CNDDB occurrence is 5.5 miles west of canal and 1.9 miles southwest of the city of Delano (reported in 1982) more recent occurrences documented in the Allensworth Ecological Reserve approximately 7.5 miles west of the study area.
Swainson's hawk *Buteo swainsoni*	—/T	Breeds in stands with few trees in juniper-sage flats, riparian areas, and oak savannah; forages in adjacent livestock pasture, grassland, or grain.	**High.** Agricultural land with tree crops may provide nesting habitat. Adjacent areas may provide suitable foraging and nesting habitats. Species may also be seen as a migrant. One CNDDB record (reported in 2017) was recorded near the canal, west of Porterville.
Northern harrier *Circus cyaneus*	—/SSC	Breeds and forages in a wide variety of open habitats. Nests on the ground in and near wet habitats such as freshwater marsh, wet meadows, weedy borders of lakes, rivers and streams, grasslands, lightly grazed pastures, and some croplands (e.g., alfalfa, tomatoes, melons).	**Moderate.** Wetlands, grasslands, and cropland habitat present within and adjacent to the study area may provide potential nesting and foraging habitat for the species.

Common Name ***Scientific Name***	**Listing Status[1] (Fed/State)**	**Habitat Requirements**	**Potential for Occurrence**
Yellow-billed cuckoo *Coccyzus americanus*	T/E	Breeds along forest edges, grassland with scattered trees, bushes, shrubs, and thickets.	**None.** The study area is not within the current known range of the species.
White-tailed kite *Elanus leucurus*	—/FP	Nests in tall shrubs and trees, forages in grasslands, agricultural fields and marshes.	**Moderate.** Trees and annual grassland habitat present in the study area provide potential nesting and foraging habitat for the species. Adjacent flood irrigated crops, groundwater recharge basins, and fallow agricultural fields may provide suitable foraging habitat.
California condor *Gymnogyps californianus*	E/E, FP	Open savannah, grasslands with semi-arid, rugged mountain ranges containing cliffs. Forages between 985 feet and 8,860 feet. Foraging is typically preferred along major ridgelines that proceed from one mountain top to another Breeding occurs from 2,000 to 6500 feet on ledges or cavities of cliffs.	**None.** Canal and surrounding area may provide low quality foraging habitat from carrion or dead cattle. However, the species is not typically observed over the valley floor, particularly in areas of intense agricultural such as those found in the immediate vicinity of the study area. Canal located 28 miles southwest from condor sanctuary and 15.5 miles from typical minimum elevational requirements. Nearest CNDDB reported occurrence is located 6.7 miles from canal and was recorded in 1976.
Bald eagle *Haliaeetus leucocephalus*	—/E, FP	Breeds and winters in riparian woodland with large trees, often old growth or open canopy. Typically nests near large bodies of permanent water or perennially flowing rivers with abundant fish.	**None.** The study area is within the wintering range of the species (CDFW 2014). Riparian habitat present is sparse and limited in nature.
Yellow-breasted chat *Icteria virens*	—/SSC	Breeds in riparian habitats having dense understory vegetation, such as willow and blackberry.	**None.** Riparian habitat within the study area lacks well-developed dense understory and is subject to ruderal influences from adjacent agricultural and infrastructure land uses.
Yellow warbler *Setophaga petechia*	—/SSC	Breeds in riparian woodlands, particularly those dominated by willows and cottonwoods with a dense brush understory.	**None.** Riparian habitats within the study area are limited to scattered cottonwood–willow riparian along stream banks. These are limited in size and quality, with typically ruderal understories and poorly developed canopies.

Common Name *Scientific Name*	Listing Status[1] (Fed/State)	Habitat Requirements	Potential for Occurrence
Mammals			
Pallid bat *Antrozous pallidus*	—/SSC	Forages over many habitats; roosts in buildings, large oaks or redwoods, rocky outcrops and rocky crevices in mines and caves. The species roosts in the open during night but prefers crevices or buildings during daytime and hibernation periods. Hibernation sites are typically near day and night roosting locations.	**Moderate.** Trees, annual grassland, and large culverts that pass under the FKC within the study area may provide potential roosting and foraging habitat for the species. Bridges and other project related infrastructure may support roosting sites. A single CNDDB occurrence was recorded in 1946 about 11 miles east of the FKC.
Townsend's big-eared bat *Corynorhinus townsendii*	—/SSC	Hibernation roosts are typically in abandoned mines or caves that have low and stable temperature. While roosting, large open areas are preferred over crevices and cracks.	**Moderate.** Large culverts that pass under the FKC may provide roosting habitat. Two CNDDB occurrences are recorded in 1988 and 1941 approximately nine miles east of the FKC near Success Lake.
Tipton kangaroo rat *Dipodomys nitratoides*	E/E	Inhabits annual grasslands on the western side of the San Joaquin Valley; marginal habitat in alkali scrub. Digs burrows in elevated soil mounds at bases of shrubs.	**None.** Habitat within the study area is not typically associated with the species. Alkali playas and well-developed salt scrub habitats within the study area are limited in size and quality, and lack connectivity with larger parcels of suitable valley salt-sink habitats. The nearest CNDDB occurrences were recorded in 1943 approximately 12 miles northwest of Porterville and in 1985 within the city limits of Earlimart, adjacent to State Route 99. All other CNDDB occurrences are recorded west of State Route 99.
Western mastiff bat *Eumops perotis californicus*	—/SSC	Open, arid habitats, woodlands, grasslands, chaparral, desert scrub. Roosts in crevices in cliff faces, high buildings, trees and tunnels.	**Moderate.** Suitable roosting habitat may be present within bridges and other project-related infrastructure.
Buena Vista Lake shrew *Sorex ornatus relictus*	E/SSC	Typically found close to water and prefers moist soils. Riparian and wetland vegetation with leaf litter and dense herbaceous cover (USFWS 2011a).	**Low.** Suitable habitat may be present around the mulefat thickets and other wet areas north of Deer Creek.

Common Name ***Scientific Name***	**Listing Status[1] (Fed/State)**	**Habitat Requirements**	**Potential for Occurrence**
American badger *Taxidea taxus*	—/SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Several hundred undisturbed acres are required for home range.	**Low.** The study area does not provide adequate undisturbed land as is required by this species. The annual grassland present is a limited corridor and is surrounding by intensively disturbed agricultural lands. There is one CNDDB occurrence reported within five miles of the study area from 1986.
San Joaquin kit fox *Vulpes macrotis mutica*	E/T	Inhabits dens with openings ranging from 4 to 12 inches in diameter within grassland and scrubland habitats. May use several dens, especially during the summer months. Also utilizes atypical dens such as culverts, pipes, and holes under concrete slabs. Agricultural lands such as orchards, vineyards, and irrigated pastures are also used for foraging.	**Low.** Burrows (4–12 inches in diameter) and other features (e.g., pipes, culverts) on the FKC embankments provide potential denning habitat. The study area provides suitable habitat, and there are CNDDB reported occurrences within 10 miles of the study area. Stantec has performed extensive surveys and camera monitoring for San Joaquin kit fox, all with negative results (Section 7.3.10, Survey Results).

[1]Federal and State Status Codes: E = Endangered; T = Threatened; CT= Candidate Threatened; CE= Candidate Endangered; FP = Fully Protected; SSC= Species of Special Concern.

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5.0 RESULTS: DISCUSSION OF BIOLOGICAL RESOURCES

5.1 SENSITIVE NATURAL COMMUNITIES AND AQUATIC RESOURCES

5.1.1 Sensitive Natural Communities

Four sensitive natural communities are present within the study area. They include valley oak woodland, red willow thickets, shining willow groves, and Fremont cottonwood forest. These habitat types are described in Section 5.2.1.

5.1.2 Aquatic Resources Results

Based on the results of the 2019 delineation of potential waters of the United States (Stantec 2019a), aquatic resources that are present in the study area include groundwater recharge basins (20.5 acres), intermittent streams (2 acres, 2,294 linear feet), irrigation canals (other than the FKC) (4.7 acres, 12,229 linear feet), non-vegetated ditches (0.6 acre, 4,816 linear feet), ponds (6 acres), riparian/fresh emergent wetland complexes (0.01 acre), riparian wetland (1.9 acres), and seasonal wetland (0.4 acre). None of these aquatic resources are anticipated to qualify as waters of the United States because they are not tributaries to a Traditional Navigable Water and do not appear to have an interstate or foreign commerce connection; or they are human-made features constructed in uplands (Attachment C, Delineation Report). However, this determination is considered preliminary until the U.S. Army Corps of Engineers (USACE) provides a written determination of its jurisdiction.

Although not included in the 2019 delineation report, the FKC is the most prominent aquatic feature within the study area and occupies a total of approximately 298 acres (33 linear miles) of the study area. Two intermittent streams that were not included in the 2019 delineation report, but that occur in the study area are Porter Slough (0.9 acre, 1,115 linear feet) and Tule River (4.7 acres, 1,081 linear feet). Porter Slough supports adjacent riparian wetlands (0.3 acre) and Tule River supports adjacent riparian wetlands (2 acres) and an adjacent fresh emergent wetland (0.1 acre).

Friant-Kern Canal

The FKC, constructed by Reclamation between 1949 and 1951, is owned by Reclamation and is operated and maintained by the FWA. The FKC supplies San Joaquin River water stored at Millerton Lake to more than 30 irrigation districts and cities, and to 15,000 family farms. Within the study area, the FKC is concrete lined and approximately 65 feet wide, and there is no vegetation present within the canal. The FKC is known to support game fish such as crappie (*Pomoxis* sp.) and catfish (Siluriformes), as well as other fish species.

Fresh Emergent Wetland

One fresh emergent wetland occurs in Tule River downstream from where water is released from the FKC. The aquatic resource is situated below the ordinary high water mark (OHWM) extending from the bank to near the middle of the channel on river right. Dominant vegetation is common tule (*Schoenoplectus acutus*).

Groundwater Recharge Basins

Groundwater recharge basins occur as depressions or diked areas used to recharge groundwater. They are generally larger than ponds and are seasonally or only occasionally inundated. They may support hydrophytic vegetation, non-hydrophytic vegetation, or be barren. Groundwater recharge basins were delineated based on the presence of an OHWM indicated by presence of biotic crust, changes in vegetation, changes in sediment texture, and breaks in slope.

Isolated Intermittent Streams

Four intermittent streams flow westerly through the study area: Porter Slough, Tule River, Deer Creek, and White River. They are characterized as bed and bank features with an OHWM, which predominately occur along fortified/channelized banks. Sand is the dominant substrate in the active low flow channel, while silt dominates the floodplain. The low flow channels are barren or sparsely vegetated by opportunistic herbaceous species including cocklebur, horseweed (*Erigeron canadensis*), Johnson grass (*Sorghum halepense*), and common sunflower (*Helianthus annuus*). The floodplains support moderate to dense non-hydrophytic vegetation including Harding grass (*Phalaris aquatica*), wall barley (*Hordeum murinum*), and short podded mustard (*Hirschfeldia incana*), or they support riparian wetlands (described below).

Non-Vegetated Ditches and Irrigation Canals

Several non-vegetated ditches and irrigation canals other than the FKC occur in the study area. Non-vegetated ditches and irrigation canals are used to deliver irrigation water to agricultural lands. They range from 2 to 71 feet wide, seasonally carry flow, are generally unlined, and may support vegetation along their edges. Some of the irrigation canals receive deliveries from the FKC while others pass under the FKC in siphons.

Ponds

Ponds occur in human-made depressions scattered throughout the study area. Ponds may have persistent surface water or dry out seasonally. Some ponds support hydrophytic vegetation around the edge or throughout the pond. Many of the ponds are associated with irrigation of adjacent fields, orchards, or vineyards. Other ponds are associated with deep excavations for siphons under the FKC to convey flood waters under the canal or to contain leaks from the canal. No outflow channels were observed from any of the ponds.

Riparian Wetlands

The intermittent streams in the study area support riparian wetlands along their banks and at some higher elevations within the Tule River channel. Dominant species include bur marigold, rice cutgrass (*Leersia oryzoides*), willow weed (*Persicaria lapathifolia*), jungle-rice (*Echinochloa colona*), white-stem hedge-nettle (*Stachys albens*), stinging nettle (*Urtica dioica*), willows, and Fremont cottonwood. One riparian/fresh emergent wetland complex was mapped in Deer Creek. Dominant vegetation included broad-leaved cattail (*Typha latifolia*) and willows.

Seasonal Wetland

One seasonal wetland was mapped in a depression adjacent to the FKC, which may have been formed incidental to the construction of the canal. Dominant plant species include common spikerush (*Eleocharis macrostachya*), cocklebur, and curly dock (*Rumex crispus*). The feature appears to collect water from a series of roadside ditches, and water is either pumped into the FKC or passes under the canal in a siphon to a pond with no defined outflow channel.

5.2 SPECIAL-STATUS PLANT SPECIES

As discussed in Section 4, the study area provides suitable habitat for 10 special-status plant species that have a potential to occur in the study area. These species include the following:

- Earlimart orache (*Atriplex cordulata* var. *erecticaulis*), CRPR 1B.2;
- Lost Hills crownscale (*Atriplex coronata* var. *vallicola*), CRPR 1B.2;
- Brittlescale (*Atriplex depressa*), CRPR 1B.2;
- Lesser saltscale (*Atriplex minuscula)*, CRPR 1B.1;
- Subtle orache (*Atriplex subtilis*), CRPR 1B.2;
- Recurved larkspur (*Delphinium recurvatum*), CRPR 1B.2;
- Hoover's eriastrum (*Eriastrum hooveri),* CRPR 4.2;
- Spiny-sepaled button-celery (*Eryngium spinosepalum),* CRPR 1B.2;
- Munz's tidy-tips (*Layia munzii*), CRPR 1B.2; and
- California alkali grass (*Puccinellia simplex*), CRPR 1B.2.

5.2.1 Special-Status Plant Species Results

Earlimart Orache

Specimens of Earlimart orache were collected multiple times between the 1920s and 1970s. However, each of these earlier collections was incorrectly labelled as a previously described, closely related plant species. Further field work as well as additional collections made in the 1980s and 1990s became a catalyst for a re-examination of preserved plant specimens housed at various herbaria. As a result of that analysis and an examination of newly collected plant specimens, it was determined that the description of a distinct and heretofore undescribed plant taxon was warranted at species rank. The outcome of those efforts resulted in the description of Earlimart orache, first published in 1997 (Stutz et. al. 1997: 89).

Earlimart orache is an annual, erect, herbaceous plant species, generally 10 to 50 centimeters tall, with one to many stems emerging from the base. The ascending to erect, abundantly branched stems are gray-scaly with soft wooly tips. The leaf blades are relatively small (6 to 20 millimeters), ovate, and gray-scaly. Earlimart orache is distinguished from related plant taxa that it closely resembles based on characteristic leaf base shapes and the size and shape attributes of the fruit. As a result, positive determinations regarding the identification of this plant species should be made well within the overall bloom period of April through October, when mature fruit are available for examination under magnification. Stutz et al. report that most flowering of Earlimart orache occurs between August and September (Stutz et al. 1997: 89).

Earlimart orache is found in valley and foothill grassland habitat at elevations between approximately 235 to 330 feet above mean sea level. It is known from approximately 20 extant occurrences in Kern, Kings, and Tulare counties. There is one CNDDB occurrence within five miles of the study area. The study area is within the known range of this plant species, and the grassland habitat throughout the study area provides potential habitat for this plant species. This habitat is isolated, limited, and of marginal ecological quality. Therefore, there is a low potential for this plant species to occur.

Lost Hills Crownscale

Lost Hills crownscale was first described and published in 1938 (Hoover 1938) and is known from approximately 100 extant occurrences in Fresno, Kings, Kern, Merced, San Benito, San Luis Obispo, and Tulare counties.

Lost Hills crownscale is an annual, erect, herbaceous plant species, generally 10 to 30 centimeters tall, with one to few stems emerging from the base. The decumbent to erect, stiff, generally gray-scaly branches become glabrous and straw-colored with age. The leaf blades are relatively small (8 to 20 millimeters) and elliptic to ovate shaped. Lost Hills crownscale is distinguished from related plant taxa that it closely resembles based on characteristic leaf margin patterns and size and shape attributes of the fruit. As a result, positive determinations regarding the identification of this plant species should be made well within the overall bloom period of April through August, when mature fruit are available for examination under magnification.

Lost Hills crownscale is found in chenopod scrub, valley and foothill grassland, drying ponds, and vernal pools at elevations between approximately 160 and 2,080 feet above mean sea level. The study area is within the known range of this plant species, but there are no CNDDB occurrences within five miles of the study area. The grassland habitat throughout the study area provides potential suitable habitat for this plant species. This habitat is isolated, limited, and of marginal ecological quality. Therefore, there is low potential for this plant species to occur.

Brittlescale

Brittlescale was first described and published in 1892 (Jepson 1892), albeit under a different name, and has been variously treated by previous taxonomic authorities, at times as a synonym of a previously described plant species and at others as a distinct variety of a plant species. It is currently treated and accepted at species rank and is known from about 60 extant occurrences in Alameda, Contra Costa, Colusa, Fresno, Glenn, Kern, Merced, Solano, Stanislaus, Tulare, and Yolo counties.

Brittlescale is an annual, prostrate-decumbent to ascending herbaceous plant species, generally less than 30 centimeters tall, with few to many stems emerging from the base. Stems are brittle, reddish in color, and peel with age. The generally oppositely arranged leaves are small (2.5 to 10 millimeters), generally densely white-scaly, and ovate to cordate shaped. Brittlescale is distinguished from related plant taxa that it closely resembles based on its many-branched prostrate form, position of leaf attachment, and characteristic textural attributes of the fruit surface. As a result, positive determinations regarding the identification of this plant species should be made well within the overall bloom period of April through October, when mature fruit are available for examination under magnification.

Brittlescale is found in habitats such as chenopod scrub, meadows and seeps, playas, and valley and foothill grassland at elevations between approximately 1 and 1,050 feet above mean sea level. This plant species is found on alkaline soils and clay soils. The study area is within the known range of this plant species, but there are no CNDDB occurrences within five miles of the study area. The grassland and saltbush scrub habitats throughout the study area provide potential habitat for this plant species. These habitat types are isolated, limited, and of marginal ecological quality. Therefore, there is a low potential for this plant species to occur.

Lesser Saltscale

Lesser saltscale was first described and published in 1916 (Standley 1916), albeit under a different name, and has been variously treated by previous taxonomic authorities, at times as a synonym of a previously described plant species and at others as a distinct variety of a plant species. It is currently treated and accepted at species rank and is known from approximately 50 extant occurrences in Alameda, Butte, Fresno, Kings, Kern, Madera, Merced, and Tulare counties.

Lesser saltscale is an annual, ascending to erect herbaceous plant species generally less than 40 centimeters tall, with many stems emerging from the base. The spreading branches are brittle, reddish in color, and peel with age. The generally alternately arranged leaves are small (4 to 10 millimeters), generally white-scaly, and ovate to cordate shaped. Lesser saltscale is distinguished from related plant taxa that it closely resembles based on its many-branched ascending to erect form, position of leaf attachment, and characteristic textural attributes of the fruit surface. As a result, positive determinations regarding the identification of this plant species should be made well within the overall bloom period of April through October, when mature fruit are available for examination under magnification.

Lesser saltscale is found in habitats such as chenopod scrub, playas, and valley and foothill grassland at elevations between approximately 50 and 656 feet above mean sea level. This plant species is found on alkaline soils or sandy soils. The study area is within the known range of this plant species, but there are no CNDDB occurrences within five miles of the study area. The grassland and saltbush scrub habitats throughout the study area provide potential habitat for the species. This habitat is isolated, limited, and of marginal ecological quality. Therefore, there is a low potential for this plant species to occur.

Subtle Orache

Specimens of subtle orache were collected many times between the 1880s and 1970s. However, each of these earlier collections was incorrectly labelled as a closely related plant species. Further field work as well as additional collections made in the1980s and 1990s became a catalyst for a re-examination of preserved plant specimens housed at various herbaria. As a result of that analysis and an examination of newly collected plant specimens, it was determined that the description of a distinct and heretofore undescribed plant taxon at species rank was warranted. The outcome of those efforts resulted in the description of subtle orache, first published in 1997 (Stutz and Chu 1997).

Subtle orache is an annual erect herbaceous plant species, generally less than 30 centimeters tall, with many slender stems emerging from the base. The many slender, spreading branches are reddish in color, and peel with age. The generally oppositely arranged leaves are very small (2 to 4 millimeters), generally white-scaly, and ovate-triangular to cordate shaped. Subtle orache is distinguished from related plant taxa that it resembles based on its many-slender, widely spreading stems position of leaf attachment and characteristic textural attributes of the fruit surface. As a result, positive determinations regarding the identification of this plant species should be made well within the overall bloom period of June through September (October), when mature fruit are available for examination under magnification.

Subtle orache is found in valley and foothill grassland habitat with saline or alkaline soils between approximately 130 to 325 feet above mean sea level. It is known from approximately 20 extant occurrences in Butte, Fresno, Kings, Kern, Madera, Merced, Stanislaus, and Tulare counties. The study area is within the known range of this plant species, but there are no CNDDB occurrences within five miles of the study area. The grassland and saltbush scrub habitats throughout the study area provide potential habitat for the species. This habitat is isolated, limited, and of marginal ecological quality. Therefore, there is a low potential for this plant species to occur.

Recurved Larkspur

Recurved larkspur was first described and published in 1889 (Greene 1889). Subsequent plant taxonomists of the early 1900s proposed treating it as a variety within a previously described taxon. However, those proposals were not recognized by later plant taxonomists, and it remains treated within and accepted at species rank. It is known from approximately 85 extant occurrences in Alameda, Contra Costa, Fresno, Glenn, Kings, Kern, Madera, Merced, Monterey, San Joaquin, San Luis Obispo, Solano, Sutter, and Tulare counties.

Recurved larkspur is a perennial erect herbaceous plant species, usually between 18 and 60 centimeters tall, with one generally unbranched stem arising from the base. Basal leaves are generally much larger than cauline leaves, with few to many lobes. The sepals are generally light blue and reflexed; the lower petals are white. Recurved larkspur is distinguished from related plant taxa that it resembles based on the presence or absence of many factors including but not limited to the chromatics of the inner and outer perianth, seed anatomy, shape and length of leaf petiole hairs; overall height of plant stem; presence or absence and location of striae on the stem; and edaphic characteristics such as the texture and chemical composition of the soil in which it occurs. As a result, positive determinations regarding the identification of this plant species should be made within the peak of the overall bloom period of March through June, during which time a suite of diagnostic taxonomic characteristics should be observable. Additional taxonomic challenges can occur; recurved larkspur may hybridize with four other species of larkspur.

Recurved larkspur is found in habitats such as chenopod scrub, cismontane woodland, and valley and foothill grassland at elevations between approximately 10 and 2,600 feet above mean sea level. This plant species tends to prefer moist, fine-textured alkaline soils. The study area is within the known range of this plant species and there are several CNDDB occurrences within five miles of the study area. The grassland and saltbush scrub habitats throughout the study area provide potential habitat for this plant species. This habitat is isolated, limited, and of marginal ecological quality. Therefore, there is a low potential for this species to occur. This species was not observed during the March 2020 botanical survey and is determined to not occur in the study area.

Hoover's Eriastrum

Hoover's eriastrum was first described in 1945 (Mason 1945). It is known from approximately 35 extant occurrences in Fresno, Kings, Kern, Los Angeles, Santa Barbara, San Benito, and San Luis Obispo counties.

Hoover's eriastrum is an annual erect herbaceous plant species, usually between 3 to 15 centimeters tall. The linear, small (5 to 25 millimeters) leaves are entire or three lobed at the base. The corolla is white and salverform in shape. Hoover's eriastrum is distinguished from related plant taxa that it resembles based on the presence or absence of many factors including but not limited to its annual life cycle, the chromatics of the outer perianth, and the location of the anthers as compared to the corolla sinus. As a result, positive determinations regarding the identification of this plant species should be made within the early portions of the overall bloom period of March through July, during which time the aforementioned diagnostic taxonomic characteristics should be observable.

Hoover's eriastrum is found in habitats such as chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland at elevations between approximately 165 and 3,000 feet above mean sea level. This plant species tends to thrive in disturbed and marginal habitats. The grassland and saltbush scrub habitats throughout the study area provide potential habitat for the species. The study area is within the known range of this plant species, but there are no CNDDB occurrences within five miles of the study area. However, given the opportunistic nature of this plant species, there is a low potential for this species to occur. This species was not observed during the March 2020 botanical survey and is determined to not occur in the study area.

Spiny-Sepaled Button-Celery

Spiny-sepaled button-celery was first described and published in 1936 (Mathias 1936), albeit under a different name, and has been variously treated by previous taxonomic authorities; it is currently treated and accepted at species rank and is known from approximately 100 extant occurrences in Contra Costa, Fresno, Kern, Madera, Merced, San Luis Obispo, Stanislaus, Tulare, and Tuolumne counties.

Spiny-sepaled button-celery is an annual or perennial, erect, herbaceous plant species usually between 30 and 75 centimeters tall. The single stem arises from the base and is generally branched between 2 and 5 centimeters above the base. Spiny-sepaled button-celery is distinguished from related plant taxa that it resembles based on the leaf length in comparison to the petiole and the characteristics of floral and fruit bracts. As a result, positive determinations regarding the identification of this plant species should be made within the bloom period of April to July, during which time some of the aforementioned diagnostic taxonomic characteristics should be observable.

Spiny-sepaled button-celery is found in temporary, wet depressions such as vernal pools, swales, and roadside ditches within valley and foothill grassland, as well as freshwater wetlands and wetland-riparian habitats between approximately 260 and 3,200 feet above mean sea level. The roadside ditches provide potential habitat for this plant species. The study area is within the known range of this plant species, and there are several CNDDB occurrences within five miles of the study area. The ditches in the study area have a high cover of upland species and are unlikely to support spiny-sepaled button-celery. Therefore, there is a low potential for this plant species to occur. This species was not observed during the March 2020 botanical survey and is determined to not occur in the study area.

Munz's Tidy Tips

Munz's tidy tips was first described and published in 1935 (Keck 1935) and is known from 57 occurrences in Fresno, Kern, San Benito, San Luis Obispo counties.

Munz's tidy tips is an annual herbaceous plant species, generally between 6 and 50 centimeters tall. It is glandular and decumbent to erect in form, and the ray flowers are white distally. Munz's tidy tips is distinguished from related plant taxa that it resembles based on the presence of disk pappus, the presence and number of ray flowers, and fruit characteristics. As a result, positive determinations regarding the identification of this plant species should be made within the bloom period of March to April, during which time some of the aforementioned diagnostic taxonomic characteristics should be observable.

Munz's tidy tips is found on alkaline and clay soils within chenopod scrub and foothill grassland between approximately 490 and 2,300 feet above mean sea level. The study area is within the known range of this plant species, but there are no CNDDB occurrences within five miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality. Therefore, there is a low potential for this plant species to occur. This species was not observed during the March 2020 botanical survey and is determined to not occur in the study area.

California Alkali Grass

California alkali grass was first described by Scribner (1899) and is known from approximately 65 extant occurrences in Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kern, Lake, Los Angeles, Madera, Merced, Napa, San Bernardino, Santa Clara, Santa Cruz, San Luis Obispo, Solano, Stanislaus, Tulare, and Yolo counties.

California alkali grass is an annual grass. It is usually erect, not mat forming, and generally between 2 and 25 centimeters tall. It is distinguished from related plant taxa that it resembles based on its annual life cycle and the length and shape of inflorescence bracts (lemmas). As a result, positive determinations regarding the identification of this plant species should be made within the bloom period of March to May, during which time some of the aforementioned diagnostic taxonomic characteristics should be observable. California alkali grass is found in alkaline soils within chenopod scrub, meadows and seeps, vernal pools, lake margins, saline flats and mineral springs and sinks at elevations between 7 and 3,050 feet above mean sea level. The study area is within the known range of this species, but there are no known occurrences within five miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality. Therefore, there is a low potential for this plant species to occur. This species was not observed during the March 2020 botanical survey and is determined to not occur in the study area.

5.3 SPECIAL-STATUS ANIMAL SPECIES

The study area provides potential habitat for 18 special-status animal species which have a potential to occur in the study area. These species include the following:

- Kern brook lamprey (*Entosphenus hubbsi*), CDFW species of special concern;
- San Joaquin roach (*Lavinia symmetricus*), CDFW species of special concern;
- Western spadefoot (*Spea hammondii*), CDFW species of special concern;
- Northern California legless lizard (*Anniella pulchra*), CDFW species of special concern;
- California glossy snake (*Arizona occidentalis*), CDFW species of special concern;
- San Joaquin coachwhip (*Masticopus flagellum ruddocki*), CDFW species of special concern;
- Coast horned lizard (*Phrynosoma blainvillii*), CDFW species of special concern;
- Golden eagle (*Aquila chrysaetos*), CDFW fully protected;
- Burrowing owl (*Athene cunicularia*), CDFW species of special concern;
- Swainson’s hawk (*Buteo swainsoni*), state threatened;
- Northern harrier (*Circus cyaneus*), CDFW species of special concern;
- White-tailed kite (*Elanus leucurus*), CDFW fully protected;
- Pallid bat (*Antrozous pallidus*), CDFW species of special concern;
- Townsend’s big-eared bat (*Corynorhinus townsendii*), CDFW species of special concern;
- Western mastiff bat (*Eumops perotis californicus*), CDFW species of special concern;
- Buena Vista Lake shrew (*Sorex ornatus relictus*), federal endangered and CDFW species of special concern;
- American badger (*Taxidea taxus*), CDFW species of special concern; and
- San Joaquin kit fox (*Vulpes macrotis mutica*), federal endangered and state threatened.

5.3.1 Special-Status Animal Species Results

Kern Brook Lamprey

Kern brook lamprey inhabits the silty backwaters of large rivers. In the summer, they are found in shallow pools along stream edges with minimal flow. They require gravel-bottomed areas for spawning and muddy-bottomed areas where the ammocoetes (larval stage) can burrow and feed. The species was first discovered in the siphons of the FKC, and there is one documented CNDDB occurrence from 1972. Given that spawning habitat is generally absent in the canal, the species is not likely to reproduce within the canal. However, with the documented occurrence within the canal, there is a high potential for the species to be present within the canal.

San Joaquin Roach

The San Joaquin roach is a subspecies that is typically found in the San Joaquin Valley in a variety of streams that are tributaries of the San Joaquin River. The fish is well adapted to small intermittent streams with warm temperatures. Individuals are often found in isolated pools as intermittent streams dry up. Potential habitat in the study area is present in the intermittent streams. No CNDDB occurrences are recorded within 15 miles of the study area. However, given the potential habitat within the range of the species, there is a low potential for this fish to occur.

Western Spadefoot

Western spadefoot requires shallow, temporary pools or streams during the breeding season and adjacent upland habitat for burrowing during the non-breeding season. Western spadefoot is typically found in grasslands, with occasional populations found in valley-foothill hardwood woodlands. Some populations are able to persist in orchard or vineyard habitats that are seasonally flooded. The study area is within the current known range of the species. There are two CNDDB occurrences from 2005 located adjacent to the FKC embankment. The seasonal wetlands and ponds within the study area provide breeding and adjacent upland habitat for the species. Therefore, given the breeding and upland habitat present in the study area and the distance from other documented occurrences, there is high potential for this species to occur.

Northern California Legless Lizard

Northern California legless lizard occurs in sparsely vegetated areas of dunes, chaparral, pine–oak woodlands, desert scrub, sandy washes, and stream terraces. Potential habitat may be available adjacent to the four stream crossings. The study area is at the eastern boundary of the current known range of the species. There are no CNDDB records within five miles of the study area. Given the potential habitat present in the study area along the boundary of the species' range, there is a low potential for the species to occur.

California Glossy Snake

California glossy snake occurs in arid scrub, rocky washes, grasslands, and chaparral habitats. The species prefers open areas with loose soil for burrowing. The study area extends into the northern boundary of the species current known range in southern Tulare and Kern counties. Within the species range, the study area contains marginally suitable arid scrub habitat. The nearest CNDDB occurrence is located approximately nine miles south of the study area. Given the marginal habitat along the boundary of the species' range, there is a low potential for the species to occur.

San Joaquin Coachwhip

The San Joaquin coachwhip occurs in open, dry, treeless areas with little or no cover in a variety of habitats. The species tends to avoid dense vegetation which prevents quick movement. It takes refuge in existing rodent burrows, under-shaded vegetation, and other surface objects. The San Joaquin coachwhip subspecies is endemic to California and ranges in the Sacramento and San Joaquin valleys from Arbuckle in Colusa County south to the Grapevine in Kern County. There are two CNDDB occurrences from 1992 approximately nine miles west of the FKC. Given that the study area is within the current known range of the species and marginal habitat exists within the valley foothill grassland and saltbush scrub, there is a low potential for the species to occur.

Coast Horned Lizard

Coast horned lizard occurs in chaparral, grasslands, woodland clearings, and riparian areas. The species prefers open areas with sandy soil and low growing vegetation, is often found along sandy washes with scattered shrubs and along dirt roads, and is also frequently found near ant hills, which is a preferred food source. Within the study area, the species could be found in arid scrub, grassland, and riparian areas. Suitable habitats are limited in size, lack connectivity with other suitable habitats, and are subject to ruderal influences. No CNDDB occurrences have been documented within five miles of the study area to date. Given that the study area is within the current known range of the species and marginal habitat exists, there is a low potential for the species to occur.

Golden Eagle

Golden eagles are typically found in rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, and cliff and rock outcrops. They build large nests in large trees in open areas and on cliffs of all heights. The study area occurs within the range of golden eagle. There are no CNDDB-recorded occurrences within five miles of the study area. The cottonwoods, valley oaks, and other tall trees within and immediately adjacent to the study area may provide suitable nest trees for this species. The annual grassland, fallow agriculture, and ruderal habitat within the study area provides potential foraging habitat for the species. Given the potential nesting and foraging habitat present in the study area, no documented occurrences within five miles of the study area, and no eagles or eagle size nests observed during the 2019 field surveys, there is low potential for this species to occur.

Burrowing Owl

Burrowing owls nest in open, dry grassland, desert, and ruderal habitats. They often nest on the banks of canals and levees. They inhabit small mammal burrows or other suitable underground cavities for nesting. The study area occurs within the range of burrowing owl. The nearest CNDDB occurrence for the species is 5.5 miles west of the study area and 1.9 miles southwest of the city of Delano. The existing canal embankments, grassland, and ruderal habitats provide suitable habitat for the species; therefore, there is a moderate potential for this species to occur.

Swainson's Hawk

Swainson's hawks nest in stands with few trees in juniper-sage flats, riparian areas, oak savannah, and open agricultural habitats. They require adjacent open fields for foraging including livestock pastures, grasslands, alfalfa, or grain fields. According to a study performed by Estep (2009) regarding the suitability of vegetation structure on Swainson's hawk foraging habitat, different habitats offer either high, moderate, or low suitability for Swainson's hawk foraging. Their preferred prey items are voles (*Microtus* sp.), pocket gophers (*Thomomys bottae*), birds, and insects such as grasshoppers (*Caelifera* sp.) (Estep 1989). Swainson's hawks are migratory and typically begin arriving in their breeding territory in the

Central Valley in early March to April and immediately begin reconstructing previously used nests or constructing new ones (Estep 2009). They typically begin their southerly migration in early August to mid-September (Estep 2009). The study area occurs outside and east of the current range (updated in 2011) of Swainson's hawk; however, the nearest CNDDB occurrence is an active nest from 2017 located approximately 100 feet west of the study area, just west of Porterville. The cottonwoods, valley oaks, and other tall trees within and immediately adjacent to the study area may provide suitable nest trees for this species. The annual grassland, agriculture, and ruderal habitat within the study area provides potential foraging habitat for the species. Given the potential nesting and foraging habitat present in the study area and the distance from other documented occurrences, there is high potential for this species to occur.

Northern Harrier

Northern harriers nest on the ground and forage in and near wet habitats such as freshwater marsh, wet meadows, grasslands, lightly grazed pastures, some croplands, and weedy borders of lakes, rivers, and streams. The study area occurs within the range of northern harrier, but there are no CNDDB occurrences for the species within the nine-quadrangle search area. The fallow agriculture and annual grassland habitats provide potential nesting habitats for this species. The annual grassland habitat within the study area also provides potential foraging habitat. Given that the study area is within the northern harrier's current range and potential nesting and foraging habitat for the species is present in the study area, there is moderate potential for this species to occur.

White-Tailed Kite

White-tailed kites nest in dense stands of tall shrubs and trees located adjacent to foraging habitat (i.e., undisturbed open grasslands, meadows, farmlands, and emergent wetlands), and are seldom observed more than 0.5 mile from an active nest during the breeding season (Zeiner et al. 1990). The study area occurs within the range of white-tailed kite, but there are no CNDDB occurrences for the species within the nine-quadrangle search area. The tall trees within and immediately adjacent to the study area may provide suitable nest trees for this species. The annual grassland habitat within the study area also provides potential foraging habitat. Given the study area is within the white-tailed kite's current range and potential nesting and foraging habitat for the species is present in the study area, there is moderate potential for this species to occur.

Pallid Bat, Townsend's Big-Eared Bat, and Western Mastiff Bat

Pallid bat, Townsend's big-eared bat, and western mastiff bat may roost individually or in small groups in the study area. Pallid bats typically roost in tree cavities, rock crevices, caves, exfoliating bark, or in human-made structures (e.g., bridges). Townsend's big-eared bats typically roost in abandoned mines and caves. Western mastiff bats typically roost in on vertical faces such as rock outcroppings, cliff faces, tunnels, and tall buildings. The study area occurs within the range of all three bat species. The study area contains mature cottonwood and oak trees that may contain suitable roosting habitat (e.g., cavities, exfoliating bark) for these species. The study area also contains large culverts that pass under the FKC that may provide suitable roosting habitat. There is one CNDDB occurrences of Townsend's big-eared bat within five miles of the study area (CDFW 2019a). Based on the past documented occurrence and the potential nesting and foraging habitat in the study area, there is moderate potential for these species to occur.

Buena Vista Lake Shrew

Buena Vista Lake shrew inhabits riparian and wetland habitat in the San Joaquin Valley (USFWS 1998). Habitats that are relatively close to permanent water with an abundance of leaf litter, dense herbaceous cover, and moist soil are preferred (USFWS 2011a). Due to their extremely high metabolism, they are constantly searching for food when awake to avoid starvation. As a result, they are active both day and night.

The study area is within the current known range of the species. Deer Creek flows into Pixley National Wildlife Refuge (approximately 14 miles to the west) where Buena Vista Lake shrew was detected in December 2016 (Cyper et al. 2017). Within the study area, there is potential habitat for Buena Vista Lake shrew in Deer Creek, the mulefat thickets to the north, and adjacent Fremont cottonwood forest. Based on the connectivity to recent documented occurrences, the potential habitat in the study area, and negative results for this species during Stantec's 2019 surveys (Stantec 2019c), there is a low potential for the species to occur.

American Badger

American badgers inhabit dry, open stages of shrub, forest, and herbaceous habitats. The species requires friable soils for digging burrows. Badgers typically require vast expanses of open, undisturbed land for their territory. Although the study area has potential habitat for American badger in the grassland habitat, the habitat is found in narrow strips surrounded by intensively disturbed agriculture. There is one CNDDB-reported occurrence approximately two miles to the east of the study area from 1986. Given the distance to the recorded occurrence and the presence of low-quality habitat for the species, there is a low potential for the species to occur.

San Joaquin Kit Fox

SJKF is typically nocturnal but is commonly observed during the day during late spring and summer months. The species inhabits dens with openings ranging from 4 to 12 inches diameter within grassland and scrubland habitats. One SJKF may occupy several dens, especially during the summer months. Natal and pupping dens may be changed one to two times per month. Pups are usually born between February and late March. The pups emerge from the den for the first time at about one month old, with dispersal from the den taking place after four to five months, usually in August or September (USFWS 2011b).

Because much of their habitat has been altered, SJKF may utilize atypical dens such as culverts, pipes, and holes under concrete slabs. Agricultural lands such as orchards, vineyards, and irrigated pastures are also utilized by the SJKF (CSU, Stanislaus undated).

The Project is in the southeastern portion of the current range of the SJKF, which extends from the Los Padres National Forest south of Bakersfield north to Concord, California (USFWS ECOS 2019). There are numerous CNDDB records of the species within five miles of the study area. Most of the CNDDB records date back to 1975, with the most recent observation (CNDDB Occurrence Number 376) of a known den recorded in 2005, located less than one mile west of the Friant-Kern Canal MP 120.35. Another occurrence (CNDDB Occurrence Number 148) from 1993 was recorded along the Friant-Kern Canal at MP 129.07 (CDFW 2020). Based on the numerous past documented occurrences and the potential habitat in the study area, there is low potential for this species to occur.

6.0 DISCUSSION OF IMPACTS AND MITIGATION

The implementation of both the CE Alternative and CER Alternative would have construction and operation-related impacts. Construction impacts would be both temporary and permanent and would result from either enlarging the existing FKC or enlarging portions of the FKC and constructing a new canal parallel to the existing canal. Operational impacts from implementation of both the CE Alternative and CER Alternative would generally be equivalent to existing conditions because both Project alternatives would result in ongoing operations and maintenance of the FKC comparable to existing conditions. As such, it is anticipated that both the CE Alternative and CER Alternative would not result in new substantial operational impacts. Therefore, the impact discussion below focuses on construction-related impacts only.

6.1 HABITATS, SENSITIVE NATURAL COMMUNITIES, AND AQUATIC RESOURCES

6.1.1 Terrestrial Habitats and Agricultural Lands

Survey Results

Terrestrial habitats and agricultural lands are described in detail in Section 5.2.1 Habitat Communities.

Potential Impacts

Estimated temporary and permanent impacts on terrestrial habitats that are not considered sensitive natural communities are presented in Table 5. Habitat types that are considered sensitive natural communities are addressed separately in the report.

Table 5. Estimated Terrestrial Habitat Impacts

Terrestrial Habitat	CE Alternative CE Temporary (acres)	CE Alternative CE Permanent (acres)	CER Alternative CER Temporary (acres)	CER Alternative CER Permanent (acres)
Agriculture: Fallow	308	15	301	40
Agriculture: Field Crop	166	20	158	28
Agriculture: Orchard	145	124	181	247
Agriculture: Vineyard	23	51	42	113
Allscale Scrub	0	1	0	1
Barren/Ruderal	489	0[a]	506	0[a]
California Buckwheat Scrub	0.3	7	5	4
Mulefat Thickets	0.5	1	0.5	1
Non-Native Annual Grassland	226	0[a]	222	0[a]
Urban	28	7	31	7

[a] The Project alternatives will likely result in a net increase of barren/ruderal and grassland habitat due to conversion of agricultural lands to canal embankments and access roads.

Mitigation Measures

The habitat types and vegetation communities listed above are common habitats and managed agricultural lands; therefore, these are not considered sensitive biological resources. As such, no MMs are recommended. Potential impacts on special-status species that may use these habitats and vegetation communities are discussed separately in this document.

Compensatory Mitigation

None recommended.

6.1.2 Riparian Habitats and Sensitive Natural Communities

Survey Results

Four sensitive natural communities were mapped in the study area as shining willow groves, red willow thickets, Fremont cottonwood forest, and valley oak woodland. (Figure 3). All four of these riparian habitats occur adjacent to intermittent streams and are considered riparian habitats.

Potential Impacts

Both the CE Alternative and CER Alternative would have similar impacts on riparian habitat. Implementation of the CE Alternative is anticipated to result in temporary impacts on approximately 0.9 acre and permanent impacts on approximately 0.9 acre of Fremont cottonwood forest. Implementation of the CER Alternative is anticipated to result in temporary impacts on approximately 0.9 acre and permanent impacts on approximately one acre of Fremont cottonwood forest (Figure 5). Temporary impacts would result from removing trees and other vegetation to allow for construction equipment access, constructing siphons, and recontouring the streambank at Deer Creek. Permanent impacts would result from tree removal for the footprint of the expanded or realigned canal. No impacts on riparian habitat would occur at White River, and no temporary or permanent impacts on shining willow groves, red willow thickets, or valley oak woodland would result from implementation of either the CER Alternative or CE Alternative (Figures 5 and 6).

Mitigation Measures

The following MMs are recommended to avoid or minimize the potential for adverse impacts on riparian habitat and other sensitive natural communities:

MM 1 Temporary and permanent impacts on the Fremont cottonwood forest habitat at Deer Creek shall be minimized to the greatest extent practicable. Trees and other vegetation shall not be removed if it can otherwise be reasonably avoided. In determining areas where vegetation must be removed to provide adequate access for construction or staging, consideration shall be given to selecting areas which require the least amount of removal of mature trees and canopy cover, in coordination with a qualified biologist.

MM 2 Prior to initiation of construction, exclusionary fencing shall be installed along the boundaries of all environmentally sensitive areas (ESAs), which include sensitive natural communities and aquatic resources adjacent to the areas of project-related impacts, to be avoided so that impacts on ESAs outside of the construction area are minimized. Locations of ESAs and exclusionary fencing shall be identified on construction plans. The exclusionary fencing shall be inspected and maintained on a regular basis throughout Project construction in the areas where the fencing is needed to avoid unintended disturbance.

MM 3 A Post-Construction Revegetation and Monitoring Plan shall be developed and implemented to provide for the restoration of temporarily impacted riparian habitats to pre-existing conditions. The plan shall include provisions for the planting of native woody vegetation and native seed mix, or otherwise providing for the reestablishment of self-sustaining native riparian vegetation similar to the existing native riparian vegetation community. The plan shall also identify success criteria and provide for annual or other regular monitoring to evaluate whether the revegetation effort has met the success criteria. The plan shall include measures for remedial actions (e.g., additional plantings, supplemental irrigation, increased monitoring) in the event that monitoring efforts indicate that success criteria are not being met.

Compensatory Mitigation

None recommended.

6.1.3 Aquatic Resources

Survey Results

Terrestrial habitats and agricultural lands are described in detail in Section 6.1.2 Aquatic Resources Results.

Potential Impacts

Based on existing project detail, implementation of both the CE Alternative and CER Alternative would result in temporary and permanent impacts on aquatic resources (Table 6, Figures 5 and 6). The FKC and aquatic features that have been mapped as groundwater recharge basin, non-vegetated ditch, irrigation canal, and pond have all been constructed in uplands and are maintained and operated regularly for routine and ongoing agricultural purposes. As such, they are not considered sensitive biological resources; and no MMs are recommended. Potential impacts on special-status species that may utilize these features are discussed separately in this report.

The fresh emergent wetland and riparian wetlands present at Tule River and the riparian wetlands present at Porter Slough are considered sensitive biological resources, but would not be impacted by either of the Project alternatives. The riparian/fresh emergent wetland at Deer Creek would not be permanently impacted by either of the Project alternatives, but would be temporarily impacted under both Project alternatives. Both Project alternatives would result in temporary impacts on the riparian wetlands present at Deer Creek and White River, permanent impacts on the riparian wetlands at Deer Creek, and in temporary impacts on the intermittent stream channels at Deer Creek and White River. The temporary impacts would occur as a result of construction equipment access, decommissioning/constructing siphons, and recontouring the streambanks. The permanent impacts on the riparian wetlands at Deer Creek would result from the footprint of the canal realignment. The new siphons would be buried under the intermittent streams at Project completion and the streambeds would be restored. As such, the new siphons are not considered a permanent impact on the intermittent streams.

Table 6 provides a summary of estimated temporary and permanent impacts on aquatic resources by each Project alternative.

Table 6. Estimated Aquatic Resources Impacts

Aquatic Resource	CE Alternative CE Temporary	CE Alternative CE Permanent	CER Alternative CER Temporary	CER Alternative CER Permanent
Intermittent Stream: White River	0.5 acre, 397 linear feet	0	0.5 acre, 397 linear feet	0
Intermittent Stream: Deer Creek	0.5 acre, 490 linear feet	0	0.5 acre, 490 linear feet	0
Groundwater Recharge Basin	0.8 acre	0.4 acre	6.5 acres	13.2 acres
Fresh Emergent Wetland	0	0	0	0

Irrigation Canal	0.9 acre, 1,729 linear feet	2.4 acres, 5,915 linear feet	0.8 acre, 1,678 linear feet	0.3 acre, 681 linear feet
Non-Vegetated Ditch	0	0.06 acre, 983 linear feet	0	0.1 acre, 526 linear feet
Pond	0.02 acre	2 acres	0.02 acre	1.5 acres
Riparian/Fresh Emergent Wetland	0.01 acre	0	0.01 acre	0
Riparian Wetland	1.01 acre	0.7 acre	0.9 acre	0.9 acre
Seasonal Wetland	0	0	0	0

Mitigation Measures

The following MMs are recommended to avoid or minimize the potential for adverse impacts on sensitive aquatic resources:

MM 4 All work within the active channel of Deer Creek and White River shall be limited to the dry season when the channels are dry. If this is not practicable, stream flow shall be diverted around the work area in the channel using a clear water diversion that maintains downstream water quality and minimizes stream impacts at the inlet and outlet locations of the diversion.

MM 5 Prior to any temporary or permanent impacts on aquatic resources, any required permits/authorizations from the Regional Water Quality Control Board (Regional Water Board) or the USACE shall be obtained. All terms and conditions of the required permits/authorizations shall be implemented.

Prior to any activities that would obstruct the flow of, or alter the bed, channel, or bank of Deer Creek, White River, or any other streams, notification of streambed alteration shall be submitted to the CDFW. If required, a streambed alteration agreement shall be obtained from CDFW and all conditions of the agreement shall be implemented.

MM 6 Within 3 days of completion of siphon construction at Deer Creek and White River, the contours of the stream channels shall be restored as close as practicable to their original contour and conditions.

All temporary impacts on riparian wetlands and other sensitive aquatic resources shall be restored to pre-existing conditions in accordance with MM 2 (Post-Construction Revegetation and Monitoring Plan).

Compensatory Mitigation

The riparian wetlands that would be permanently impacted by the Project are considered sensitive biological resources that function to provide valuable resources for wildlife, and also provide for water quality benefits. The CE Alternative is estimated to result in a permanent loss of 0.7 acre of riparian wetland and the CER Alternative is estimated to result in the permanent loss of 0.9 acre of riparian wetland. This loss of wetland habitat is considerable and the following compensatory mitigation measure (CMM) is recommended.

CMM 1 The permanent loss of riparian wetlands shall be mitigated at a minimum of a 1:1 ratio. Mitigation shall consist of the purchase of mitigation credits from an agency-approved wetland mitigation bank (i.e., CDFW, Regional Water Board, USACE) or payment into an agency-approved in-lieu fee fund. The purchase of mitigation credits or in-lieu fee payment shall be completed prior to initiation of any permanent wetland impacts.

On- or offsite creation or restoration of wetland habitats may also be used to satisfy the compensatory mitigation requirement with written agency approval.

6.2 SPECIAL-STATUS PLANT SPECIES

Survey Results

There is potential habitat for ten special-status plants within the study area. General surveys of the study area were conducted from September 30 to October 3, 2019 to characterize habitat types. Botanical surveys timed to coincide with the early blooming period (March 2020) for potentially occurring special-status plant species have been conducted within the study area and resulted in no special-status plants observed within the study area (Attachment D, Stantec 2020). Botanical surveys timed to coincide with the late blooming period (e.g., August and September) for potentially occurring special-status plant species have not been conducted within the study area. As such, the presence or absence of late-blooming special-status plant species within the study area has not been determined. A list of all plants observed in the study area during all biological and botanical surveys is provided as Attachment E.

Project Impacts

Ground-disturbing activities for the both the CE Alternative and CER Alternative and the staging of equipment and materials is anticipated to temporarily and permanently impact annual grassland habitat. Spiny-sepaled button-celery and recurved larkspur, which both have moderate potential to occur in the study area, generally occur in wet depressions and alkaline areas respectively, within grassland habitats. Although the other potentially occurring special-status plants are relatively unlikely to occur in the study area given the generally poor habitat conditions, they are also associated with annual grassland habitat and their presence or absence cannot be confirmed until botanical surveys have been completed.

The CE Alternative is estimated to result in temporary impacts on approximately 226 acres of annual grassland. The CER Alternative is estimated to result in temporary impacts on approximately 222 acres of annual grassland. These impacts on annual grassland could adversely affect special-status plants if occurrences are present in the annual grassland habitats.

Mitigation Measures

The following MMs are recommended to avoid or minimize the potential for adverse effects on special-status plants.

MM 7 One botanical survey (late season) shall be conducted prior to construction activities to determine the presence or absence of special-status plant species including Earlimart orache, Lost Hills crownscale, brittlescale, lesser saltscale, and subtle orache in the project area. The surveys should be conducted in general accordance with the *Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities* (CDFW 2018) and shall be timed to appropriately coincide with the late blooming period (e.g., August to September) in all suitable habitat (e.g., annual grasslands) located within the project disturbance areas.

MM 8 If more than five years lapse after the March 2020 botanical survey before ground disturbance takes place, two botanical surveys (early and late season) shall be conducted in all suitable habitat located within the Project disturbance areas to determine the presence or absence of special-status plants. Special-status plants with a potential to be within the Project area that typically bloom early in the season (e.g., March and April) include recurved larkspur, Hoover's eriastrum, spiny-sepaled button-celery, Munz's tidy-tips, and California alkali grass. Special-status plants with a potential to be within the Project area that typically bloom late in the season (e.g., August and September) include Earlimart orache, Lost Hills crownscale, brittlescale, lesser saltscale, and subtle orache.

MM 9 In the event that special-status plant species are found during the botanical surveys, the locations of the special-status plants should be marked as avoidance areas both in the field, using flagging, staking, fencing, or similar devices, and on construction plans.

MM 10 If special-status plants are identified during pre-construction surveys, complete avoidance is not practicable, and the project would directly or indirectly affect more than 25 percent of a local occurrence by either number of plants or extent of occupied habitat, a qualified biologist will determine if implementation of a conservation plan is recommended. The conservation plan may consist of but is not limited to purchase of mitigation credits at a regional conservation bank; plant salvage and relocation; collection and subsequent planting of seed, or incorporating seed from native nursery into seed mix used for revegetation efforts; stockpiling, storing, and replacing topsoil containing the local seed bank; or other measures determined practicable based on the species and site conditions. If onsite conservation measures are implemented, the objective is to restore the impacted special-status plant species community to pre-existing conditions by providing for the restoration of a self-sustaining population of special-status plants in the general area where the impact occurred at a minimum of a 1:1 ratio (e.g., number of plants, square footage occupied). For onsite conservation measures, the conservation plan will identify success criteria and provide for annual or other regular monitoring to evaluate whether the conservation effort has met the success criteria. The conservation plan will also include measures for remedial actions (e.g., additional plantings, supplemental irrigation, increased monitoring) in the event that monitoring efforts indicate that success criteria are not being met.

For some species and site conditions, the biologist may determine that a conservation plan is not recommended. Some of these circumstances may include but are not limited to the following: (1) there are other nearby populations that will not be disturbed; (2) plant relocation, seeding, or revegetation would not have a reasonable probability of success; (3) implementation of measures could result in detrimental effects on existing special-status plant populations; or (4) incompatibility with required operations and maintenance activities. If the biologist determines that a conservation plan is not warranted, no additional measures are required.

Compensatory Mitigation

The proposed Project would result in a negligible impact on special-status plant species; therefore, compensatory mitigation is not proposed.

6.3 SPECIAL-STATUS ANIMAL SPECIES

The following general MMs are recommended to minimize the potential for adverse effects on special-status animal species:

MM 11 A Biological Resources Management and Monitoring Plan (BRMMP) shall be developed and implemented for the project. The BRMMP shall provide for the following:

1) Overall implementation and monitoring of the MMs and CMMs for biological resources and the terms and conditions of any agency permits/authorizations throughout the duration of project construction and restoration/revegetation efforts of riparian habitat per MM 3.

2) Designation of an overall Project Biologist and the roles and responsibilities of the Project Biologist and other monitoring biologists; and the roles of Reclamation, FWA, and construction personnel in the coordination and implementation of the BRMMP.

3) Adaptive management in scheduling worker environmental awareness training (WEAT) and conducting pre-construction surveys for special-status species. In some cases, additional biological surveys beyond those identified in the MMs may be warranted to proactively avoid biological constraints or conflicts with protective measures identified in the MMs. For example, early monitoring for nesting birds or occupied mammal burrows may be needed to preserve opportunities for vegetation

removal, removal of nesting starts before egg laying, and burrow monitoring and closure prior to the initiation of breeding or nesting activities.

4) The procedure and authorizations required to modify the MMs if needed to resolve conflicts with constructability requirements or other measures required by agency permits/authorizations, or to equivalently provide for avoidance/minimization of adverse effects on sensitive biological resources under changing conditions over the life of project construction.

   For example, nesting birds or other special-status species may initiate nesting or denning activities in proximity to construction areas while active construction activities are ongoing, including within the “no-disturbance buffers” identified in the MMs. In these cases, it may be that the animals are acclimated to the level of construction disturbance, and continuance of construction activities would not be expected to adversely affect the animals or their nesting/breeding activities (assuming that increased levels of disturbance or closer proximity of construction activities is not planned). The BRMMP shall include provisions for how these and similar circumstances will be addressed and how determinations regarding additional biological monitoring or agency coordination will be addressed.

5) The procedure to record and document implementation of the MMs and other measures including any pre-construction survey reports, WEAT sign-in forms, routine biological monitoring forms, photographs, and other materials related to implementation of the BRMMP.

6) The procedure to comply with the terms and conditions, and notification and reporting requirements of any agency permits/authorizations required for the Project; and the procedure for coordination/consultation with resource or permitting agencies as necessary.

7) The procedure to inform, document, and monitor restoration and revegetation activities associated with restoring temporary impacts on terrestrial and aquatic habitats and vegetation communities. This includes any post-construction monitoring/reporting and remedial measures that may be required.

MM 12 Prior to initiation of ground-breaking, a qualified biologist(s) shall conduct a WEAT for all construction personnel. Training sessions shall be repeated for all new personnel before they access the Project site. Sign-in sheets identifying attendees and the contractor/company they represent shall be prepared for each training session, and records of attendance will be maintained by the Project. At a minimum, the WEAT shall include a description of the protected species and biological resources that may occur in the Project area and their physical description, habitats, and natural history, as well as the measures that are being implemented to avoid or minimize Project-related impacts, penalties for non-compliance, and the boundaries of the work area. So that employees and contractors understand their roles and responsibilities, training shall be conducted in languages other than English, as appropriate. A written summary of the training will be provided to all attendees, and an electronic copy provided so that the project can make and distribute future copies. The WEAT shall be conducted annually, at a minimum, for all construction personnel.

MM 13 A litter control program shall be instituted at each Project site. All workers shall place their food scraps, paper wrappers, food containers, cans, bottles, and other trash in covered or closed trash containers. The trash containers should be removed from the Project area at the end of each working day.

MM 14 No firearms (except as possessed by federal, state, or local law enforcement officers) or pets shall be permitted on construction sites.

MM 15 To prevent inadvertent entrapment of wildlife during construction, all excavated steep-walled holes or trenches greater than two feet deep (excluding excavation work on either the FKC itself or the realigned canal) should be covered or filled at the end of each working day or provided with one or more escape ramps no greater than 200 feet apart. Before such trenches or holes are filled, they must be thoroughly inspected for trapped animals. If protected species are found in any of the holes or trenches, work shall cease until an escape ramp is provided and the animal leaves on its own volition, or until the animal has been relocated by a USFWS-approved biologist, and/or in coordination with the USFWS as appropriate.

MM 16 All construction activity would be confined within the Project site, which may include temporary access roads, haul roads, and staging areas specifically designated and marked for these purposes.

MM 17 Tightly woven fiber netting or similar material (no monofilament material) should be used for erosion control or other purposes at the project site to ensure that animals do not become trapped.

6.3.1 Kern Brook Lamprey, San Joaquin Roach, and Game Fish

Survey Results

There is potential aquatic habitat for Kern brook lamprey and game fish (e.g., catfish, bass) in the FKC and San Joaquin roach in the intermittent streams.

Project Impacts

The proposed Project could result in temporary loss of habitat due to project activities affecting potential aquatic habitat. Direct disturbance from construction activities, such as dewatering for rebuilding canal segments or siphon decommissioning, could result in stress, injury, or mortality to individuals. Both

Project alternatives include the construction of new siphons and other activities that require dewatering of canal segments and would both result in similar potential impacts on special-status and game fish.

Mitigation Measure

In addition to sediment and erosion control measures, the following MM is recommended to avoid or minimize the potential for adverse effects on Kern brook lamprey, San Joaquin roach, and game fish:

MM 18 Work within Deer Creek and White River (e.g., siphon construction) shall take place when the streams are dry. If this is not practicable, appropriate stream diversions that protect water quality will be constructed. Where there is a potential for fish entrapment (e.g., dewatering of streams or canal), a beach seine with a minimum of three passes or other appropriate method will be implemented in areas where fish could be trapped (e.g., remaining ponded areas). If appropriate, block nets could be placed upstream and downstream of the Project area to prevent fish from entering the area and further reduce the potential for entrapment. Implementation of measures to avoid fish entrapment and any translocation/removal of fish will be conducted with the oversight of qualified fisheries biologists. Coordination with CDFW shall be conducted prior to initiation of any fish salvage/relocation activities to confirm that all required authorizations are in place.

Compensatory Mitigation

The proposed Project would result in a negligible impact on habitat for Kern brook lamprey, San Joaquin roach, and game fish as the impacts on aquatic habitat would be temporary and the habitat restored once the new canal is operational. Therefore, compensatory mitigation is not recommended.

6.3.2 Western Spadefoot

Survey Results

There is potential aquatic (breeding) habitat for western spadefoot throughout the study area in aquatic habitats such as fresh emergent wetland, riparian/fresh emergent wetland, riparian wetlands, seasonal wetlands, and ponds. Potential upland habitat occurs adjacent to the aquatic habitat.

Project Impacts

The proposed Project could result in temporary loss of habitat and displacement due to Project activities affecting potential aquatic breeding and upland burrow sites. Direct disturbance from construction activities, such as operation of vehicles, heavy equipment operation, and earth moving operations around burrows could result in stress, injury, or mortality to individuals or destruction of their burrows.

Mitigation Measures

The following MMs are recommended to avoid or minimize the potential for adverse effects on western spadefoot:

MM 19 If western spadefoot is encountered during construction activities, it will be allowed to move out of harm's way of its own volition, or a qualified biologist will relocate it to the nearest suitable habitat that is at least 100 feet outside of the construction impact area.

MM 20 Prior to moving equipment or materials each day, construction personnel shall inspect underneath and around equipment and other project materials (e.g., stored pipes greater than 2 inches in diameter) where located within 200 feet of aquatic habitat, for western spadefoot. If western spadefoots are found, they will be allowed to move out of the construction area under their own volition, or a qualified biologist will relocate the organism(s) to the nearest suitable habitat that is at least 100 feet outside of the construction impact area.

Compensatory Mitigation

The proposed Project would result in a negligible impact on habitat for western spadefoot because construction-related impacts would be temporary. Therefore, compensatory mitigation is not recommended.

6.3.3 Northern California Legless Lizard, California Glossy Snake, San Joaquin Coachwhip, and Coast Horned Lizard

Survey Results

There is potential habitat for northern California legless lizard, California glossy snake, San Joaquin coachwhip, and coast horned lizard throughout the study area in sandy washes, scrub, and grassland habitats.

Project Impacts

The proposed Project could result in temporary loss of habitat and displacement due to Project activities affecting potential habitat. Direct disturbance from construction activities, such as operation of vehicles, heavy equipment operation, and earth moving operations around burrows could result in stress, injury, or mortality to individuals or destruction of their burrows.

Mitigation Measure

The following MM is recommended to avoid or minimize the potential for adverse effects on Northern California legless lizard, California glossy snake, San Joaquin coachwhip, and coast horned lizard:

MM 21 Prior to moving equipment or materials each day, construction personnel shall inspect underneath and around equipment for northern California legless lizard, California glossy snake, San Joaquin coachwhip, and coast horned lizard. If these species are encountered during construction activities, they will be allowed to move out of harm's way of their own volition or a qualified biologist will relocate the organism(s) the nearest suitable habitat that is at least 100 feet outside of the construction impact area.

Compensatory Mitigation

The proposed Project would result in a negligible impact on habitat for northern California legless lizard, California glossy snake, San Joaquin coachwhip, and coast horned lizard because construction-related impacts would be temporary. Therefore, compensatory mitigation is not recommended.

6.3.4 Migratory Birds and Raptors

Survey Results

There is potential nesting and foraging habitat for non-special-status migratory birds and raptors, such as common songbirds, red-tailed hawk, and red-shouldered hawk, within the study area. During the 2019 field surveys, abundant remnant cliff swallow nests were observed on all bridges crossing the FKC.

Project Impacts

Construction activities (e.g., vegetation removal, bridge removal, earth-moving, equipment noise) may be scheduled during the avian (bird) breeding season (generally February 1 to August 31, depending on the species) and could disturb nesting birds in or adjacent to the study area. Impacts on nesting birds would be generally equivalent in the level of disturbance under both alternatives. However, impacts on ground-nesting birds would be greater with the CER Alternative as it could potentially disturb more habitat that is not immediately adjacent to the existing canal. Construction-related disturbance could result in the incidental loss of fertile eggs or nestlings or nest abandonment, which could affect local or regional populations of affected birds. Impacts on nesting birds could result from the following:

- Tree and shrub removal, which would be necessary to accommodate the construction of siphons and adjacent canal
- Ground-disturbing activities (e.g., grubbing and grading) in annual grasslands that could affect ground-nesting birds (e.g., killdeer [*Charadrius vociferous*] and western meadowlark [*Sturnella neglecta*])
- Noise from construction activities
- Removal of bridges and other construction activities near the existing bridges that could disturb or remove active cliff swallow nests if they are present

Mitigation Measures

The following MMs are recommended to minimize the potential for adverse effects on nesting migratory birds:

MM 22 To the extent practicable, vegetation removal shall be scheduled to avoid the breeding season for nesting raptors and other special-status birds (generally February 1 to August

31, depending on the species). Removal of vegetation outside of the nesting season is intended to minimize the potential for delays in vegetation removal due to active nests.

MM 23 Regardless of when vegetation removal is scheduled, a qualified biologist shall conduct a minimum of one pre-construction survey for nesting migratory birds and raptors within the project area and a 250-foot buffer around the project area (where accessible) for all construction-related activities that will occur during the nesting season. The pre-construction survey shall be conducted no more than 15 days prior to the initiation of construction in a given area and will be phased based on construction schedule. Due to the ongoing, phased approach to construction, multiple pre-construction surveys per year may be required. If an active nest is found, appropriate conservation measures (as determined by a qualified biologist) shall be implemented. These measures may include but are not limited consultation with CDFW in order to establish a construction-free buffer zone around the active nest site, daily biological monitoring of the active nest site, and delaying construction activities in the vicinity of the active nest site until the young have fledged.

MM 24 If removal of bridges or other bridge work is scheduled to occur during the nesting season, exclusionary devices (e.g., netting) shall be installed around the bridges prior to the initiation of the avian breeding season (before February 15) during the same year as the bridges are scheduled for removal; and after a qualified biologist has determined no active nests (i.e., nests with eggs or young) are present. The exclusionary devices will remain in place until August 15 or until the bridge removal or other bridge work is completed. The exclusionary devices shall be anchored such that swallows cannot attach their nests to the structure through gaps. Exclusionary devices shall be regularly inspected as necessary to confirm that they are adequately preventing initiation of nest building. In the event that swallows have breached the exclusionary devices and began building nests on the structure, nesting material (i.e., partially built nests) can be removed only if a qualified biologist has determined that eggs or young are not present. No removal of nests with eggs or young can be conducted without written authorization from the CDFW and USFWS, or until a qualified biologist has determined that the nest is no longer active (e.g., nest has failed, young have fledged and are no longer dependent on the nest).

Compensatory Mitigation

The proposed Project would result in a negligible impact on breeding habitat for non-special-status migratory birds and raptors; therefore, compensatory mitigation is not proposed.

6.3.5 Golden Eagle, Swainson's Hawk, Northern Harrier, and White-tailed Kite

Survey Results

There is potential nesting and foraging habitat for golden eagle, Swainson's hawk, northern harrier, and white-tailed kite within the study area. Field surveys were conducted from September 30 to October 3, 2019, and December 2019, which is outside of the breeding season. However, there is a 2017 recorded CNDDB occurrence of Swainson's hawk near the FKC west of Porterville. White-tailed kites were observed foraging in the study area during the 2019 field surveys. No golden eagles or northern harriers were observed during the 2019 field surveys.

Swainson's hawks forage over a variety of agriculture crops, grassland, and pasture, using alfalfa more than any other crop (CDFW 2016). Within the study area, high-quality Swainson's hawk foraging habitat consists of alfalfa; moderate-quality Swainson's hawk foraging habitat consists of other field crops, fallow agriculture, and annual grassland. The barren and ruderal habitats and orchards and vineyards in the study area provide very low-quality to no foraging habitat for Swainson's hawk.

Project Impacts

The proposed Project could result in temporary and permanent loss of foraging habitat and displacement due to project activities affecting potential nesting sites. Direct disturbance from construction activities, such as operation of vehicles, heavy equipment operation, and earth-moving operations around active nests could result in stress, injury, or mortality to individuals. Impacts on nesting golden eagle, Swainson's hawk, northern harrier, and white-tailed kite would be fairly similar in the level of disturbance with both Project alternatives. Both Project alternatives would have temporary impacts on foraging habitat through the staging of equipment, temporary construction access, and other construction activities. Permanent impacts would result from new canal embankment footprint and using large areas of land to borrow soil to build up the new embankments. The estimated acreage impacts on Swainson's hawk foraging habitat with moderate to high suitability by Project alternative are presented in Table 7.

Table 7. Estimated Swainson's Hawk Foraging Habitat Impacts

Swainson's Hawk Foraging Habitat	CE Alternative CE Temporary (acres)	CE Alternative CE Permanent (acres)	CER Alternative CER Temporary (acres)	CER Alternative CER Permanent (acres)
Alfalfa	111	12	112	13
Other field crops	55	8	47	15
Fallow agriculture	308	15	301	40
Annual grassland	226	0	222	0

Mitigation Measures

The following MMs are recommended to avoid or minimize the potential for significant impacts on golden eagle, Swainson's hawk, northern harrier, and white-tailed kite.

MM 25 For construction activities that occur between February 1 and August 31, a qualified biologist will conduct pre-construction surveys for golden eagle, Swainson's hawk, northern harrier, and white-tailed kite. The pre-construction surveys will include the project footprint and a 0.25-mile radius (where access is permitted) around the construction area in suitable nesting habitat (i.e., large trees). The pre-construction surveys will be conducted no more than 15 days before ground disturbance in a given area and will be phased based on construction schedule.

If nesting golden eagles, Swainson's hawks, northern harriers, or white-tailed kites are detected, an appropriate no-disturbance buffer (minimum of 500 feet) shall be established and monitored daily by a qualified biologist. Buffers will be maintained until a qualified biologist has determined that the young have fledged and are no longer reliant on the nest or parental care for survival.

MM 26 If a minimum 500-foot no-disturbance buffer around an active golden eagle, Swainson's hawk, northern harrier, or white-tailed kite nest is not practicable, CDFW will be consulted to determine alternative measures to minimize the potential for Project-related disturbance to the nest site that could result in nest abandonment or other forms of take. Measures may include but are not limited to continuous biological monitoring by a qualified biologist until it has been determined that the young have fledged and are no longer reliant on the nest or parental care for survival or the construction is complete. If the nesting pair shows signs of distress (i.e., adults leaving the nest when eggs or young chicks are present) as a result of Project-related activities, the monitoring biologist shall have authority to stop work until it is determined that the adults have returned and are no longer showing signs of distress.

If trees suitable for nesting by Swainson's hawk are scheduled to be removed during the non-nesting season, a qualified biologist will conduct a pre-construction survey during the nesting season prior to tree removal to determine if Swainson's hawks are using the trees for nesting. If the trees proposed for removal are being used for nesting by Swainson's hawk, consultation with CDFW will take place per MM 27 prior to tree removal.

MM 27 If consultation with CDFW results in a determination that take of an active Swainson's hawk nest cannot be avoided, then an Incidental Take Permit pursuant to CESA will be obtained from CDFW prior to initiation of any activities that are likely to result in such take.

If an active golden eagle or white-tailed kite nest may not be avoidable, then all activities that are likely to result in take will be delayed until a qualified biologist has determined that the young have fledged and are no longer reliant on the nest or parental care for survival.

Compensatory Mitigation

Alfalfa fields are considered to be very high-quality foraging habitat for Swainson's hawk (CDFW 2016). Swainson's hawk is listed as threatened under the CESA, and have been observed foraging in the study area. The CE Alternative is estimated to result in a permanent loss of 12 acres of alfalfa fields and the CER Alternative is estimated to result in the permanent loss of 13 acres of alfalfa fields. This loss of very high-quality Swainson's hawk foraging habitat is considerable, and compensatory mitigation is recommended.

CMM 2 The project-related permanent loss of alfalfa fields (high-quality foraging habitat for Swainson's hawk) will be mitigated at a minimum of a 1:1 ratio. Mitigation will occur in coordination with CDFW and may consist of but is not limited to purchase of mitigation credits from a CDFW-approved mitigation bank, obtaining conservation easements with appropriate provisions to maintain the land as suitable foraging habitat in perpetuity, establishing new alfalfa fields, or other habitat conservation measures as approved by CDFW.

6.3.6 Burrowing Owl

Survey Results

There is potential nesting and foraging habitat for burrowing owl along the canal embankments, barren/ruderal and grassland habitats. No burrowing owls were observed during any of the field visits or biological surveys. However, given the abundant small mammal burrows present in the study area, there is a potential for burrowing owls to be present.

Project Impacts

If burrowing owls are present during construction activities, the proposed Project could result in temporary loss of habitat and displacement due to Project activities affecting potential burrow sites. Direct disturbance from construction activities, such as operation of vehicles, heavy equipment operation, and earth-moving operations around burrows could result in stress, injury, or mortality to individuals or destruction of their burrows. The greatest concentration of small mammal burrows in the study area is along the embankments of the FKC. As both of the Project alternatives would modify the existing FKC throughout the entire reach of the study area, both Project alternatives have a generally equivalent potential to result in impacts on burrowing owl. Potential impacts are considered to be temporary because small mammal burrows are expected to become reestablished along the enlarged canal or realigned canal after they are constructed. Under the CER Alternative, approximately 19 miles of the existing FKC would be abandoned due to the realignment. As such, this alternative could result in a future benefit to burrowing owls if they were to colonize portions of the abandoned alignment.

Mitigation Measures

The following MMs shall be implemented to avoid or minimize the potential for significant impacts on burrowing owls.

MM 28 A minimum of one pre-construction survey for burrowing owls within 300 feet of the Project area (where accessible) will be conducted by a qualified biologist within 15 days prior to the initiation of construction activities in a given area, regardless of the timing of construction. Pre-construction surveys each year of construction during the non-breeding season (September 1 to January 31) shall take place in order to determine the presence of burrowing owls prior to breeding activities begin.

MM 29 If any occupied burrows are identified, appropriate conservation measures (as determined by a qualified biologist) will be implemented. No disturbance will occur within 150 feet of occupied burrows during the non-breeding season (September 1 to January 31) or within 250 feet during the breeding season (February 1 to August 31). These measures may also include establishing a construction-free buffer zone around the active nest site in coordination with the CDFW, biological monitoring of the active nest site, and delaying construction activities in the vicinity of the active nest site until the young have fledged.

MM 30 If burrowing owls are detected within the Project area during the non-breeding season and maintaining a 150-foot no-disturbance buffer is not practicable, a qualified biologist shall submit an exclusion plan to CDFW. The exclusion plan will generally follow the guidelines outlined in Appendix E of the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012). The exclusion plan will consist of installing one-way doors in potential burrows, daily monitoring, and collapsing burrows once it is determined that the burrows are unoccupied. Exclusion may only take place during the non- breeding season (September 1 to January 31) and may be an ongoing effort during this time period. This will allow the owls to exit burrows if they are present, but not return.

MM 31 If occupied burrows are detected during the breeding season and maintaining a 250-foot no-disturbance buffer is not practicable, CDFW will be consulted to determine alternative measures to minimize the potential for disturbance to occupied burrows and nesting activities. Measures may include but are not limited to continuous biological monitoring by a qualified biologist until it has been determined that the young have fledged and are no longer reliant on the nest for parental care or survival, or the construction is complete. No direct disturbance of burrows with eggs or young can be conducted without written authorization from the CDFW and USFWS.

Compensatory Mitigation

The proposed Project would result in a negligible impact on breeding and foraging habitat for burrowing owl as the disturbance is temporary and habitat will become reestablished after construction is completed. Therefore, compensatory mitigation is not recommended.

6.3.7 Pallid Bat, Townsend's Big-Eared Bat, Western Mastiff Bat, and Other Roosting Bats

Survey Results

There is potential roosting and foraging habitat for special-status bats, such as pallid bat, Townsend's big-eared bat, and western mastiff bat, within the study area. Also, common bat species could roost in the Project area. No roosting bats or evidence of roosting bats were detected within the study area during the surveys. However, potential roosting habitat is present in large trees and concrete culvert structures underneath the FKC.

Project Impacts

Due to the ability of individual bats to move away from disturbance, direct impacts on bats are not expected when the bats are not using the roost site for a maternity colony (i.e., a breeding roost to bear and rear young). Bats may form maternity colonies in tree cavities and large culverts in the study area. If a tree or structure is removed that contains a bat maternity colony, the disturbance could result in bat mortality or injury. Indirect impacts may occur from construction disturbances if a maternity colony is present in or adjacent to the Project area. Significant noise disturbance could result in adults temporarily or permanently leaving the maternity colony. The majority of tree removal for both alignments would be the Fremont cottonwood trees located just north of Deer Creek. Various concrete culverts are located throughout the Project alignment and would either be demolished or expanded depending on the Project alternative implemented. Impacts onto special-status bats would generally be similar in the level of disturbance with both Project alternatives.

Mitigation Measures

The following MMs are recommended to avoid or minimize the potential for adverse effects on bat species.

MM 32 To the extent practicable, removal of large trees with cavities or destruction of large culverts shall occur before maternity colonies form (i.e., prior to March 1) or after young are volant (able to fly) (i.e., after August 15).

MM 33 If construction (including the removal of large trees and/or destruction or expansion of large culverts) occurs during the non-volant season (March 1 to August 15), a qualified biologist shall conduct a pre-construction survey of the study area for maternity colonies. The pre-construction survey will be performed no more than 14 days prior to the implementation of construction activities (including staging and equipment access). If a lapse in construction activities for 14 days or longer occurs between those dates, another pre-construction survey will be performed. If any maternity colonies are detected, appropriate conservation measures (as determined by a qualified biologist) shall be implemented. These measures may include but are not limited to establishing a construction-free buffer zone around the maternity colony site, biological monitoring of the maternity colony, and delaying construction activities in the vicinity of the maternity site.

Compensatory Mitigation

The proposed Project would result in a negligible impact on habitat for special-status bats and other bat species given that impacts on potential roosting habitat would be temporary; therefore, compensatory mitigation is not recommended.

6.3.8 Buena Vista Lake Shrew

Survey Results

There is potential habitat for Buena Vista Lake shrew (BVLS) along Deer Creek and the adjacent wet areas (i.e., mulefat thickets, Fremont cottonwood forest). Camera arrays were set up in these areas and monitored for seven consecutive nights in December 2019. No BVLS were observed during this survey (Stantec 2019a).

Project Impacts

Implementation of both Project alternatives would result in similar impacts on potential BVLS habitat. The CE Alternative would result in temporary impacts on 0.9 acre of Fremont cottonwood forest and 0.5 acre of mulefat thickets, and the CER Alternative would result in temporary impacts on 0.9 acre of Fremont cottonwood forest and 0.5 acre of mulefat thickets. The CE Alternative would result in permanent impacts on 0.90 acre of Fremont cottonwood forest and one acre of mulefat thickets, while the CER Alternative would result in permanent impacts on one acre of Fremont cottonwood forest and one acre of mulefat thickets. Temporary disturbance to and permanent removal of this vegetation would reduce the amount of available foraging habitat and vegetative cover, which may increase the risk of Buena Vista Lake shrew mortality from starvation and/or exposure to the elements if any shrews are present in or near the Project area. Reclamation is currently conducting ESA section 7 consultation with the USFWS for Project-related effects on BVLS.

Mitigation Measures

The following MMs are recommended to avoid or minimize the potential for adverse effects on BVLS. The measures below may be revised based on the results of the ESA section 7 consultation.

MM 34 In areas of suitable habitat for Buena Vista Lake shrew (BVLS) (*Sorex ornatus relictus*) within the Project area (i.e., the Deer Creek crossing and adjacent areas), all above-ground herbaceous vegetation within the construction footprint will be cleared using hand tools (i.e., non-gasoline or electrically powered tools, including weed whackers and/or mowers, unless approved by the USFWS) under the supervision of a USFWS-approved BVLS biologist or biological monitor. All leaf litter will be removed using rakes or similar hand tools. All woody vegetation will be cut as closely to the ground as possible using hand tools (which can include chainsaws). Vegetation will be removed immediately and stored away from areas of suitable BVLS habitat. Such vegetation hand-removal efforts will be implemented in the areas that require vegetation removal to clearly detect BVLS and will continue in each area of suitable habitat until it is reasonably certain that BVLS can be detected within the cleared areas, if present.

MM 35 After vegetation has been cleared from areas of suitable BVLS habitat, non-disturbance exclusion fencing will be installed along the edges of the Project area where vegetation was cleared from areas of suitable habitat; fencing will be buried to a minimum depth of 6 inches. Fencing will be placed between areas of active construction and adjacent to nearby suitable habitat to preclude BVLS from running through the Project area. In areas where installation of fencing is not practicable, the USFWS will be contacted and will provide direction on a case-by-case basis. The exclusionary fencing will be installed under the supervision of the USFWS-approved BVLS biological monitor, and fence placement/configuration will be determined by a USFWS-approved BVLS biologist, with input from the USFWS as required. Fencing may consist of a combination of both Environmentally Sensitive Area fencing and Wildlife Exclusion fencing with one-way exit/escape points.

MM 36 If BVLS is found within the fenced-in Project area, work in the Project area will cease immediately, and a section of fence will be removed so the BVLS may leave the fenced area on their own volition. The USFWS-approved BVLS biologist or biological monitor will monitor the BVLS to ensure that any BVLS has moved and remains outside of the fenced-in work area. If the BVLS does not leave of its own volition it will be relocated following an approved BVLS Relocation Plan.

MM 37 Prior to the vegetation removal described in MM 34 above, areas of potentially suitable habitat would be surveyed for BVLS using close-focus automated Reconyx camera stations, baited with live and dried mealworms, per the methodology described in the *Conservation of Endangered Buena Vista Lake shrews (Sorex ornatus relictus) through Investigation of Taxonomic Status, Distribution, and Use of Non-Invasive Survey Methods* (Cypher et al. 2017).

Compensatory Mitigation

The proposed Project would result in a negligible impact on habitat for BVLS given that there is a low potential for them to be present based on the results of the 2019 camera-trap surveys. Therefore, compensatory mitigation is not recommended.

6.3.9 American Badger

Survey Results

There is a low potential for American badger to occur in the low-quality grassland habitat throughout the study area.

Project Impacts

Construction may result in reproductive failure by disrupting foraging activities and precluding the formation of natal dens within and adjacent to the Project area. In general, both Project alternatives are equally likely to temporarily impact American badger during construction. While the loss of potential dens would negatively affect American badger if any are present within or adjacent to the Project area, with the implementation of the proposed MM, no direct mortality of American badgers is expected to occur.

Mitigation Measure

The following MM is recommended to avoid or minimize the potential for adverse effects on American badger:

MM 38 Any American badger detected within the project area during Project-related activities shall be allowed to move out of the work area of its own volition. If American badger is denning on or within 50 feet of the Project work areas, the den shall be avoided by maintaining a minimum 50-foot, no-disturbance buffer. If maintaining the buffer is not practicable, CDFW will be consulted to determine alternative measures to minimize the potential for disturbance of the burrow, or (if necessary) to develop and implement procedures to monitor and close the burrow to prevent use by badger during construction activities.

Compensatory Mitigation

The proposed Project would result in a negligible impact on habitat for American badger given that there is a low potential for them to be present. Therefore, compensatory mitigation is not recommended.

6.3.10 San Joaquin Kit Fox

Survey Results

Stantec has conducted extensive surveys and monitoring for SJKF within the study area. A summary of surveys completed to date is provided below.

In December of 2018, surveys for potential SJKF dens were conducted in the Project area between MP 103.66 and MP 107.34 prior to activities related to the immediate repair of approximately 3.5 miles of the canal, during which time 58 potential SJKF dens were identified. The 58 potential dens were each monitored for three consecutive nights using remote cameras and tracking media between January and March 2019, and no SJKFs were detected.

Between October 15, 2019 and November 20, 2019, pre-construction surveys and monitoring of potential SJKF dens were conducted prior to geotechnical borings. Approximately 140 potential SJKF dens were identified during the surveys, of which 41 were monitored for four consecutive nights using remote cameras and tracking medium (i.e. diatomaceous earth); no SJKF were detected during the surveys or monitoring.

From November 8, 2019, to December 17, 2019, Stantec's subconsultant, H.T. Harvey & Associates, conducted surveys along the entire FKC within the project area using ecological scent-detection dogs trained to recognize the specific scent of SJKF scat and to alert their handler to the location of the scat. No SJKF, SJKF scat, or alerts by scent dogs were detected during the surveys (H.T. Harvey & Associates 2020).

From December 2, 2019, to December 9, 2019, Stantec deployed two arrays of remotely operated cameras enhanced with scent attractants (e.g., cans of cat food or tuna with small punctures to promote long-lasting scent dispersal) in two locations within the study area: the first (northern) array included ten cameras beginning adjacent to the Tulare County Mid-Valley Disposal site Teapot Dome at Avenue 128 south along the eastern embankment of the FKC approximately 2.76 miles to about 0.5 mile south of Avenue 112. The second (southern) array included eight cameras beginning near the Kern County/Tulare County border and extending 2.5 miles south to the north end of Lake Woollomes. In both arrays, cameras were placed at 0.25- to 0.5-mile intervals facing east of and down the outboard embankment of the canal with scent attractants in view of the camera. In seven nights of continuous monitoring, resulting in 126 camera-nights, no SJKF were detected (Stantec 2019b). Several other mammalian species were recorded by the 18 cameras deployed in the two arrays, including striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), opossum (*Didelphis marsupialis*), deer mouse (*Peromyscus maniculatus*), desert cottontail (*Sylvilagus audubonii*), domestic dog (*Canis lupus familiaris*), and domestic cat (*Felis catus*).

Although no SJKF were detected during the surveys, there is a potential for SJKF to be present (either in dens or using the project area as a movement corridor) prior to the start of construction.

Project Impacts

Destruction of potential SJKF dens during construction may displace SJKF and make them more susceptible to predation. Construction may also result in reproductive failure by disrupting foraging activities, increasing human disturbance, and precluding the formation of natal dens in the project area. in general, both Project alternatives are equally likely to temporarily impact SJKF during construction. While the loss of potential dens would negatively affect SJKF if any are present in the Project area, with the implementation of the proposed MMs, no direct mortality of SJKF from den removal is expected to occur. Reclamation is currently conducting ESA section 7 consultation with the USFWS for Project-related effects on SJKF.

Mitigation Measures

The following MMs are recommended to avoid or minimize the potential for adverse effects on SJKF. The following MMs would be limited to those areas where SJKF presence has been detected via scent attractant enhanced remote camera arrays and trained ecological scent dogs, and in areas otherwise determined to be sensitive for SJKF based on coordination with the USFWS. The measures below may be revised based on the results of the ESA section 7 consultation.

MM 39 Determine the presence of San Joaquin Kit Fox (SJKF) dens:

a) Pedestrian inventories of potential and occupied dens will be completed to determine the need for pre-construction monitoring. Pedestrian inventories of potential and occupied dens shall be conducted within 90 calendar days prior to the start of construction (i.e., before any activity that covers or disrupts surface soils [e.g., clearing and grubbing, grading, excavation, soil or equipment stockpiling, equipment or vehicle storage or parking]). To the extent practicable, these surveys would be conducted nearer in time to the start of construction.

b) Pre-construction monitoring will be performed to confirm and document kit fox presence or absence at potential and occupied dens identified during the inventory.

c) Areas within which pedestrian den inventories or pre-construction monitoring have been completed more than 30 days prior to construction will be re-inventoried not more than 30 days prior to construction. Preconstruction monitoring will be performed on potential and occupied dens discovered during re-inventory that have not been previously monitored.

d) Pedestrian inventories and pre-construction monitoring for dens shall be conducted by qualified biologists familiar with SJKF biology, natural history, and potential dens.

e) Pipes and culverts shall be searched for kit foxes immediately prior to being moved or sealed to ensure that an animal has not been trapped. If a kit fox is observed, it will be gently encouraged to leave the area by a USFWS-approved biologist (i.e., without using loud noise, physical force, or physical movement of the pipe or culvert such that the animal could be injured or startled while it is leaving the area).

MM 40 Identify and document locations of potential or occupied dens (natal or non-natal) and their status (occupied or unoccupied). Definitions:

a) Known den: any existing natural den or human-made structure for which conclusive evidence or circumstantial evidence can show that the den is used or has been used at any time in the past by SJKF.

b) Potential den: any natural den or burrow within the range of the species that has entrances of appropriate dimensions (4 to 12 inches in diameter) to accommodate

SJKF. A qualified biologist will survey and investigate using remote cameras and track plates to determine species use. If no information is collected that would indicate use by other species, the den will be treated as a potential SJKF den.

c) Natal/Pupping den: any known SJKF den (as defined) used by SJKF to whelp and/or rear pups.

d) Atypical den: any known SJKF den that has been established in or in association with a human-made structure.

MM 41 Identify and execute appropriate action(s) regarding notification, buffers, excavation and fill or seal-off:

a) Occupied natal den: if an occupied natal den is visible or encountered within the Project limits or on publicly accessible land sufficiently close to the Project construction area such that it would be disturbed (based on a qualified biologist's opinion and monitoring), the USFWS shall be contacted immediately, before any Project action occurs, to determine permissible actions to permit resumption of work.

b) Unless determined necessary for safety or constructability by Reclamation, FWA, or the Project contractor, the Project site shall not be lighted between sunset and sunrise.

c) Pipes or culverts with a diameter greater than four inches shall be capped or taped closed when it is ascertained that no SJKF are present. Any SJKF found in a pipe or culvert shall be allowed to escape unimpeded.

MM 42 If a natural den is determined to meet size criteria (i.e., greater than four inches in diameter) and cannot be avoided and must be destroyed, the following guidelines shall be followed:

a) Prior to den destruction, the den shall be evaluated by a qualified biologist. If subjectively deemed suitable, the den would be monitored for at least three consecutive days to determine its status. Activity at the den shall be monitored by placing tracking medium at the entrance and by remote cameras. If no SJKF activity is observed during this period, the den shall be deemed unoccupied and destroyed immediately under the supervision of a USFWS-approved biologist to preclude subsequent use. If SJKF activity is observed at the den during this period, the den shall be monitored for at least five consecutive days from the time of observation to allow any resident animal to move to another den during its normal activities. Use of the den can be discouraged during this period by partially plugging the entrance(s) with soil in such a manner that any resident animal can escape easily. Destruction of the den may begin when, in the judgment of a USFWS-approved biologist, the animal has moved to a different den. The biologist shall be trained and familiar with SJKF biology. If the animal is still present after five or more consecutive days of plugging and monitoring, the den may be excavated when, in the judgment of a USFWS-approved biologist, it is temporarily vacant, for example during the animal's normal foraging activities. All den destruction shall be conducted under the supervision of a USFWS-approved biologist.

b) If it is determined to be unnecessary or logistically impractical to monitor all dens using remote cameras and tracking medium (or to hand excavate to confirm vacancy), alternative methods of assessing presence or absence of SJKF activity can be used provided that the alternative methods are approved by the USFWS. Alternative methods of assessing SJKF activity could include but are not limited to spotlighting, ecological scent-detection dogs, and digital video inspection cameras (videoscope).

c) All dens requiring excavation shall be excavated under the supervision of a USFWS-approved biologist. In no event will an excavation that meets the definition of a confined space (i.e., a space large enough and so configured that a person can bodily enter but has limited or restricted means for entry or exit) be initiated. In this circumstance, discouragement (as in MM 39a above) would be used.

d) The den shall be fully excavated and then filled with dirt and compacted so that SJKF cannot reenter or use the den during the construction period. If, at any point during excavation SJKF is discovered inside the den, the excavation activity shall cease immediately, and monitoring of the den shall be resumed. Destruction of the den may be resumed when, in the judgment of a USFWS-approved biologist, the animal has escaped from the partially destroyed den.

Compensatory Mitigation

Construction of the proposed Project would result in only temporary impacts on potential habitat for SJKF. With implementation of the CER Alternative, there would be an increase in potential habitat resulting from abandonment of the existing canal and habitat associated with the realigned canal. With the implementation of the CE Alternative, the new embankment would also provide potential habitat. Therefore, compensatory mitigation is not recommended.

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Figures
(provided under separate cover)

ATTACHMENT A
USFWS SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: September 10, 2019
Consultation Code: 08ESMF00-2019-SLI-2982
Event Code: 08ESMF00-2019-E-09544
Project Name: Friant-Kern Canal Middle Reach Capacity Correction Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 ofthe Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2019-SLI-2982

Event Code: 08ESMF00-2019-E-09544

Project Name: Friant-Kern Canal Middle Reach Capacity Correction Project

Project Type: WATER SUPPLY / DELIVERY

Project Description: The project would restore the capacity of the approximately 33-mile long segment of the Friant-Kern Canal (FKC) by enlarging and realigning portions of the existing canal corridor to restore conveyance capacity of up to 4,500 cubic feet per second (cfs). Enlargements to approximately 10 miles of the existing canal would occur at the northernmost and southernmost portions of the project area consisting of raising or widening and raising the banks of the existing canal. Raising the canal would consists of an up to a 4-foot-high concrete lining raise. The raise would be accomplished by placing new concrete lining on top of the existing lining and extending the height of the earthen canal banks. Widening and raising would consist of removing a portion of the existing liner and cutting in a bench into the existing grade to accommodate the widening of the canal. Once completed, a liner would be extended on the bench and the raised embankment. Existing delivery turnouts would be maintained, with some modifications.

The project also consists of an approximate 23-mile new realigned canal that would be constructed east of and adjacent to the existing canal. The new parallel canal would accommodate a conveyance capacity ofbetween 3,500 and 4,000 cfs. Once the new canal is constructed, the majority of the existing canal would be abandoned, demolished, and the area would be restored to grade. New turnouts consisting of new cast-in-place concrete structures and delivery piping would be constructed as needed along the new parallel canal. Small portions of the existing canal would be left in place to accommodate existing turnouts to maintain water deliveries to existing distribution systems within the project area. This would be accomplished by creating a pool within small portions of the existing FKC, upstream of existing pump stations, which would allow water to be delivered from the new realigned canal to a controlled water level in the delivery pool without impacting existing pumps and distribution systems. New right-of-way (ROW) would be required to accommodate the project features.
The Project/Action would require removal of the existing check structures, wasteways and siphons at Deer Creek and White River and replacement with new similar facilities. Control buildings and associated

electrical, mechanical, and controls equipment at these facilities would be replaced with new equipment, as required. Up to 27 existing bridges would be removed and replaced with new road crossing structures. Existing utility crossings would be removed, modified, and/or replaced to accommodate the needs of the utilities and the new canal system. The Project would also require modification, relocation, abandonment, or removal of existing facilities on lands adjacent to the canal and within the project alignment. Impacted facilities could include, but are not limited to, wells, irrigation systems, farm roads, miscellaneous structures (such as small control buildings), and power lines.

Construction of the project would be ongoing continuous for an approximate 3-year period. Construction would occur between the hours of 7 a.m. to 7 p.m. Monday through Friday. Work crews would consist of up to eight construction teams consisting of 15-–30 people per team, for a maximum work force of up to 240 workers.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/35.946026692209585N119.11660440973944W

Counties: Kern, CA | Tulare, CA

Endangered Species Act Species

There is a total of 12 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
San Joaquin Kit Fox *Vulpes macrotis mutica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2873	Endangered
Tipton Kangaroo Rat *Dipodomys nitratoides nitratoides* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7247 Species survey guidelines: https://ecos.fws.gov/ipac/guideline/survey/population/40/office/11420.pdf	Endangered

Birds

NAME	STATUS
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Blunt-nosed Leopard Lizard *Gambelia silus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/625	Endangered
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891 Species survey guidelines: https://ecos.fws.gov/ipac/guideline/survey/population/205/office/11420.pdf	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened

Flowering Plants

NAME	STATUS
California Jewelflower *Caulanthus californicus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4599	Endangered
San Joaquin Adobe Sunburst *Pseudobahia peirsonii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2931	Threatened
Springville Clarkia *Clarkia springvillensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8309	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

ATTACHMENT B
CNDDB AND CNPS RECORDS

SciName	ComName	TaxonGroup	ElmCode	TotalOccs	FedList	CalList	GRank	SRank	RPlantRank	OthrStatus	Habitats	GenHab	MicroHab	ReturnOccs
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	955	None	Threatened	G2G3	S1S2		BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_EN-Endangered | NABCI_RWL-Red Watch List | USFWS_BCC-Birds of Conservation Concern	Freshwater marsh | Marsh & swamp | Swamp | Wetland	Highly colonial species, most numerous in Central Valley & vicinity. Largely endemic to California.	Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	6
Anniella grinnelli	Bakersfield legless lizard	Reptiles	ARACC01050	20	None	None	G2G3	S2S3		CDFW_SSC-Species of Special Concern		Southern San Joaquin Valley. Known from two disjunct areas: the east side of the Carrizo Plain and portions of the city limits of Bakersfield.	Microhabitat of this species is poorly known. Other legless lizard species occur in sparsely vegetated areas with moist, loose soil. Often found underneath leaf litter, rocks, and logs.	1
Anniella pulchra	northern California legless lizard	Reptiles	ARACC01020	375	None	None	G3	S3		CDFW_SSC-Species of Special Concern | USFS_S-Sensitive	Chaparral | Coastal dunes | Coastal scrub	Sandy or loose loamy soils under sparse vegetation.	Soil moisture is essential. They prefer soils with a high moisture content.	5
Antrozous pallidus	pallid bat	Mammals	AMACC10010	420	None	None	G5	S3		BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFS_S-Sensitive | WBWG_H-High Priority	Chaparral | Coastal scrub | Desert wash | Great Basin grassland | Great Basin scrub | Mojavean desert scrub | Riparian woodland | Sonoran desert scrub | Upper montane	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting.	Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	2
Arizona elegans occidentalis	California glossy snake	Reptiles	ARADB01017	260	None	None	G5T2	S2		CDFW_SSC-Species of Special Concern		Patchily distributed from the eastern portion of San Francisco Bay, southern San Joaquin Valley, and the Coast, Transverse, and Peninsular ranges, south to Baja California.	Generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils.	2
Athene cunicularia	burrowing owl	Birds	ABNSB10010	1989	None	None	G4	S3		BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Coastal prairie | Coastal scrub | Great Basin grassland | Great Basin scrub | Mojavean desert scrub | Sonoran desert scrub | Valley &	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation.	Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	21
Atriplex cordulata var.	Earlimart orache	Dicots	PDCHE042V0	21	None	None	G3T1	S1	1B.2	BLM_S-Sensitive	Valley & foothill grassland	Valley and foothill grassland.	60-115 m.	11
Atriplex coronata var. vallicola	Lost Hills crownscale	Dicots	PDCHE04371	74	None	None	G4T2	S2	1B.2	BLM_S-Sensitive | SB_SBBG-Santa Barbara Botanic Garden	Chenopod scrub | Valley & foothill grassland | Vernal pool	Chenopod scrub, valley and foothill grassland, vernal pools.	In powdery, alkaline soils that are vernally moist with Frankenia, Atriplex spp. and Distichlis. 45-885 m.	2
Atriplex depressa	brittlescale	Dicots	PDCHE042L0	60	None	None	G2	S2	1B.2		Alkali playa | Chenopod scrub | Meadow & seep | Valley & foothill grassland | Vernal pool | Wetland	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools.	Usually in alkali scalds or alk. clay in meadows or annual grasslnd; rarely associated with riparian, marshes, or vernal pools. 1-325 m.	1
Atriplex minuscula	lesser saltscale	Dicots	PDCHE042M0	52	None	None	G2	S2	1B.1		Alkali playa | Chenopod scrub | Valley & foothill grassland	Chenopod scrub, playas, valley and foothill grassland.	In alkali sink and grassland in sandy, alkaline soils. 0-225 m.	2
Atriplex persistens	vernal pool smallscale	Dicots	PDCHE042P0	41	None	None	G2	S2	1B.2		Vernal pool | Wetland	Vernal pools.	Alkaline vernal pools. 3-115 m.	1
Atriplex subtilis	subtle orache	Dicots	PDCHE042T0	24	None	None	G1	S1	1B.2	BLM_S-Sensitive	Valley & foothill grassland	Valley and foothill grassland.	Alkaline soils. 20-100 m.	6
Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	234	None	Candidate Endangered	G3G4	S1S2				Coastal California east to the Sierra-Cascade crest and south into Mexico.	Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum.	5
Branchinecta lynchi	vernal pool fairy shrimp	Crustaceans	ICBRA03030	770	Threatened	None	G3	S3		IUCN_VU-Vulnerable	Valley & foothill grassland | Vernal pool | Wetland	Endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools.	Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	18
Brodiaea insignis	Kaweah brodiaea	Monocots	PMLIL0C060	27	None	Endangered	G1	S1	1B.2	BLM_S-Sensitive | USFS_S-Sensitive	Cismontane woodland | Meadow & seep | Valley & foothill grassland	Cismontane woodland, meadows and seeps, valley and foothill grassland.	Granite or clay soils on S-SW facing slopes; usually in grassland surrounded by foothill woodland. 170-1405 m.	3
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2518	None	Threatened	G5	S3		BLM_S-Sensitive | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Great Basin grassland | Riparian forest | Riparian woodland | Valley & foothill grassland	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, & agricultural or ranch lands with groves or lines of trees.	Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	9
Calochortus striatus	alkali mariposa-lily	Monocots	PMLIL0D190	113	None	None	G3?	S2S3	1B.2	BLM_S-Sensitive | SB_RSABG-Rancho Santa Ana Botanic Garden | USFS_S-Sensitive	Chaparral | Chenopod scrub | Meadow & seep | Mojavean desert scrub | Wetland	Chaparral, chenopod scrub, Mojavean desert scrub, meadows and seeps.	Alkaline meadows and ephemeral washes. 70-1600m.	1
Caulanthus californicus	California jewelflower	Dicots	PDBRA31010	67	Endangered	Endangered	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden | SB_SBBG-Santa Barbara Botanic Garden | SB_UCBG-UC Botanical Garden at Berkeley	Chenopod scrub | Pinon & juniper woodlands | Valley & foothill grassland	Chenopod scrub, valley and foothill grassland, pinyon and juniper woodland.	Sandy soils. 65-1860 m.	5
Cicindela tranquebarica ssp.	San Joaquin tiger beetle	Insects	IICOL0220E	2	None	None	G5T1	S1				Known only from Tulare and Kings counties.		1
Clarkia springvillensis	Springville clarkia	Dicots	PDONA05120	28	Threatened	Endangered	G2	S2	1B.2		Chaparral | Cismontane woodland | Valley & foothill grassland	Chaparral, cismontane woodland, valley and foothill grassland.	Cutbanks and openings in blue oak woodland. Decomposed granite loam. 210-2255 m.	3
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	Marsh	CTT52410CA	60	None	None	G3	S2.1			Marsh & swamp | Wetland			1
Corynorhinus townsendii	Townsend's big-eared bat	Mammals	AMACC08010	635	None	None	G3G4	S2		BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFS_S-Sensitive | WBWG_H-High Priority	Broadleaved upland forest | Chaparral | Chenopod scrub | Great Basin grassland | Great Basin scrub | Joshua tree woodland | Lower montane coniferous forest | Meadow & seep | Mojavean desert scrub | Riparian forest | Riparian woodland | Sonoran desert scrub | Sonoran thorn woodland | Upper montane coniferous forest | Valley & foothill grassland	Throughout California in a wide variety of habitats. Most common in mesic sites.	Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	2
Delphinium recurvatum	recurved larkspur	Dicots	PDRAN0B1J0	120	None	None	G2?	S2?	1B.2	BLM_S-Sensitive | SB_SBBG-Santa Barbara Botanic Garden	Chenopod scrub | Cismontane woodland | Valley & foothill grassland	Chenopod scrub, valley and foothill grassland, cismontane woodland.	On alkaline soils; often in valley saltbush or valley chenopod scrub. 3-790 m.	17

SciName	ComName	TaxonGroup	ElmCode	TotalOccs	FedList	CalList	GRank	SRank	RPlantRank	OthrStatus	Habitats	GenHab	MicroHab	ReturnOccs
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	Insects	IICOL48011	271	Threatened	None	G3T2	S2			Riparian scrub	Occurs only in the Central Valley of California, in association with blue elderberry (Sambucus mexicana).	Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for "stressed" elderberries.	5
Diplacus pictus	calico monkeyflower	Dicots	PDSCR1B240	73	None	None	G2	S2	1B.2	BLM_S-Sensitive | SB_RSABG-Rancho Santa Ana Botanic Garden	Broadleaved upland forest | Cismontane woodland	Broadleafed upland forest, cismontane woodland.	In bare ground around gooseberry bushes or around granite rock outcrops. 180-1280 m.	3
Dipodomys nitratoides nitratoides	Tipton kangaroo rat	Mammals	AMAFD03152	79	Endangered	Endangered	G3T1T2	S1S2		IUCN_VU-Vulnerable	Chenopod scrub	Saltbrush scrub and sink scrub communities in the Tulare Lake Basin of the southern San Joaquin Valley.	Needs soft friable soils which escape seasonal flooding. Digs burrows in elevated soil mounds at bases of shrubs.	12
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1385	None	None	G3G4	S3		BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_VU-Vulnerable | USFS_S-Sensitive	Aquatic | Artificial flowing waters | Klamath/North coast flowing waters | Klamath/North coast standing waters | Marsh & swamp | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters | South coast flowing waters | South coast standing waters | Wetland	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation.	Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	1
Entosphenus hubbsi	Kern brook lamprey	Fish	AFBAA02040	2	None	None	G1G2	S1S2		AFS_TH-Threatened | CDFW_SSC-Species of Special Concern | IUCN_NT-Near Threatened | USFS_S-Sensitive	Aquatic | Sacramento/San Joaquin flowing waters	San Joaquin River system and Kern River.	Gravel-bottomed areas for spawning and muddy-bottomed areas where ammocoetes can burrow and feed.	1
Eremalche parryi ssp. kernensis	Kern mallow	Dicots	PDMAL0C031	184	Endangered	None	G3G4T3	S3	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden | SB_SBBG-Santa Barbara Botanic Garden	Chenopod scrub | Pinon & juniper woodlands | Valley & foothill grassland	Chenopod scrub, valley and foothill grassland, pinyon and juniper woodlands.	On dry, open, sandy to clay soils; usually within valley saltbush scrub; often at edge of balds. 60-1295 m.	4
Eriastrum hooveri	Hoover's eriastrum	Dicots	PDPLM03070	47	Delisted	None	G3	S3	4.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Chenopod scrub | Pinon & juniper woodlands | Valley & foothill grassland	Chenopod scrub, valley and foothill grassland, pinyon and juniper woodland.	On sparsely vegetated alkaline alluvial fans; also in the Temblor Range on sandy soils. 50-915 m.	1
Eryngium spinosepalum	spiny-sepaled button-celery	Dicots	PDAPI0Z0Y0	108	None	None	G2	S2	1B.2		Valley & foothill grassland | Vernal pool | Wetland	Vernal pools, valley and foothill grassland.	Some sites on clay soil of granitic origin; vernal pools, within grassland. 15-1270 m.	10
Eumops perotis californicus	western mastiff bat	Mammals	AMACD02011	296	None	None	G5T4	S3S4		BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | WBWG_H-High Priority	Chaparral | Cismontane woodland | Coastal scrub | Valley & foothill grassland	Many open, semi-arid to arid habitats, including conifer & deciduous woodlands, coastal scrub, grasslands, chaparral, etc.	Roosts in crevices in cliff faces, high buildings, trees and tunnels.	2
Fritillaria striata	striped adobe-lily	Monocots	PMLIL0V0K0	23	None	Threatened	G1	S1	1B.1	BLM_S-Sensitive | SB_RSABG-Rancho Santa Ana Botanic Garden | SB_USDA-US Dept of Agriculture | USFS_S-Sensitive	Cismontane woodland | Valley & foothill grassland	Cismontane woodland, valley and foothill grassland.	Heavy clay adobe soils in oak grassland. 135-1460 m.	7
Gambelia sila	blunt-nosed leopard lizard	Reptiles	ARACF07010	380	Endangered	Endangered	G1	S1		CDFW_FP-Fully Protected | IUCN_EN-Endangered	Chenopod scrub	Resident of sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief.	Seeks cover in mammal burrows, under shrubs or structures such as fence posts; they do not excavate their own burrows.	27
Great Valley Valley Oak Riparian Forest	Great Valley Valley Oak Riparian Forest	Riparian	CTT61430CA	33	None	None	G1	S1.1			Riparian forest			1
Gymnogyps californianus	California condor	Birds	ABNKA03010	13	Endangered	Endangered	G1	S1		CDF_S-Sensitive | CDFW_FP-Fully Protected | IUCN_CR-Critically Endangered | NABCI_RWL-Red Watch List	Chaparral | Valley & foothill grassland	Require vast expanses of open savannah, grasslands, and foothill chaparral in mountain ranges of moderate altitude.	Deep canyons containing clefts in the rocky walls provide nesting sites. Forages up to 100 miles from roost/nest.	1
Lasiurus cinereus	hoary bat	Mammals	AMACC05030	238	None	None	G5	S4		IUCN_LC-Least Concern | WBWG_M-Medium Priority	Broadleaved upland forest | Cismontane woodland | Lower montane coniferous forest | North coast coniferous forest	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding.	Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	1
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Dicots	PDAST5L0A1	111	None	None	G4T2	S2	1B.1	BLM_S-Sensitive | SB_RSABG-Rancho Santa Ana Botanic Garden | SB_SBBG-Santa Barbara Botanic Garden	Alkali playa | Marsh & swamp | Salt marsh | Vernal pool | Wetland	Coastal salt marshes, playas, vernal pools.	Usually found on alkaline soils in playas, sinks, and grasslands. 1-1375 m.	1
Layia munzii	Munz's tidy-tips	Dicots	PDAST5N0B0	68	None	None	G2	S2	1B.2	BLM_S-Sensitive	Chenopod scrub | Valley & foothill grassland	Chenopod scrub, valley and foothill grassland.	Hillsides, in white-grey alkaline clay soils, w/grasses and chenopod scrub associates. 45-765 m.	1
Leptosiphon serrulatus	Madera leptosiphon	Dicots	PDPLM09130	27	None	None	G3	S3	1B.2	USFS_S-Sensitive	Cismontane woodland | Lower montane coniferous forest	Cismontane woodland, lower montane coniferous forest.	Dry slopes; often on decomposed granite in woodland. 80-1645 m.	1
Lytta hoppingi	Hopping's blister beetle	Insects	IICOL4C010	5	None	None	G1G2	S1S2				Inhabits the foothills at the southern end of the Central Valley.		2
Lytta molesta	molestan blister beetle	Insects	IICOL4C030	17	None	None	G2	S2			Vernal pool | Wetland	Inhabits the Central Valley of California, from Contra Costa to Kern and Tulare counties.		2
Lytta morrisoni	Morrison's blister beetle	Insects	IICOL4C040	10	None	None	G1G2	S1S2			Valley & foothill grassland	Inhabitant of the southern Central Valley of California.		3
Masticophis flagellum ruddocki	San Joaquin coachwhip	Reptiles	ARADB21021	96	None	None	G5T2T3	S2?		CDFW_SSC-Species of Special Concern	Chenopod scrub | Valley & foothill grassland	Open, dry habitats with little or no tree cover. Found in valley grassland and saltbush scrub in the San Joaquin Valley.	Needs mammal burrows for refuge and oviposition sites.	2
Monolopia congdonii	San Joaquin woollythreads	Dicots	PDASTA8010	111	Endangered	None	G2	S2	1B.2	SB_UCBG-UC Botanical Garden at Berkeley	Chenopod scrub | Valley & foothill grassland	Chenopod scrub, valley and foothill grassland.	Alkaline or loamy plains; sandy soils, often with grasses and within chenopod scrub. 55-840 m.	2
Navarretia nigelliformis ssp. radians	shining navarretia	Dicots	PDPLM0C0J2	102	None	None	G4T2	S2	1B.2	BLM_S-Sensitive	Cismontane woodland | Valley & foothill grassland | Vernal pool | Wetland	Cismontane woodland, valley and foothill grassland, vernal pools.	Apparently in grassland, and not necessarily in vernal pools. 60-975 m.	1
Northern Claypan Vernal Pool	Northern Claypan Vernal Pool	Herbaceous	CTT44120CA	21	None	None	G1	S1.1			Vernal pool | Wetland			5

SciName	ComName	TaxonGroup	ElmCode	TotalOccs	FedList	CalList	GRank	SRank	RPlantRank	OthrStatus	Habitats	GenHab	MicroHab	ReturnOccs
Opuntia basilaris var. treleasei	Bakersfield cactus	Dicots	PDCAC0D055	62	Endangered	Endangered	G5T1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Chenopod scrub | Cismontane woodland | Valley & foothill grassland	Chenopod scrub, valley and foothill grassland, cismontane woodland.	Coarse or cobbly well-drained granitic sand on bluffs, low hills, and flats, within grassland. 85-550 m.	1
Perognathus inornatus	San Joaquin Pocket Mouse	Mammals	AMAFD01060	127	None	None	G2G3	S2S3		BLM_S-Sensitive | IUCN_LC-Least Concern	Cismontane woodland | Mojavean desert scrub | Valley & foothill grassland	Grassland, oak savanna and arid scrubland in the southern Sacramento Valley, Salinas Valley, San Joaquin Valley and adjacent foothills, south to the Mojave Desert.	Associated with fine-textured, sandy, friable soils.	10
Phrynosoma blainvillii	coast horned lizard	Reptiles	ARACF12100	784	None	None	G3G4	S3S4		BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Chaparral | Cismontane woodland | Coastal bluff scrub | Coastal scrub | Desert wash | Pinon & juniper woodlands | Riparian scrub | Riparian woodland | Valley & foothill grassland	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes.	Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	6
Pseudobahia peirsonii	San Joaquin adobe sunburst	Dicots	PDAST7P030	51	Threatened	Endangered	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Cismontane woodland | Valley & foothill grassland	Valley and foothill grassland, cismontane woodland.	Grassy valley floors and rolling foothills in heavy clay soil. 115-795 m.	23
Puccinellia simplex	California alkali grass	Monocots	PMPOA53110	80	None	None	G3	S2	1B.2		Chenopod scrub | Meadow & seep | Valley & foothill grassland | Vernal pool	Meadows and seeps, chenopod scrub, valley and foothill grasslands, vernal pools.	Alkaline, vernally mesic. Sinks, flats, and lake margins. 1-915 m.	1
Rana boylii	foothill yellow-legged frog	Amphibians	AAABH01050	2468	None	Candidate Threatened	G3	S3		BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_NT-Near Threatened | USFS_S-Sensitive	Aquatic | Chaparral | Cismontane woodland | Coastal scrub | Klamath/North coast flowing waters | Lower montane coniferous forest | Meadow & seep | Riparian forest | Riparian woodland | Sacramento/San Joaquin flowing waters	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats.	Needs at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis.	2
Senecio aphanactis	chaparral ragwort	Dicots	PDAST8H060	98	None	None	G3	S2	2B.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral | Cismontane woodland | Coastal scrub	Chaparral, cismontane woodland, coastal scrub.	Drying alkaline flats. 20-1020 m.	1
Sidalcea keckii	Keck's checkerbloom	Dicots	PDMAL110D0	50	Endangered	None	G2	S2	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Cismontane woodland | Ultramafic | Valley & foothill grassland	Cismontane woodland, valley and foothill grassland.	Grassy slopes in blue oak woodland. On serpentine-derived, clay soils, at least sometimes. 85-505 m.	2
Spea hammondii	western spadefoot	Amphibians	AAABF02020	1275	None	None	G3	S3		BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_NT-Near Threatened	Cismontane woodland | Coastal scrub | Valley & foothill grassland | Vernal pool | Wetland	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands.	Vernal pools are essential for breeding and egg-laying.	17
Sycamore Alluvial Woodland	Sycamore Alluvial Woodland	Riparian	CTT62100CA	17	None	None	G1	S1.1			Riparian woodland			1
Talanites moodyae	Moody's gnaphosid spider	Arachnids	ILARA98020	6	None	None	G1G2	S1S2			Ultramafic	Serpentine endemic.		2
Taxidea taxus	American badger	Mammals	AMAJF04010	592	None	None	G5	S3		CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Alkali marsh | Alkali playa | Alpine | Alpine dwarf scrub | Bog & fen | Brackish marsh | Broadleaved upland forest | Chaparral | Chenopod scrub | Cismontane woodland | Closed-cone coniferous forest | Coastal bluff scrub | Coastal dunes | Coastal prairie | Coastal scrub | Desert dunes | Desert wash | Freshwater marsh | Great Basin grassland | Great Basin scrub | Interior dunes | Ione formation | Joshua tree woodland | Limestone | Lower montane coniferous forest | Marsh & swamp | Meadow & seep | Mojavean desert scrub | Montane dwarf scrub | North coast coniferous forest | Oldgrowth | Pavement plain | Redwood | Riparian forest | Riparian scrub | Riparian woodland | Salt marsh | Sonoran desert scrub | Sonoran thorn woodland | Ultramafic | Upper montane coniferous forest | Upper Sonoran scrub | Valley & foothill grassland	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.	Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	6
Valley Sacaton Grassland	Valley Sacaton Grassland	Herbaceous	CTT42120CA	9	None	None	G1	S1.1			Valley & foothill grassland			1
Valley Saltbush Scrub	Valley Saltbush Scrub	Scrub	CTT36220CA	19	None	None	G2	S2.1			Chenopod scrub			2
Valley Sink Scrub	Valley Sink Scrub	Scrub	CTT36210CA	29	None	None	G1	S1.1			Chenopod scrub			3
Vulpes macrotis mutica	San Joaquin kit fox	Mammals	AMAJA03041	1018	Endangered	Threatened	G4T2	S2			Chenopod scrub | Valley & foothill grassland	Annual grasslands or grassy open stages with scattered shrubby vegetation.	Need loose-textured sandy soils for burrowing, and suitable prey base.	97

Scientific Name	Common Name	Family	Lifeform	CRPR	Global Rank	State Rank
Allium howellii var. howellii	Howell's onion	Alliaceae	perennial bulbiferous herb	4.3	G3G4T3	S3
Atriplex cordulata var. cordulata	heartscale	Chenopodiaceae	annual herb	1B.2	G3T2	S2
Atriplex cordulata var. erecticaulis	Earlimart orache	Chenopodiaceae	annual herb	1B.2	G3T1	S1
Atriplex coronata var. vallicola	Lost Hills crownscale	Chenopodiaceae	annual herb	1B.2	G4T2	S2
Atriplex depressa	brittlescale	Chenopodiaceae	annual herb	1B.2	G2	S2
Atriplex minuscula	lesser saltscale	Chenopodiaceae	annual herb	1B.1	G2	S2
Atriplex persistens	vernal pool smallscale	Chenopodiaceae	annual herb	1B.2	G2	S2
Atriplex subtilis	subtle orache	Chenopodiaceae	annual herb	1B.2	G1	S1
Azolla microphylla	Mexican mosquito fern	Azollaceae	annual / perennial herb	4.2	G5	S4
Brodiaea insignis	Kaweah brodiaea	Themidaceae	perennial bulbiferous herb	1B.2	G1	S1
Calochortus striatus	alkali mariposa lily	Liliaceae	perennial bulbiferous herb	1B.2	G3?	S2S3
Caulanthus californicus	California jewelflower	Brassicaceae	annual herb	1B.1	G1	S1
Clarkia exilis	slender clarkia	Onagraceae	annual herb	4.3	G3	S3
Clarkia springvillensis	Springville clarkia	Onagraceae	annual herb	1B.2	G2	S2
Convolvulus simulans	small-flowered morning-glory	Convolvulaceae	annual herb	4.2	G4	S4
Delphinium hansenii ssp. ewanianum	Ewan's larkspur	Ranunculaceae	perennial herb	4.2	G4T3	S3
Delphinium inopinum	unexpected larkspur	Ranunculaceae	perennial herb	4.3	G3	S3
Delphinium recurvatum	recurved larkspur	Ranunculaceae	perennial herb	1B.2	G2?	S2?
Diplacus pictus	calico monkeyflower	Phrymaceae	annual herb	1B.2	G2	S2
Eremalche parryi ssp. kernensis	Kern mallow	Malvaceae	annual herb	1B.2	G3G4T3	S3
Eriogonum twisselmannii	Twisselmann's buckwheat	Polygonaceae	perennial herb	1B.2	G2	S2
Eryngium spinosepalum	spiny-sepaled button-celery	Apiaceae	annual / perennial herb	1B.2	G2	S2
Fritillaria striata	striped adobe-lily	Liliaceae	perennial bulbiferous herb	1B.1	G1	S1
Hordeum intercedens	vernal barley	Poaceae	annual herb	3.2	G3G4	S3S4
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Asteraceae	annual herb	1B.1	G4T2	S2
Layia munzii	Munz's tidy-tips	Asteraceae	annual herb	1B.2	G2	S2
Leptosiphon serrulatus	Madera leptosiphon	Polemoniaceae	annual herb	1B.2	G3	S3
Monolopia congdonii	San Joaquin woollythreads	Asteraceae	annual herb	1B.2	G2	S2
Myosurus minimus ssp. apus	little mousetail	Ranunculaceae	annual herb	3.1	G5T2Q	S2
Navarretia nigelliformis ssp. nigelliformis	adobe navarretia	Polemoniaceae	annual herb	4.2	G4T3	S3
Navarretia nigelliformis ssp. radians	shining navarretia	Polemoniaceae	annual herb	1B.2	G4T2	S2
Opuntia basilaris var. treleasei	Bakersfield cactus	Cactaceae	perennial stem succulent	1B.1	G5T1	S1
Oreonana purpurascens	purple mountain-parsley	Apiaceae	perennial herb	1B.2	G3	S3
Pseudobahia peirsonii	San Joaquin adobe sunburst	Asteraceae	annual herb	1B.1	G1	S1
Puccinellia simplex	California alkali grass	Poaceae	annual herb	1B.2	G3	S2
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	2B.2	G3	S2
Sidalcea keckii	Keck's checkerbloom	Malvaceae	annual herb	1B.1	G2	S2

ATTACHMENT C
DELINEATION OF WATERS OF THE UNITED STATES REPORT

Friant-Kern Canal Middle Reach Capacity Correction Project

Delineation of Waters of the United States

January 29, 2020

Prepared for:

Friant Water Authority
854 N. Harvard Ave
Lindsay, CA 93247

Bureau of Reclamation
South-Central California Area Office
1243 N Street
Fresno, CA 93721

Prepared by:

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JANUARY 29, 2020

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Executive Summary

On behalf of Friant Water Authority (Friant) and Bureau of Reclamation (Reclamation), Stantec Consulting Services Inc. (Stantec) conducted a delineation of waters of the United States occurring in the 2,249.49-acre Friant-Kern Canal Middle Reach Capacity Correction Project study area (study area) in Tulare and Kern counties, California. The delineation was conducted in accordance with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (U.S. Army Corps of Engineers 2008a). The field delineation was conducted on September 30, October 1–3, and December 10 and 11, 2019. No potential waters of the United States were mapped within the study area. Excluded aquatic features occupy a total of 35.864 acres (19,339 linear feet) and include groundwater recharge basins (20.460 acres), intermittent stream (2.114 acres, 2,294 linear feet), irrigation canal (other than the Friant-Kern Canal) (4.650 acres, 12,229 linear feet), non-vegetated ditch (0.601 acre, 4,816 linear feet), pond (5.799 acres), riparian/fresh emergent wetland complex (0.011 acre), riparian wetland (1.874 acres), and seasonal wetland (0.355 acre).

The purpose of this delineation is to document and describe aquatic resources in the study area and provide an opinion as to whether any aquatic resources qualify as waters of the United States. To request U. S. Army Corps of Engineers (USACE) verification that no aquatic resources within the study area are considered waters of the United States, this delineation can be submitted to the USACE with a request for an Approved Jurisdictional Determination. Stantec advises all parties to treat the information contained herein as preliminary until the USACE provides a written determination of its jurisdiction.

If the USACE wishes to conduct a field verification, Friant and Reclamation request that the USACE contact both Douglas DeFlitch (Friant Chief Operating Officer) and Rain Emerson (Reclamation Environmental Compliance Branch Chief) to schedule a date and time to access the study area. Contact information for Mr. DeFlitch and Ms. Emerson is provided below:

> Douglas DeFlitch. Telephone: (559) 562-6305 ext. 4000. Email: ddeflitch@friantwater.org.
>
> Rain Emerson. Telephone: (559) 262-0335. Email: remerson@usbr.gov.

Abbreviations

ºF	degrees Fahrenheit
EPA	United States Environmental Protection Agency
Friant	Friant Water Authority
GPS	Global Positioning System
NWI	National Wetlands Inventory
OHWM	Ordinary High Water Mark
RGLs	Regulatory Guidance Letters
Stantec	Stantec Consulting Services Inc.
study area	Friant-Kern Canal Middle Reach Capacity Correction Project study area
TNW	Traditional Navigable Water
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey

1.0 PROJECT LOCATION

The study area encompasses 2,249.49 acres and consists of a linear alignment along the banks of the Friant-Kern Canal beginning at Avenue 208, just north of the community of Strathmore in Tulare County, stretching approximately 33 miles south-southwest to Lake Woollomes, approximately 0.5 mile north of Pond Road, to the southeast of the city of Delano in Kern County. It is shown on the *Delano East, Ducor, Lindsay, McFarland, Porterville, and Sausalito School, California* U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles. Public Land Survey location descriptions are provided in Table 1. The approximate center of the study area is located at latitude 35.949836º, longitude -119.121187º (North American Datum 83). The study area location is shown in Figure 1 (Appendix A).

Table 1. Study Area Location

Range	Township	Sections
27 East	20 South	21, 28, 33
	21 South	3, 4, 9, 16, 20, 21, 29, 30, 31
	22 South	6, 7, 18, 19, 30, 31, 32
	23 South	6
26 East	23 South	1, 11,12, 14, 15, 22, 23, 26, 27, 34
	24 South	3, 9, 10, 15, 16, 20, 21, 22, 28, 33
	25 South	4, 9, 16, 21, 28

To access the north end of the study area, from Highway 65, travel 1.3 miles east on Avenue 208 to the study area. To access the southern end of the study area, from Highway 99, travel 3.0 miles east on Pond Road to the Friant-Kern Canal then turn north on the road on top of the canal embankment and travel 0.5 mile to the study area.

2.0 ENVIRONMENTAL SETTING

2.1 CURRENT/RECENT LAND USE

The primary land use in the region is agriculture. The Friant-Kern Canal, vineyards, orchards, and agricultural fields are the dominant land uses in the study area. Other adjacent land uses include a landfill, groundwater recharge basins, agricultural related industrial facilities, and rural and urban housing in the northern portion of the study area near the communities of Strathmore and Porterville.

2.2 SITE TOPOGRAPHY AND ELEVATION

The topography in the study area is predominantly nearly level, ranging in elevation from a high of approximately 420 feet at the northern end to a low of 380 feet at the southern end. The embankments of the Friant-Kern Canal and the banks of two major drainages (Deer Creek, and White River), which the canal crosses under using siphons, provide the most topographic relief in the study area.

2.3 CLIMATE

Historical data used to describe the climate are collected at National Weather Service Cooperative Observer Program station # 047077 in Porterville, California (Western Regional Climate Center 2019). The Porterville Cooperative Observer Program station is located approximately 3.5 miles southeast of the study area.

Type: The climate of the area is characterized as Mediterranean with moderate winters and hot, dry summers.

Precipitation: Precipitation in the study area primarily occurs as rain. The average annual rainfall is approximately 10.9 inches.

Air Temperature: Air temperatures in the study area range between an average January high of 57 degrees Fahrenheit (ºF), and an average July high of 99ºF. The annual average high is approximately 78ºF.

Growing Season: The growing season (i.e., 50% probability of air temperature 28 ºF or higher) in the study area is approximately 346 days and occurs between mid-January and mid-December.

2.4 HYDROLOGY/HYDROLOGIC FEATURES

The main hydrologic features in the study area are two intermittent streams: Deer Creek, and White River. The study area is situated in the Tulare Basin, which is essentially a closed basin and historically only connected to the San Joaquin River in years of extreme rainfall (Regional Water Quality Control Board 2018). Deer Creek, and White River are tributaries to the Tulare Basin. Deer Creek and White River flow west and historically only reached Tulare Lake, a historical isolated inland lake, during high flow events (ECORP 2007). Currently Deer Creek terminates at the east bank of Homeland Canal approximately 20 miles west of the study area. The canal bank is breached during high runoff years to allow Deer Creek to flow into Homeland Canal (Gibson & Skordal 2015). White River appears to spread out across the valley floor or be diverted into canals 9.25 miles west of the study area. Several other manmade hydrological features occur in the study area including irrigation ditches and canals, excavated ponds, and groundwater recharge basins. Hydrology for aquatic resources in the study area is provided by pumped groundwater, sheet flow, snow melt from the Sierra Nevada, and diversion from the Friant-Kern Canal.

2.5 SOIL MAP UNITS

Twenty-six soil map units occur in the study area. They are described in the *Soil Survey of Kern County, California, Northwestern Part*; *Tulare County, California, Central Part*; and *Tulare County, Western Part, California* (Natural Resources Conservation Service 2019). These map units are summarized in Table 1 and shown in Figure 2 (Appendix A).

Table 2. Soil Map Units in the Study Area

Map Unit Name Taxonomy	Map Unit Reference Code	Drainage Class	Depth to Restrictive Layer	Hydric Soils
Tulare County, Western Part, California (CA659)				
Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes Calcic Haploxerepts	101	Well drained	More than 80 inches	No, except depressions
Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes Typic Durixerepts	105	Moderately well drained	20 to 40 inches to duripan	No, except depressions
Centerville clay, 0 to 2 percent slopes Aridic Calcixererts	106	Well drained	48 to 60 inches to densic material	No, except depressions
Colpien loam, 0 to 2 percent slopes Calcic Pachic Haploxerolls	108	Moderately well drained	More than 80 inches	No
Dumps	112	N/A	N/A	N/A
Exeter loam, 0 to 2 percent slopes Typic Durixeralfs	114	Moderately well drained	20 to 40 inches to duripan	No, except depressions
Flamen loam, 0 to 2 percent slopes Calcic Pachic Haploxerolls	116	Moderately well drained	40 to 60 inches to duripan	No, except depressions

Map Unit Name Taxonomy	Map Unit Reference Code	Drainage Class	Depth to Restrictive Layer	Hydric Soils
Hanford sandy loam, 0 to 2 percent slopes Typic Xerorthents	124	Well drained	More than 80 inches	No
Nord fine sandy loam, 0 to 2 percent slopes Cumulic Haploxerolls	130	Well drained	Abrupt textural changes at around 38 and 50 inches.	No, except flood plains, alluvial fans
Pits	131	N/A	N/A	No
Riverwash	134	N/A	N/A	Yes
San Joaquin loam, 0 to 2 percent slopes Typic Durixeralfs	135	Moderately well drained	About 15 inches to abrupt textural change; 20 to 40 inches to duripan	No
Tagus loam, 0 to 2 percent slopes Calcic Haploxerolls	137	Well drained	More than 80 inches	No
Tujunga loamy sand, 0 to 2 percent slopes Typic Xeropsamments	138	Somewhat excessively drained	More than 80 inches	No, except flood plains, alluvial fans
Yettem sandy loam, 0 to 2 percent slopes Entic Haploxerolls	143	Well drained	More than 80 inches	No, except flood plains, alluvial fans
Water-perennial	145	N/A	N/A	N/A

Map Unit Name Taxonomy	Map Unit Reference Code	Drainage Class	Depth to Restrictive Layer	Hydric Soils
Tulare County, California, Central Part (CA660)				
Exeter loam, 0 to 2 percent slopes Typic Durixeralfs	124	Well drained	20 to 40 inches to duripan	No, except depressions
San Joaquin loam, 0 to 2 percent slopes Abruptic Durixeralfs	154	Moderately well drained	About 20 inches to abrupt textural change; 20 to 40 inches to duripan	No, except depressions
San Joaquin loam, 2 to 9 percent slopes Abruptic Durixeralfs	155	Moderately well drained	About 20 inches to abrupt textural change; 20 to 40 inches to duripan	No, except depressions
Wyman loam, 0 to 2 percent slopes Typic Haploxeralfs	172	Well drained	More than 80 inches	No
Water	178	N/A	N/A	N/A
Kern County, California, Northwestern Part (CA666)				
Nord fine sandy loam, 0 to 2 percent slopes Cumulic Haploxerolls	130tw	Well drained	Abrupt textural changes at around 38 and 50 inches.	No, except flood plains, alluvial fans
Exeter sandy loam, 0 to 2 percent slopes Typic Durixeralfs	154	Well drained	20 to 40 inches to duripan	No, except depressions

Map Unit Name Taxonomy	Map Unit Reference Code	Drainage Class	Depth to Restrictive Layer	Hydric Soils
McFarland loam Typic Torriorthents	192	Well drained	More than 80 inches	No
Wasco sandy loam Typic Torriorthents	243	Well drained	More than 80 inches	No
Water	257	N/A	N/A	N/A

2.6 VEGETATION COMMUNITES

Vegetation communities in the study area were classified based on descriptions provided in *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988), as well as *A Manual of California Vegetation* (Sawyer et al. 2009). Undeveloped vegetation communities present within the study area include annual grassland, allscale saltbush scrub, California buckwheat scrub, Fremont cottonwood forest, mulefat thickets, and smartweed-cocklebur patches. Developed vegetation communities include agricultural types: fallow, field crops, orchards, and vineyards. Other developed vegetation communities include barren/ruderal and urban. Additionally, two aquatic vegetation communities were observed: including open water and riverine. Descriptions of each vegetation community are provided below.

Annual Grassland. Annual grassland occurs throughout the study area, primarily on the landside slopes of the Friant-Kern Canal. Annual grassland is an herbaceous vegetation community consisting primarily of introduced annual plant species, predominantly grasses. Commonly observed plant species include slender oat (*Avena barbata*), foxtail chess (*Bromus madritensis*), ripgut grass (*Bromus diandrus*), Russian thistle (*Salsola tragus*), prickly lettuce (*Lactuca serriola*), and cheeseweed (*Malva parviflora*).

Allscale Saltbush Scrub. Allscale saltbush scrub occurs within the study area in limited portions of the landside slopes of the Friant-Kern Canal. Allscale saltbush (*Atriplex polycarpa*), a shrub, is the dominant plant species occurring within this vegetation community. The understory of this vegetation community is composed of annual grassland species.

California Buckwheat Scrub. California buckwheat scrub occurs within the study area in limited portions of the landside slopes of the Friant-Kern Canal. California buckwheat (*Eriogonum fasciculatum*), a shrub, is the dominant plant occurring within this vegetation community. The understory of this vegetation community is composed of annual grassland species.

Fremont Cottonwood Forest. Fremont cottonwood forest occurs within the study area along the north and south banks of Deer Creek, located just west of the Friant-Kern Canal, and north of Deer Creek, adjacent to a groundwater recharge basin east of and alongside the Friant-Kern Canal. Fremont cottonwood (*Populus fremontii*) is the dominant plant species occurring within this vegetation community. The understory of this vegetation community varies; willow (*Salix* spp.) species commonly occur.

Mulefat Thickets. Mulefat thickets occur within a presumed old borrow site adjacent to Deer Creek, in the northern portion of the study area. Mulefat (*Baccharis salicifolia*), a shrub, is the dominant plant species occurring within this vegetation community. The sparse to very sparse understory of this vegetation community is largely composed of various annual and perennial herbaceous plant species.

Smartweed-Cocklebur Patches. A single smartweed-cocklebur patch occurs within a groundwater recharge basin along the east side of the Friant-Kern Canal, located in the northern portion of the study area. Cocklebur (*Xanthium strumarium*) is the dominant plant species within this vegetation community. There was no understory within this vegetation community as the groundwater recharge basin was inundated during the field survey.

Agriculture-Fallow. Agriculture-fallow was used to describe unplanted fields that were not currently in production but were utilized for agriculture in the recent past, or where annual agricultural production had ceased for the current growing year. These areas are currently unvegetated or are vegetated with annual plant species capable of colonizing recently and regularly disturbed land.

Agriculture-Field Crop. Agriculture-field crop applied to herbaceous plant crops. The most commonly cultivated herbaceous field crop observed within the study area was alfalfa (*Medicago sativa*).

Agriculture-Orchard. Both evergreen and deciduous orchards occur throughout the study area and represent the dominant type of agricultural within the study area. The most common species include almond (*Prunus dulcis*), pistachio (*Pistacia vera*), and citrus (*Citrus* sp.). Some orchards within the study area have sparse herbaceous vegetation growing in the understory while others are barren.

Agriculture-Vineyard. Vineyards occur throughout the study area. The vineyards consist of grape vines (*Vitis vinifera*) planted in rows and supported by wood and wire trellises. The understory is open, and the ground is generally devoid of vegetation.

Barren/Ruderal. Barren areas occur where vegetation is absent provides sparse cover (less than three percent). Barren areas are present on the dirt and paved roads and associated road shoulders. Vegetation is generally not present. The ruderal vegetation community includes areas that are regularly disturbed in the course of maintaining and operating the Friant-Kern Canal. Plant species composition in these areas is similar to that of annual grassland.

Urban. Urban describes developed areas within the study associated with homes, businesses, paved roads, and the many bridges that cross over the Friant-Kern Canal. These areas are devoid or nearly devoid of vegetation, or are dominated by non-native and ornamental species.

Open Water. Open water environments occur throughout the study area in manmade ponds and groundwater recharge basins. Some of the depressions or leveed areas hold water seasonally while other are permanently inundated. The substrate is typically soil and vegetation may be present but is often removed as a part of regular maintenance.

Riverine. Riverine occurs in canals, and two streams: Deer Creek and White River. The dominate substrate in canals is concrete or soil while sand is the dominate substrate in the streams. Vegetation is typically sparse and either limited to the channel margins or consisting of ruderal species growing in the channels when they are dry.

3.0 METHODS

Stantec conducted an on-site routine delineation of wetlands and “other waters” of the United States based on field observations of positive indicators for wetland vegetation, hydrology, and soils; and indicators of an ordinary high water mark (OHWM). The routine delineation includes standard 3-parameter data points to document wetland features, other waters, and uplands. This methodology is consistent with the approach outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (U.S. Army Corps of Engineers 2008a). Plant taxonomy follows *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012), including applicable errata and supplements (Jepson Flora Project 2019). Wetland indicator status for plant species was confirmed using *The National Wetland Plant List* (Lichvar et al. 2016), and the “50/20 Rule” or “Prevalence Index” was applied to determine plant dominance (U.S. Army Corps of Engineers 2008a). Presence of primary and secondary wetland hydrology indicators were documented for each wetland feature. The OHWM was determined using the approach outlined in *A Field Guide to the Identification of the OHWM in the Arid West Region of the Western United States* (U.S. Army Corps of Engineers 2008b).

Soil pits were dug in representative wetland features to a depth sufficient to document the presence or confirm the absence of hydric soil or wetland hydrology indicators. Soils were examined to assess field indicators of hydric soils. Positive indicators of hydric soils were observed in the field following the criteria outlined in *Field Indicators of Hydric Soils in the United States* (Vasilas et al. 2018). Soil colors were determined using a Munsell® soil color chart. The hydric status of each soil map unit occurring in the study area was reviewed using the *Web Soil Survey* (Natural Resources Conservation Service 2019). At least one set of data points was selected to best represent the wetland feature type and the adjacent upland or other waters. Data points were also placed in suspect areas to confirm wetland or upland status.

Other waters are defined as traditional navigable waters and their tributaries (33 CFR 329). Delineation of other waters was based on presence of an OHWM as defined in USACE regulations (33 CFR 328.3 and 33 CFR 328.4) and whether the feature qualified as tributary to waters of the United States. Physical characteristics of an OHWM include, but are not limited to the following conditions: a natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, presence of litter and debris, leaf litter disturbed or washed away, scour, deposition, presence of bed and bank, and water staining. At least one data point was selected to best represent the OHWM of other waters for each other waters type and OHWM data forms were completed at select transects.

Prior to conducting the on-site routine delineation, the U.S. Fish and Wildlife Service's, National Wetlands Inventory (NWI) Wetlands Mapper (U.S. Fish and Wildlife Service 2019) was reviewed to determine if any surface water and wetland features were previously mapped in the study area and general vicinity. Surface water and wetland features within NWI are described by the Cowardin et al. (1979) system, as amended by subsequent updates (Federal Geographic Data Committee 2013). Non-riparian features delineated during the on-site routine delineation were classified using the Cowardin et al. (1979) system based on existing NWI mapping or assigned a Cowardin type if not previously mapped. Stantec used the U.S. Fish and Wildlife Service's *A System for Mapping Riparian Areas in the Western United States* to classify riparian features (United States Fish and Wildlife Service 2009). The USACE Aquatic Resources Excel spreadsheet, which includes specific information about the wetland and other waters features delineated, including their Cowardin or riparian type, was completed and submitted as a separate deliverable with this report.

Twenty-four 3-parameter data points were used to characterize and document each wetland type and the adjacent upland or other waters, and suspect areas. Five OHWM data forms were used to document other waters. Field observations were conducted on September 30, October 1–3, and December 10 and 11, 2019.

The boundaries of delineated features and the associated data points were mapped using an Eos Positioning Systems®, Inc., Arrow 100 submeter Global Positioning System (GPS) receiver, paired to an Apple® iPhone® or iPad® using Esri® Collector for ArcGIS app. Where the use of the GPS was not practicable (e.g., dense vegetation precluded access) the features were delineated by hand using the Esri® Collector for ArcGIS app. The GPS and digitized location data were overlaid onto an aerial photograph of the study area to develop the delineation map.

4.0 RESULTS AND DISCUSSION

No potential waters of the United States were observed in the study area (Figure 3, Appendix A). All delineated features were considered excluded features (i.e., did not meet definition of waters of the United States). Routine wetland determination data forms are presented in Appendix B and OHWM data forms are presented in Appendix C. A plant list is provided in Appendix D. Representative photographs of the excluded features and data point locations are presented in Appendix E.

4.1 EXCLUDED FEATURES

4.1.1 Overview of Excluded Features

This delineation report was prepared to support an Approved Jurisdictional Determination from the USACE. As such, aquatic resources in the study area that meet wetland criteria or exhibit an OHWM—but do not meet the definition of waters of the United States—were classified and mapped as excluded features (Table 3).

Excluded features include those aquatic resources that are excluded from the definition of waters of the United States based on:

1. The preamble to the Regulatory Programs of the Corps of Engineers; Final Rule published in the Federal Register on November 13, 1986;

2. The United States Environmental Protection Agency (EPA) and USACE Joint Memorandum clarifying guidance regarding the Supreme Court's decision in Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers published in the Federal Register on January 15, 2003;

3. The EPA and USACE Joint Memorandum titled Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States dated December 2, 2008; and

4. Other applicable USACE guidance provided in the 2011 *Draft Guidance on Identifying Waters Protected by the Clean Water Act* and applicable Regulatory Guidance Letters (RGLs) and regulatory branch memoranda.

Examples of excluded features identified in the above sources include, but are not limited to:

1. Non-tidal drainage and irrigation ditches excavated on dry land;

2. Artificially irrigated areas that would revert to upland if the irrigation ceased;

3. Artificial lakes or ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;

4. Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

5. Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States;

6. Isolated, intrastate, non-navigable waters where the sole basis available for asserting Clean Water Act jurisdiction rests on any of the factors listed in the ''Migratory Bird Rule";

7. Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water; or

8. Waters that lack a "significant nexus" where one is required for a water to be protected by the Clean Water Act (e.g., intermittent streams that do not drain to traditionally navigable waters of the U.S).

Table 3. Summary of Excluded Features in the Study Area

Excluded Features	Total Acres	Total Linear Feet	Cowardin Type[1]
Groundwater Recharge Basin	20.460	N/A	L2US, PUB, RP2EM
Intermittent Stream	2.114	2,294	R4SB
Irrigation Canal (other than the Friant-Kern Canal)	4.650	12,229	R4SB
Non-Vegetated Ditch	0.601	4,816	R4SB
Pond	5.799	N/A	PUB, PEM
Riparian/Fresh Emergent Wetland	0.011	N/A	RP1SS
Riparian Wetland	1.874	N/A	RP1EM, RP1SS, RP1FO, RP2SS
Seasonal Wetland	0.355	N/A	PEM
Total Excluded Features	**35.864**	**19,339**	

1. Cowardin et al. 1979 and U.S. Fish and Wildlife Service 2009

4.1.2 Characterization of Excluded Features

4.1.2.1 Groundwater Recharge Basins

Groundwater recharge basins occur as depressions or diked areas used to recharge groundwater. They are generally larger than ponds and are seasonally or only occasionally inundated. They may support hydrophytic vegetation, non-hydrophytic vegetation, or be barren. Groundwater recharge basins were delineated based on the presence of an OHWM indicated by presence of biotic crust, changes in vegetation, changes in sediment texture, and breaks in slope.

We considered groundwater recharge basins excluded features as they have no outflow channels and they are artificial bodies of water constructed in dry land.

4.1.2.2 Isolated Intermittent Streams

Two isolated intermittent streams occur in the study area, Deer Creek and White River. They are characterized as bed and bank features with an OHWM, which predominately occurs along fortified/channelized banks. Sand is the dominate substrate. The low flow channels are barren or sparsely vegetated by opportunistic herbaceous species including cocklebur, horseweed (*Erigeron canadensis*), Johnson grass (*Sorghum halepense*), and common sunflower (*Helianthus annuus*). The floodplains support moderate to dense non-hydrophytic vegetation including short podded mustard (*Hirschfeldia incana*) or they support riparian wetlands (described below).

Deer Creek and White River historically dissipated into the ground in the San Joaquin Valley and only reached Tulare Lake during high flow events (ECORP 2007). Deer Creek terminates at Homeland Canal approximately 20 miles west of the study area. During years of high rainfall/snow melt, the embankment of the canal is breached and Deer Creek flows into Homeland Canal (Gibson & Skordal 2015). Homeland Canal flows to the south and west from its juncture with Deer Creek and terminates at Gates–Jones Canal (Gibson & Skordal 2015). White River has been channelized and appears to spread out as sheet flow or is diverted into canals approximately 9.25 miles west of the study area. Water from the Friant-Kern Canal can be released into both streams for agricultural use and groundwater recharge.

We considered Deer Creek and White River excluded features based on the USACE approved jurisdictional determination for the Pixley Groundwater Bank (SPK-2015-00265, Appendix E) where the agency determined Deer Creek was an isolated intrastate water with no connection to interstate or foreign commerce. Additionally the USACE has determined that Poso Creek, which crosses the Friant-Kern Canal approximately 8 miles south of the study area and flows to Goose Lake Canal, did not qualify as a waters of the United States as it lacked a hydrologic connection to a Traditional Navigable Water (TNW) and did not have a nexus to interstate or foreign commerce (SPK-2003-00265, Appendix E). White River is similar to Deer Creek and Poso Creek (i.e., does not flow into the ocean or a TNW and evaporates or dissipates into the ground within the Tulare Basin). Therefore, we have considered it as an excluded feature.

4.1.2.3 Irrigation Canals and Non-vegetated Ditches

Several private/non-federal irrigation canals and non-vegetated ditches occur in the study area. Irrigation canals and non-vegetated ditches are used to deliver irrigation water to farms. They range in size from 2 to 71 feet wide, seasonally carry flow, are usually unlined, and may support vegetation along their edges. Some of the irrigation canals receive deliveries from the Friant-Kern Canal while others pass under the Friant-Kern Canal in siphons.

We consider the irrigation canals and non-vegetated ditches in the study area to be excluded features as they were excavated on dry land and lack a significant nexus to downstream waters.

4.1.2.4 Ponds

Ponds occur in man-made depressions scattered throughout the study area. Ponds may have persistent surface water or dry out seasonally. Some ponds supported hydrophytic vegetation around the edge or throughout the pond. However, as the ponds were excavated in dry land and would likely revert to upland vegetation if not artificially inundated, we mapped all these features as ponds regardless of whether they supported hydrophytic vegetation. All ponds were delineated based on the presence of an OHWM indicated by changes in vegetation, break in slope, sediments deposits, and drift deposits.

Many of the ponds are associated with irrigation of adjacent fields, orchards, or vineyards (e.g., Pond 4, Figure 3). Other ponds were associated with deep excavations for siphons under the Friant Kern Canal to convey flood waters under the canal (e.g. Pond 2, Figure 3), or to contain leaks from the canal (i.e., Pond 1 and 11, Figure 3). No outflow channels were observed from any of the ponds suggesting they do not overflow and connect to other hydrologic features on a regular basis.

We consider all ponds in the study area excluded features based on their apparent isolation from other features as evidenced by the lack of an outflow channel. Further, the preamble to the Regulatory Programs of the Corps of Engineers states that the USACE generally does not consider ponds created by excavating or diking dry land that are used for irrigation to be waters of the United States.

4.1.2.5 Riparian Wetlands

Deer Creek and White River support riparian wetlands along their banks and a presumed old borrow site adjacent to Deer Creek also supports riparian wetlands. Dominant species include white-stem hedge-nettle (*Stachys albens*), common spikerush (*Eleocharis macrostachya*), stinging nettle (*Urtica dioica*), willows, and Fremont cottonwood. Hydric soil indicators observed include depleted matrix, depleted below dark surface, and sandy redox. Some hydric soils were problematic in that these features occur on sandbars within and adjacent to the streams. Indicators of hydric soils are often absent within stream channels due to deposition of new soil material, low iron and manganese levels, and lack of organic content. Indicators of wetland hydrology included surface water, high water table, saturation, biotic crust, water stained leaves, drift deposits, drainage patterns, and FAC-Neutral test.

One fresh emergent/riparian wetland complex was mapped in Deer Creek. Dominant vegetation included broad-leaved cattail (*Typha latifolia*) and willows; hydric soils were problematic as they consisted of sand within the stream channel, hydrology was provided by surface water. We consider these wetlands to be excluded features as they are associated with streams that lack a hydrologic connection to a TNW and a nexus to interstate or foreign commerce.

4.1.2.6 Seasonal Wetland

One seasonal wetland was mapped in a depression adjacent to the Friant-Kern Canal, which may have been formed incidental to construction of the canal. Common spikerush (*Eleocharis macrostachya*) was the dominant plant at the data point with cocklebur and curly dock (*Rumex crispus*). Hydric soils were considered problematic as seasonally ponded soils and hydrology was indicated by the presence of a biotic crust. The feature appears to collect water from a series of roadside ditches and water is either pumped into the Friant-Kern Canal or passes under the canal in a siphon to a pond with no defined outflow channel.

We consider the seasonal wetland an excluded feature because it lacks a significant nexus to downstream waters.

5.0 CONCLUSION

No waters of the United Sates were mapped in the study area. Excluded features occupy a total of 35.864 acre (19,339 linear feet) and include groundwater recharge basin, intermittent stream, irrigation canal, non-vegetated ditch, pond, riparian/fresh emergent wetland complex, riparian wetland, and seasonal wetland.

Determinations of waters of the United States, including wetlands, are based on current conditions, (i.e., normal circumstances) and made in accordance with relevant EPA and USACE guidance. Determinations are subject to verification by the USACE. Stantec advises all interested parties to treat the information contained herein as preliminary pending written verification by the USACE.

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Appendix A FIGURES

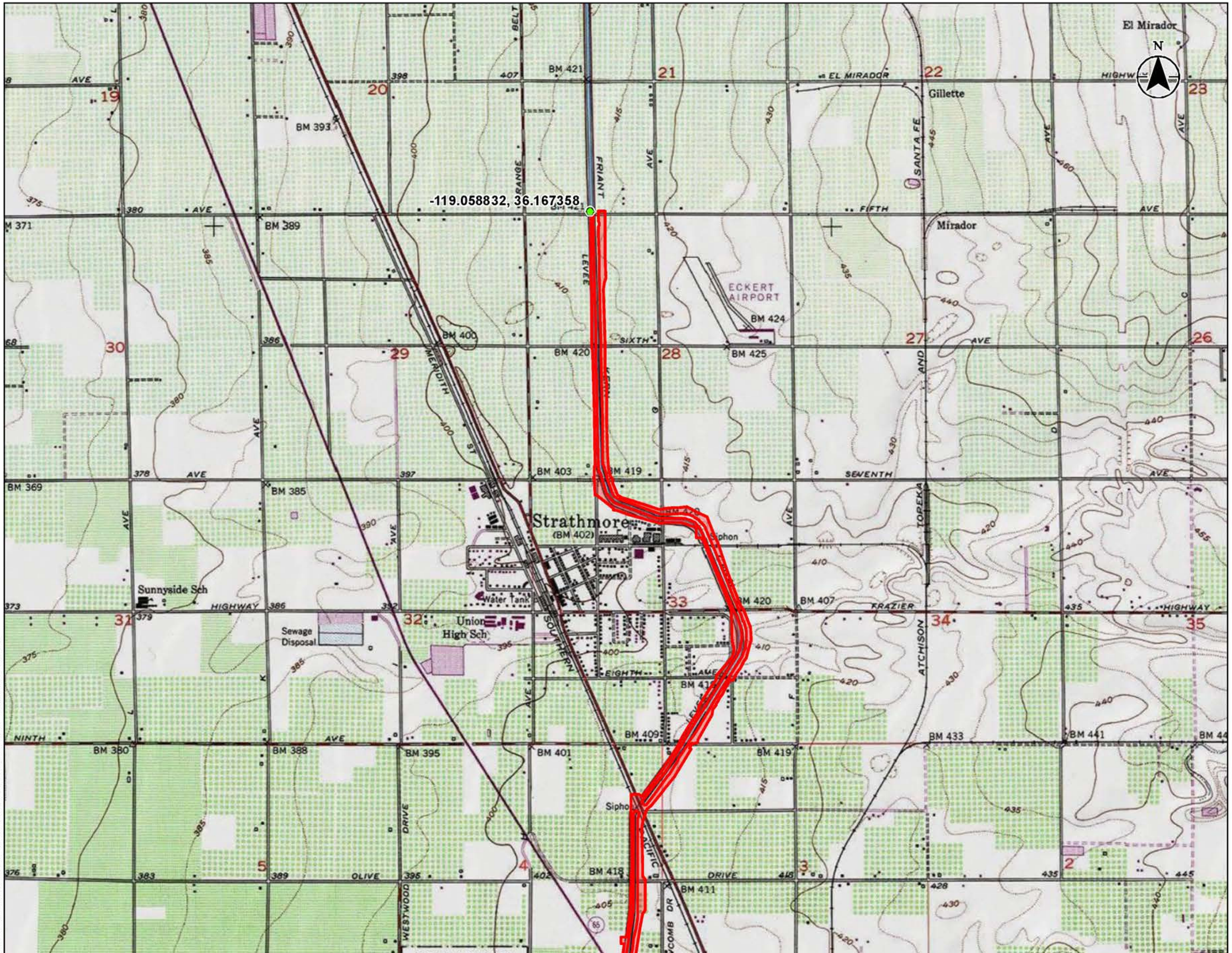

Figure No.
1a

Title
Project Location

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

1 inch = 2,000 feet
0 2,000 4,000 Feet
1:24,000 (At original document size of 11x17)

Study Area (2,249.49 acres)
Map Reference Point

Public Land Survey
T20S, R27E, Sec.21, 28, 33
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7.5' USGS Quadrangles
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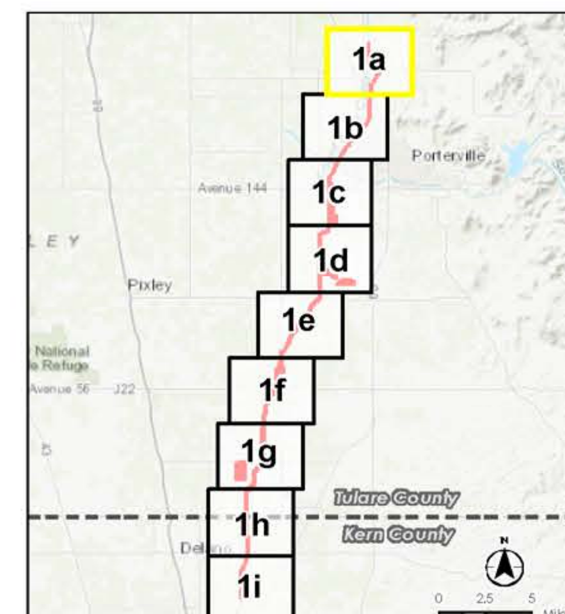

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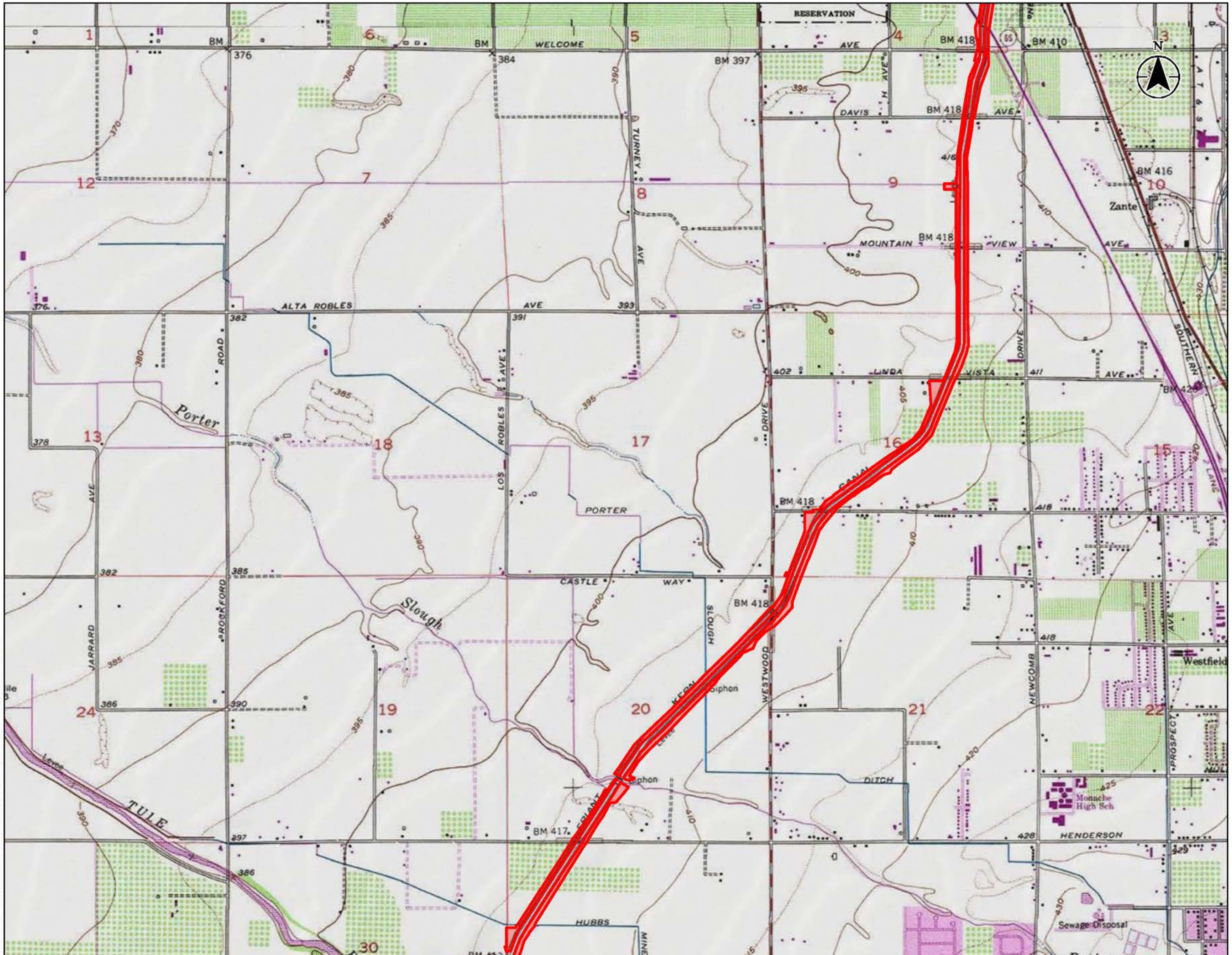

Figure No.
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Title
Project Location

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Project Location
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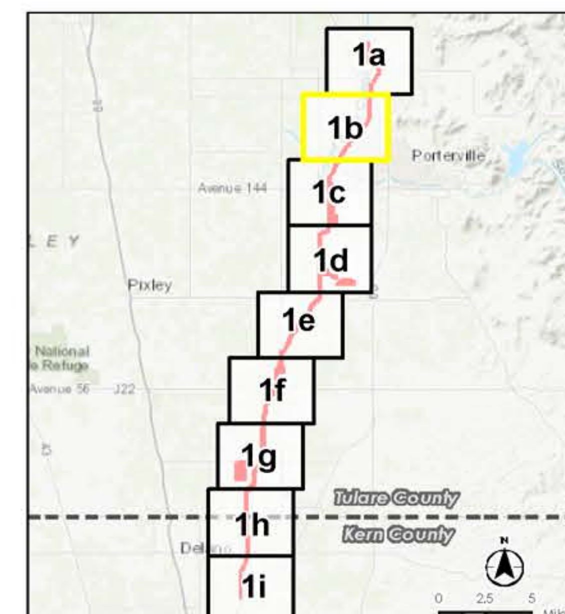

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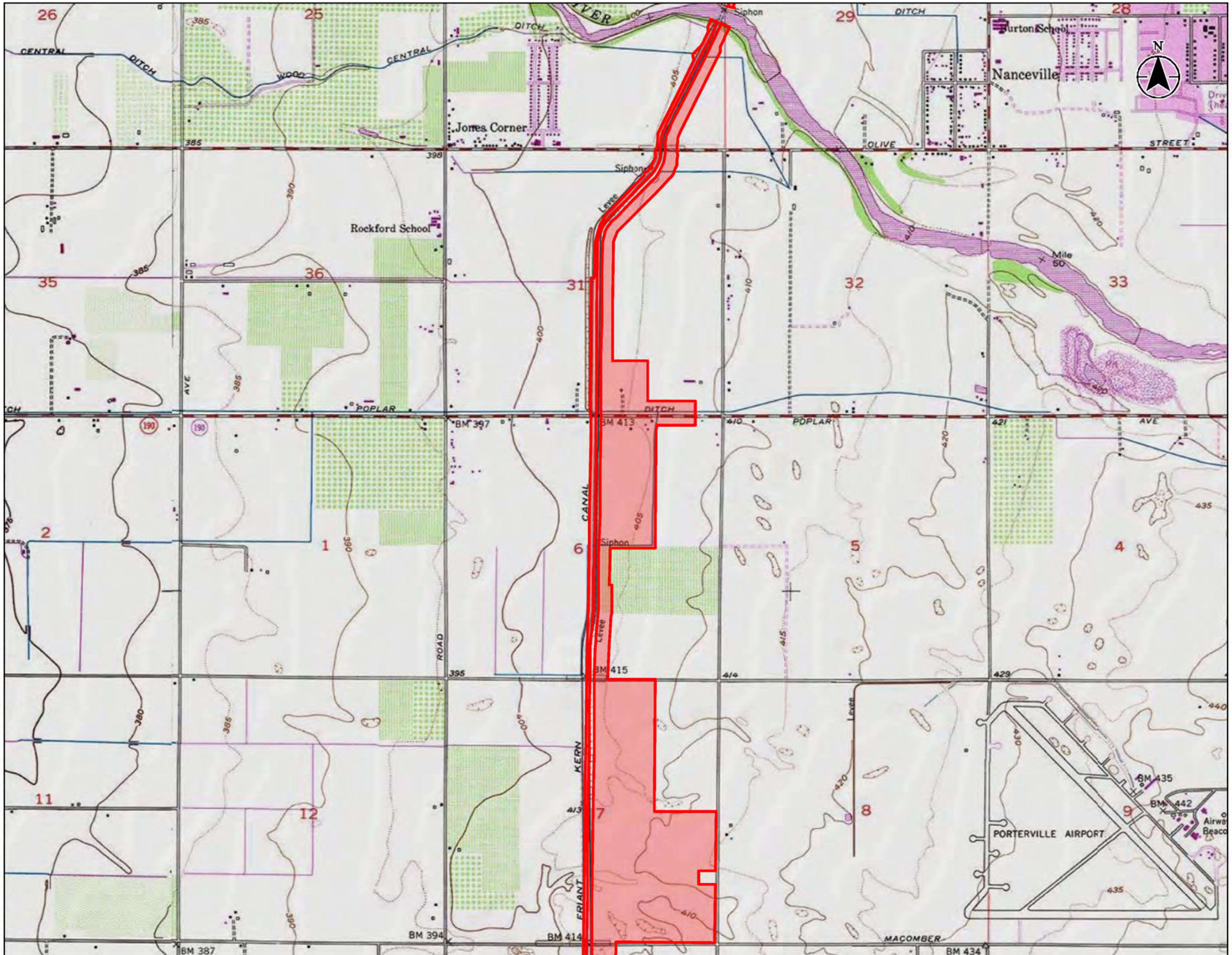

Figure No.
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Title
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Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location — 184031016
Tulare and Kern Counties, California
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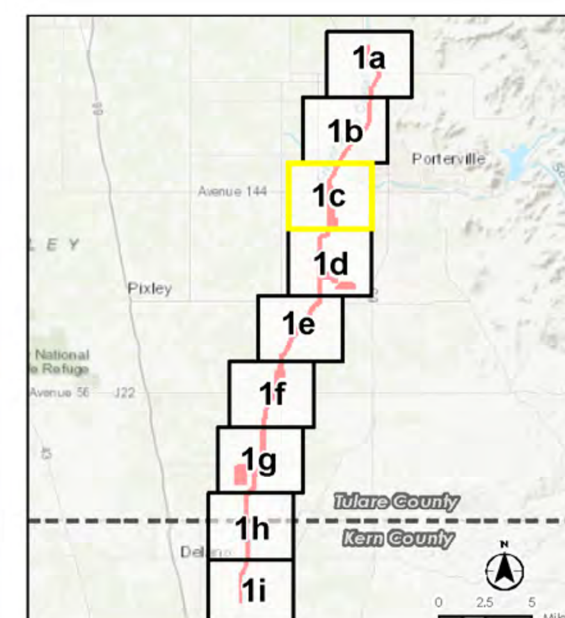

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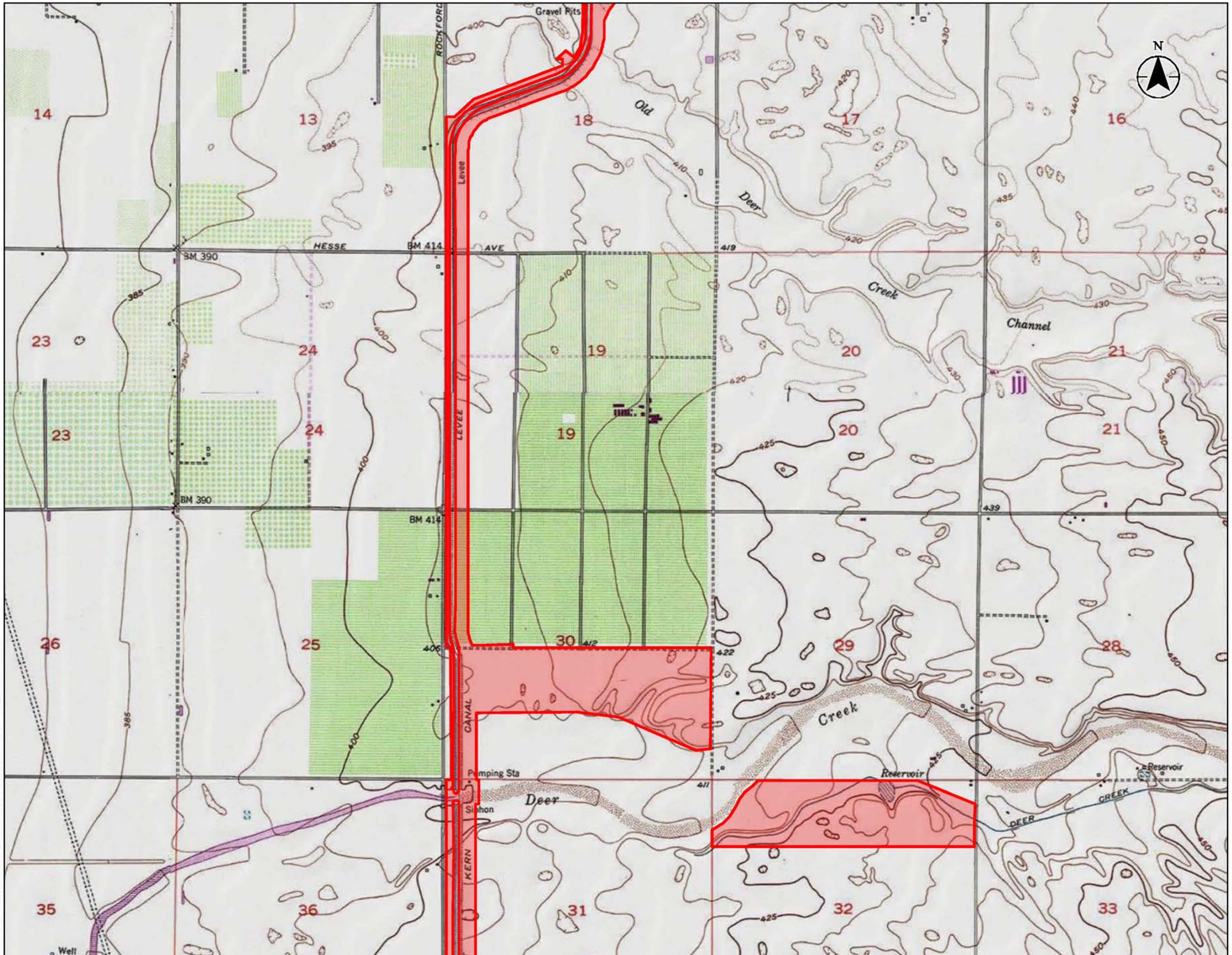

Figure No.
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Title
Project Location

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Friant-Kern Canal Middle Reach Capacity
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Project Location
Tulare and Kern Counties, California

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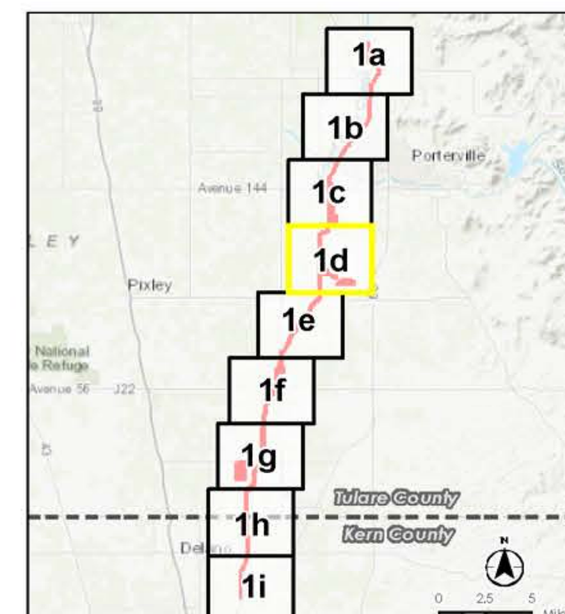

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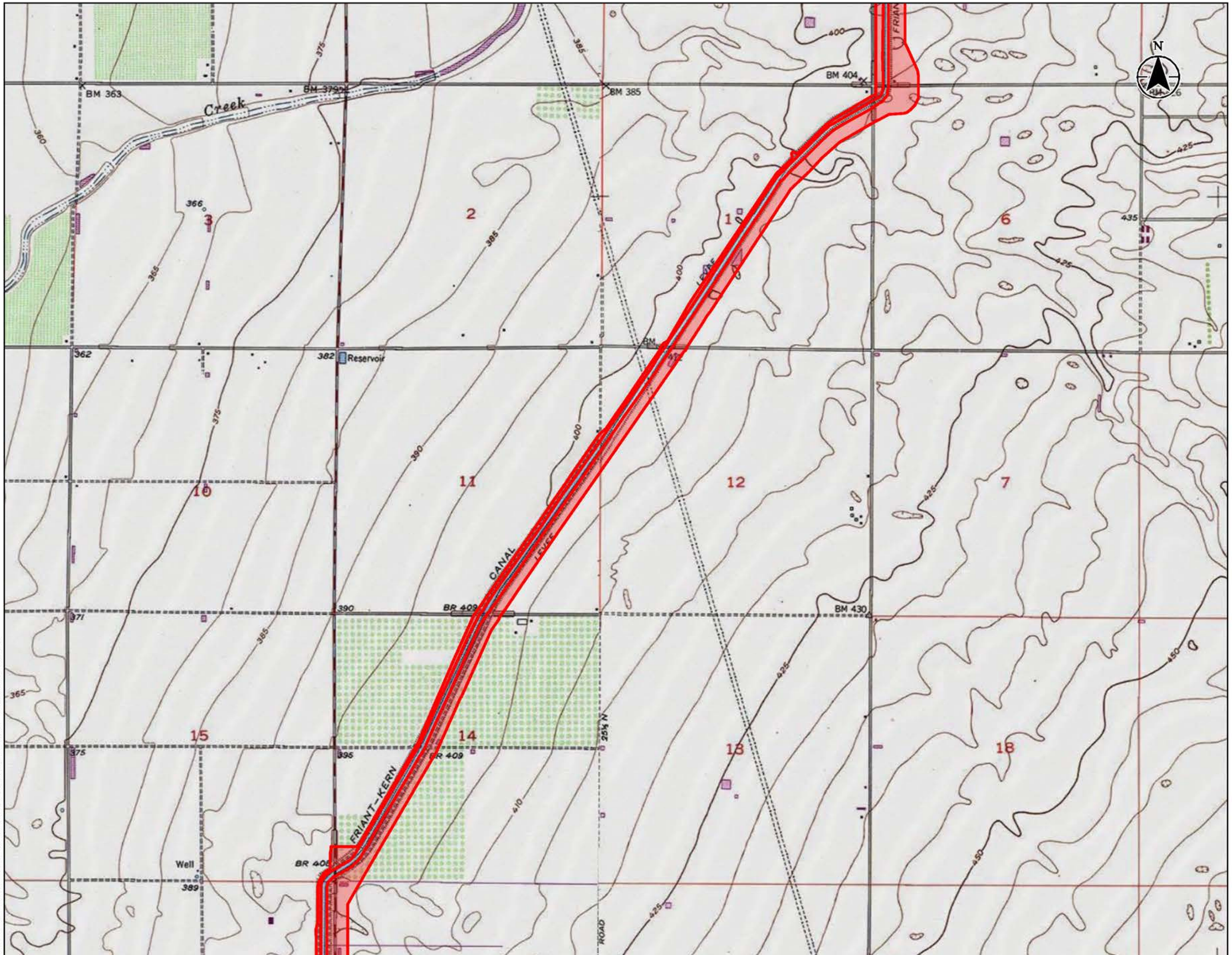

Figure No.
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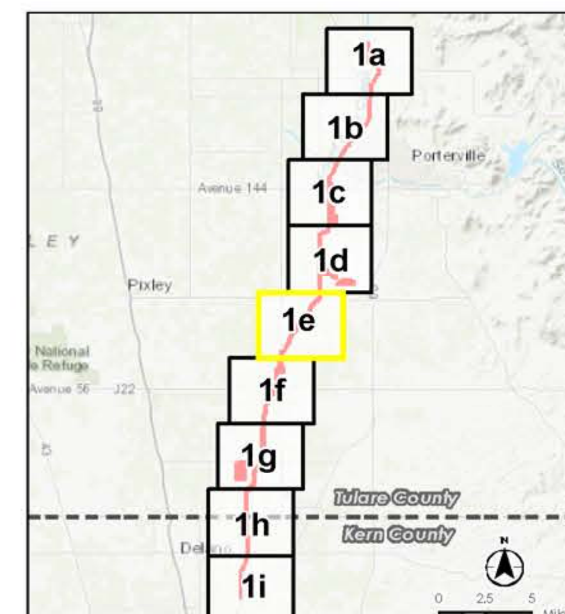

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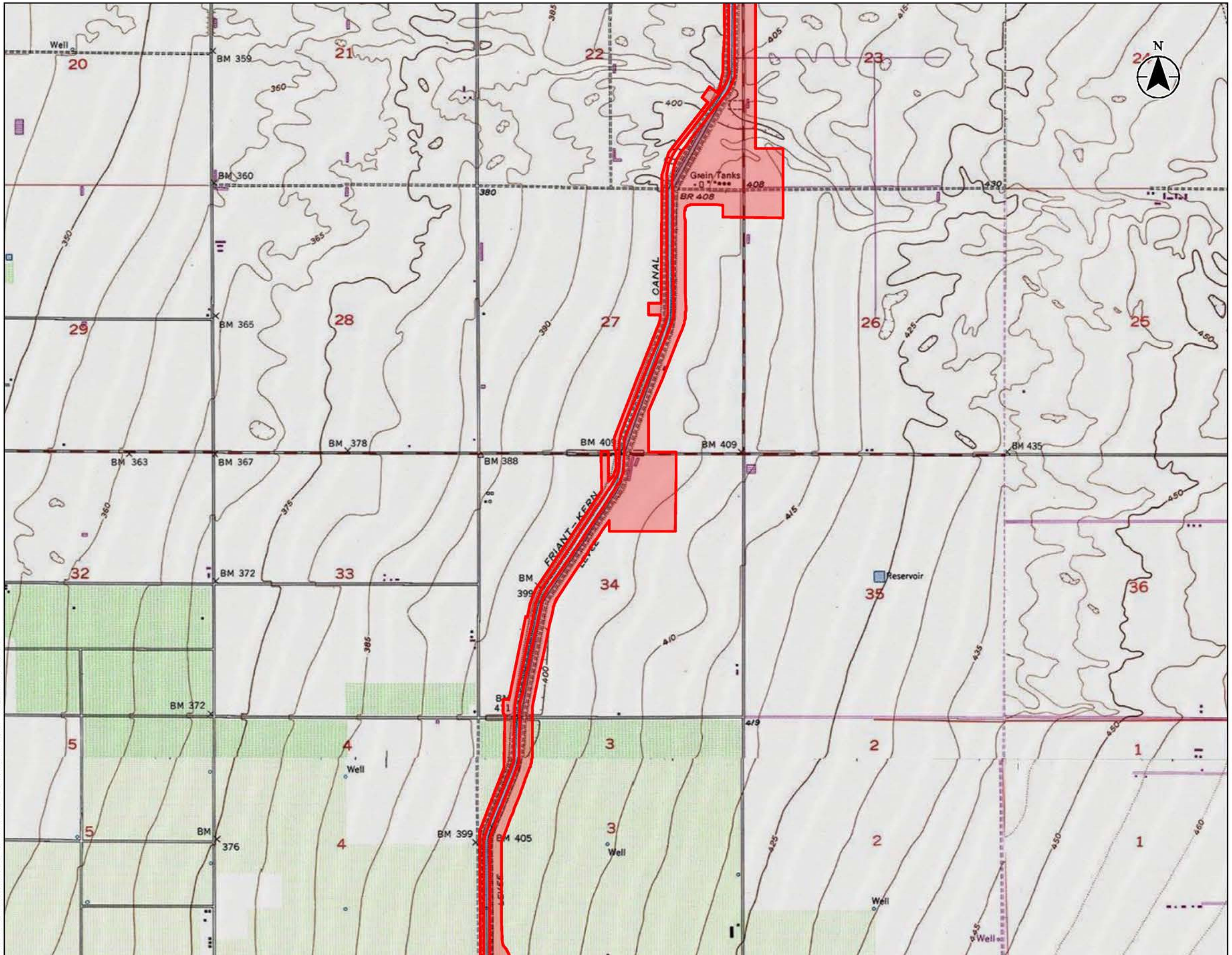

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Title
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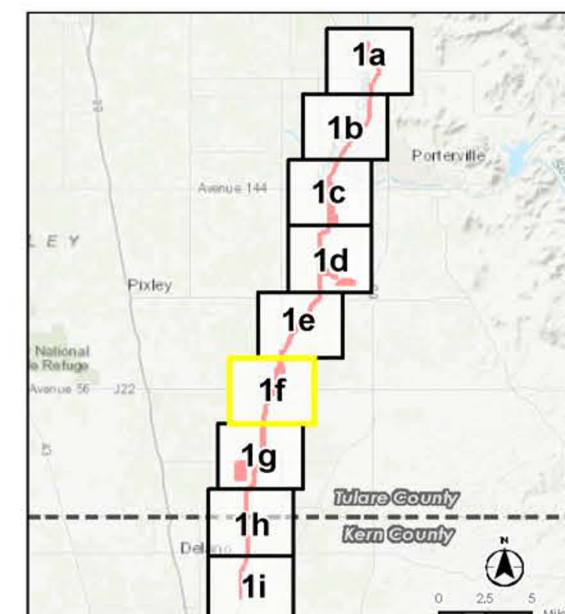

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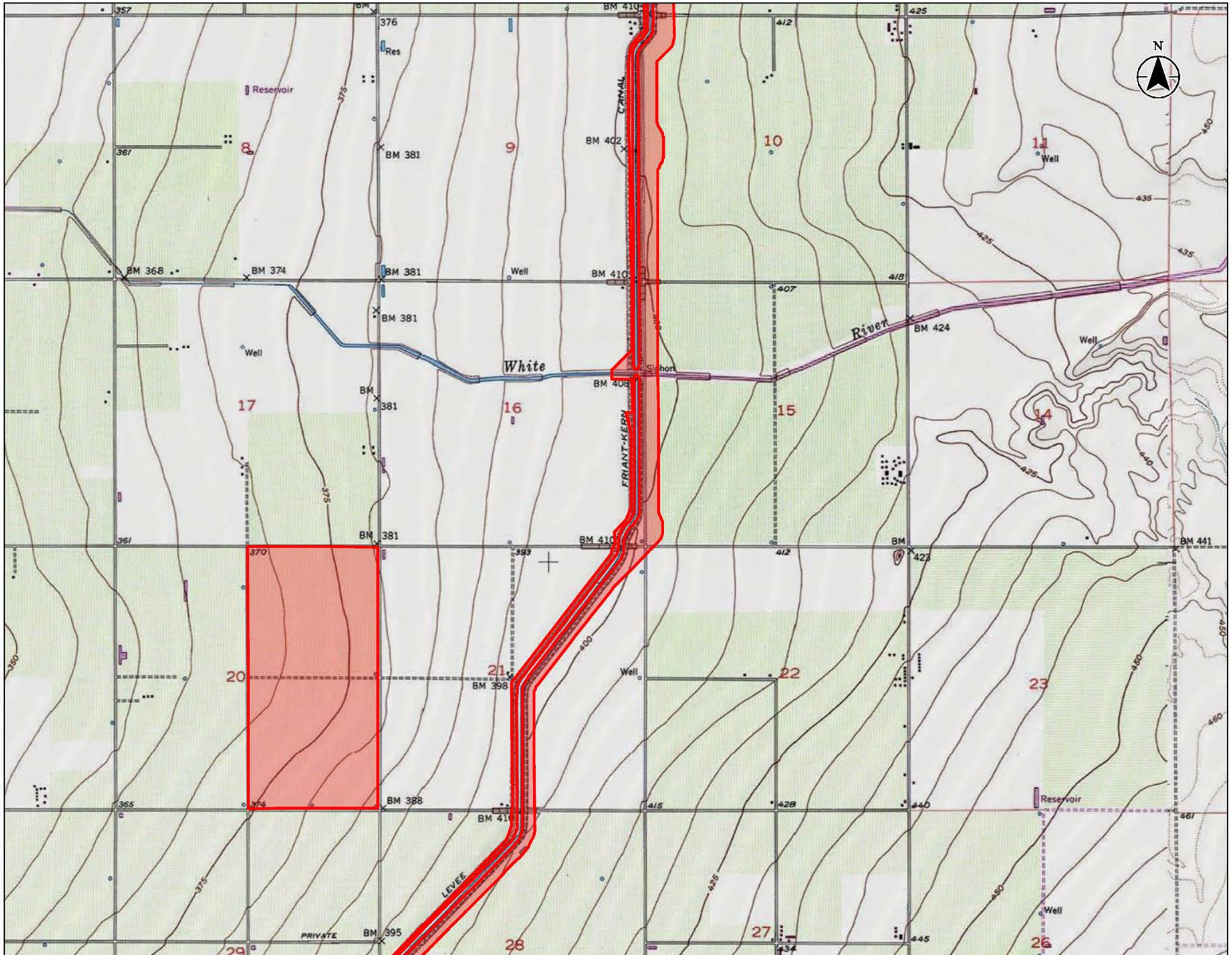

Figure No.
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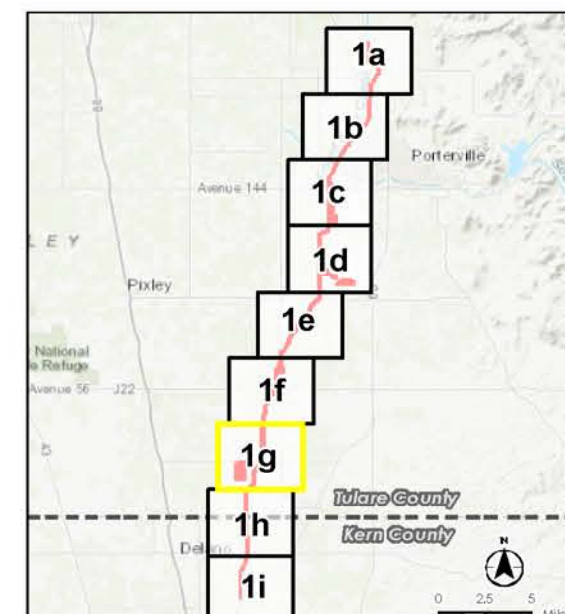

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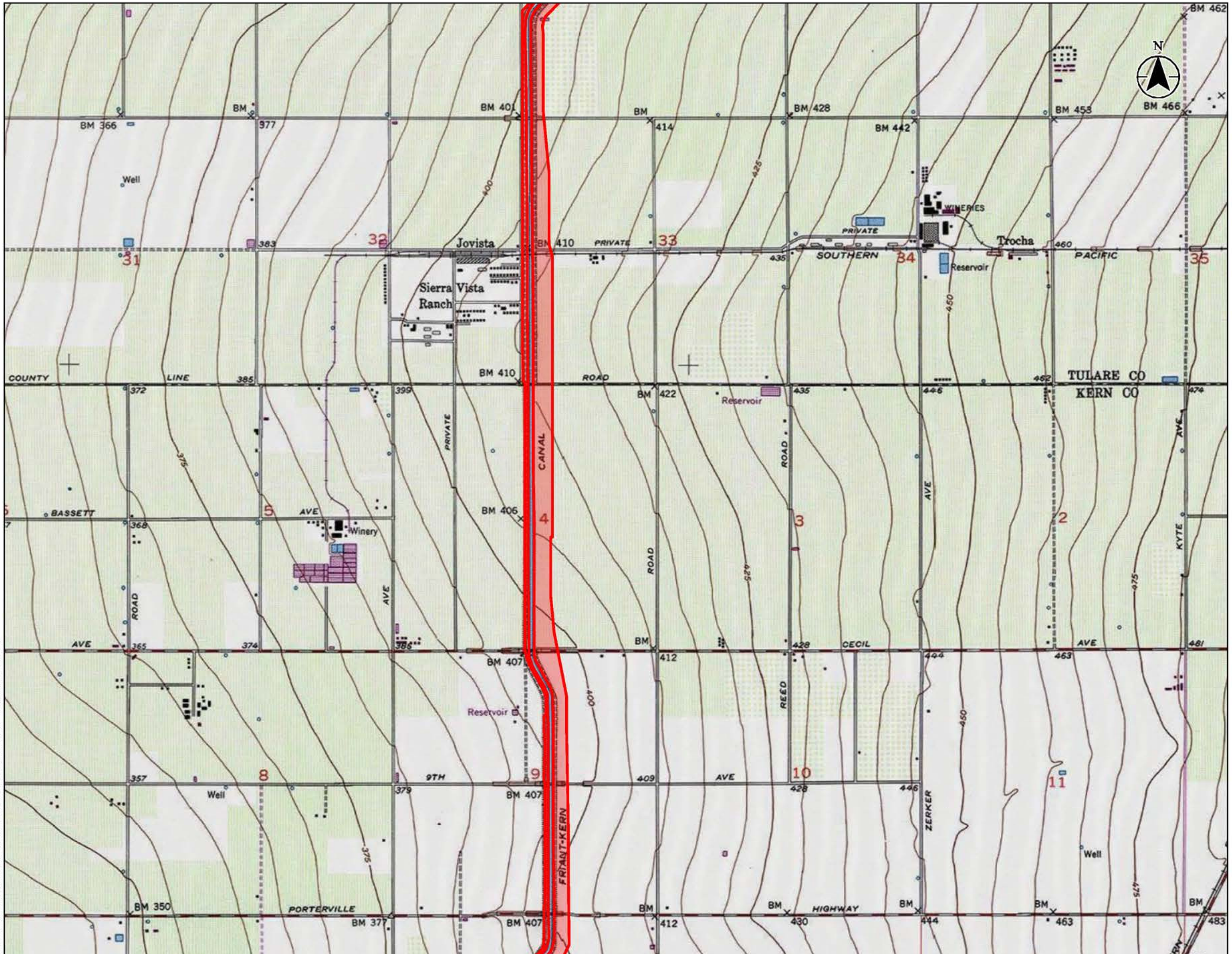

Figure No.
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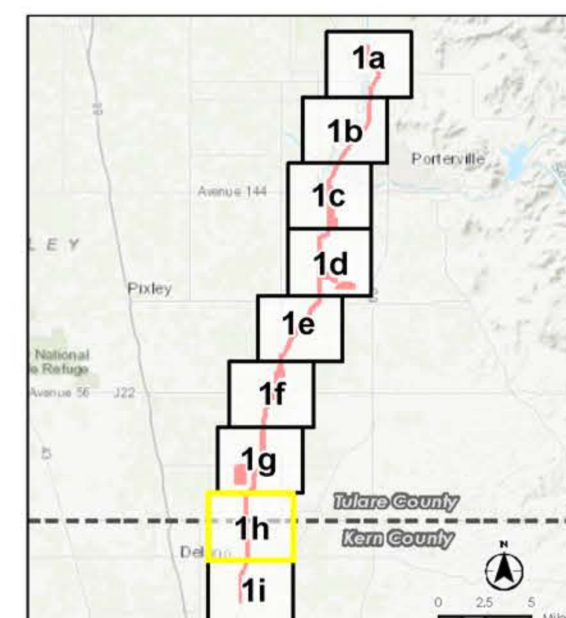

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Friant WATER AUTHORITY

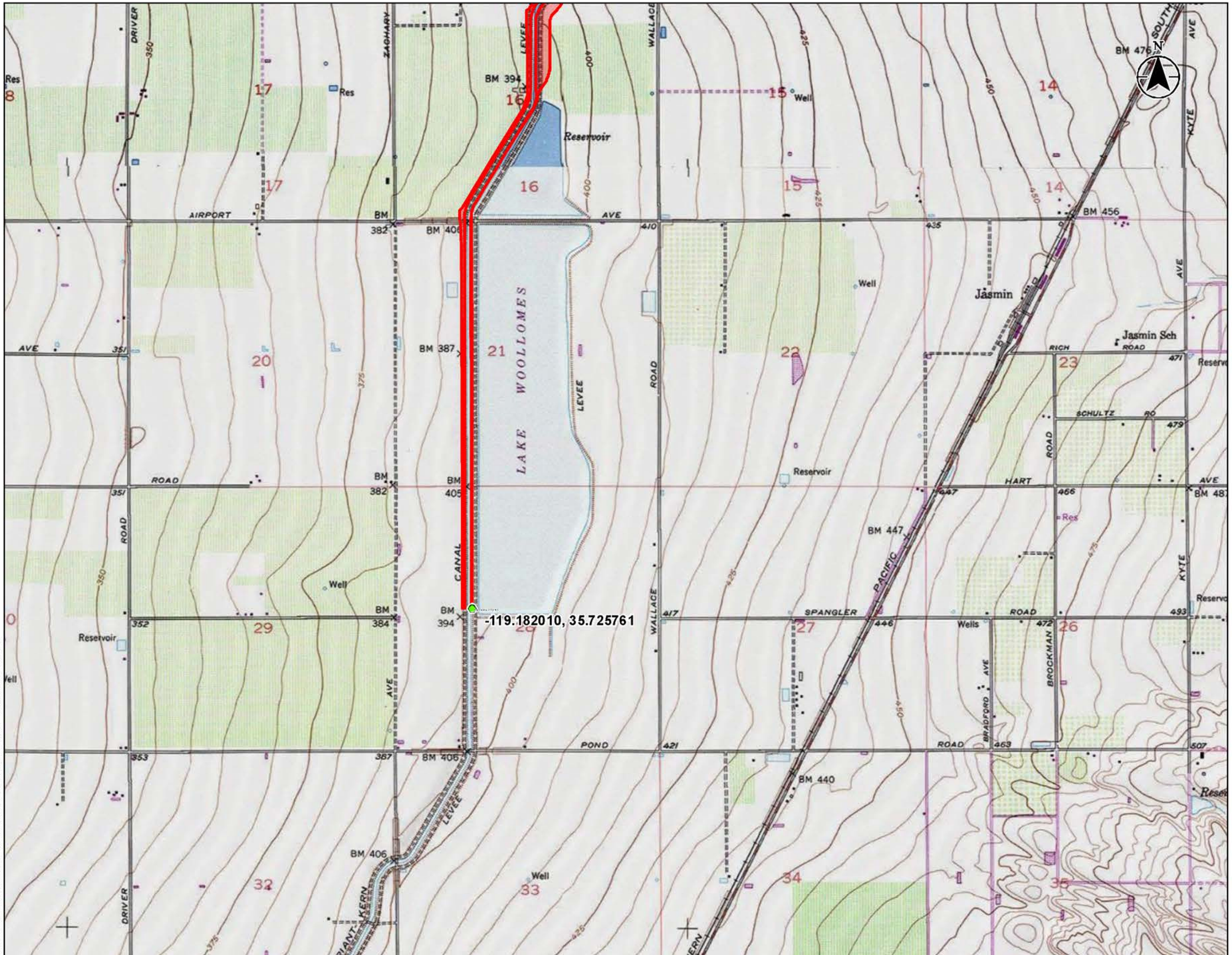


Figure No.

1i

Title

Project Location

Client/Project

Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location: Tulare and Kern Counties, California

184031016

Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

1 inch = 2,000 feet

0 2,000 4,000 Feet

1:24,000 (At original document size of 11x17)

Study Area (2,249.49 acres)

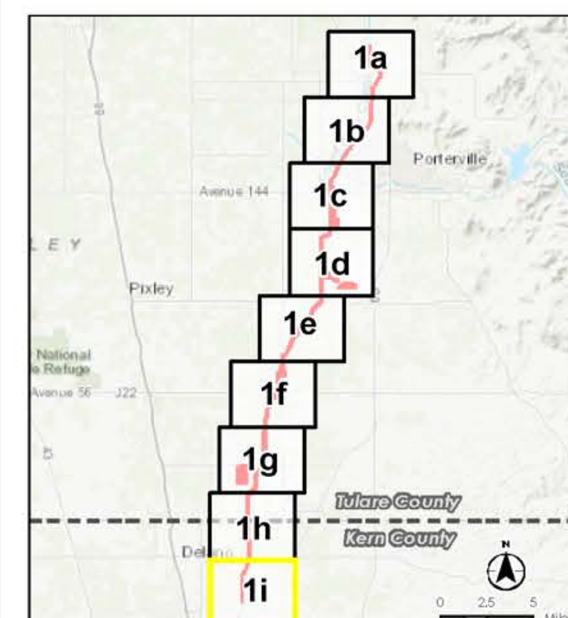
Map Reference Point

Public Land Survey

T20S, R27E, Sec.21, 28, 33
T21S, R27E, Sec.03, 04, 09, 16, 20, 21, 29, 30, 31
T22S, R27E, Sec.06, 07, 18, 19, 30, 31, 32
T23S, R26E, Sec.01, 11, 12, 14, 15, 22, 23, 26, 27, 34
T23S, R27E, Sec.06
T24S, R26E, Sec.03, 09, 10, 15, 16, 20, 21, 22, 28, 33
T25S, R26E, Sec.04, 09, 16, 21, 28

7.5' USGS Quadrangles

Delano East, California (1969)
Ducor, California (1972)
Lindsay, California (1969)
McFarland, California (1969)
Porterville, California (1971)
Sausalito School, California (1971)

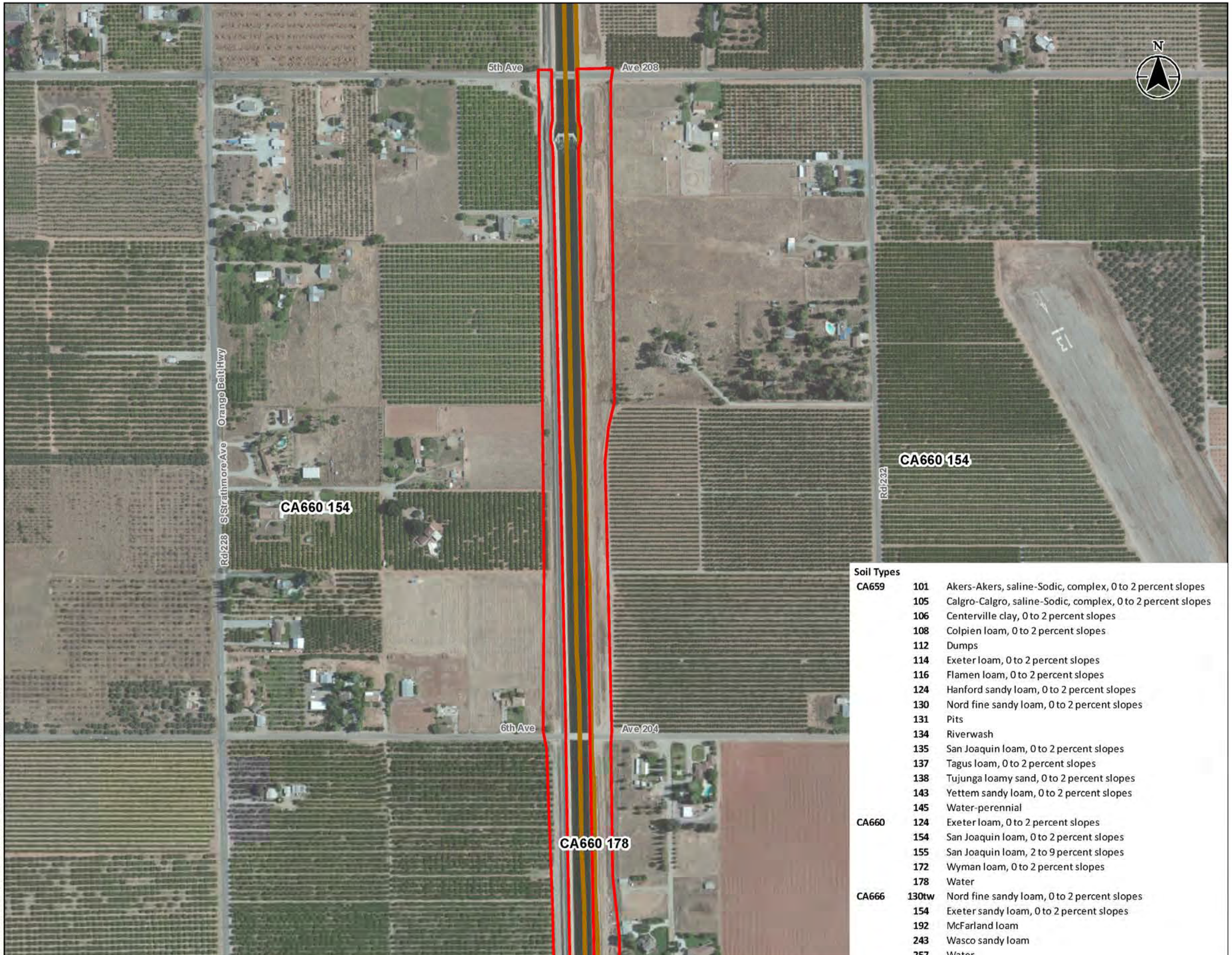


Notes

1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. ESRI USA Topo Maps, 2019

Stantec

Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2a

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location 184031016
Tulare and Kern Counties, California
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

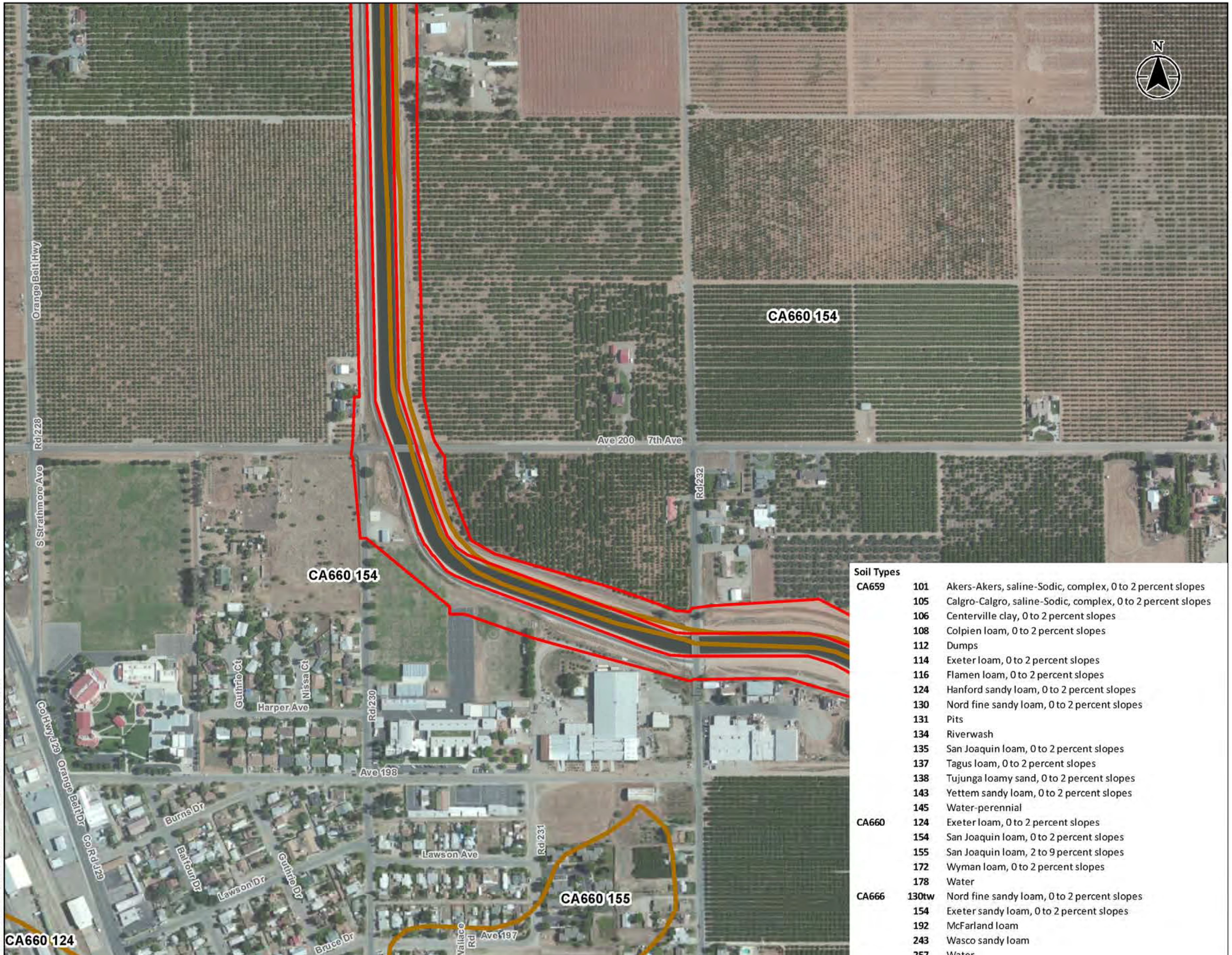
1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Soils

Notes

1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO), 1/28/2019
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	**101**	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	**124**	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	**130tw**	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2b

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

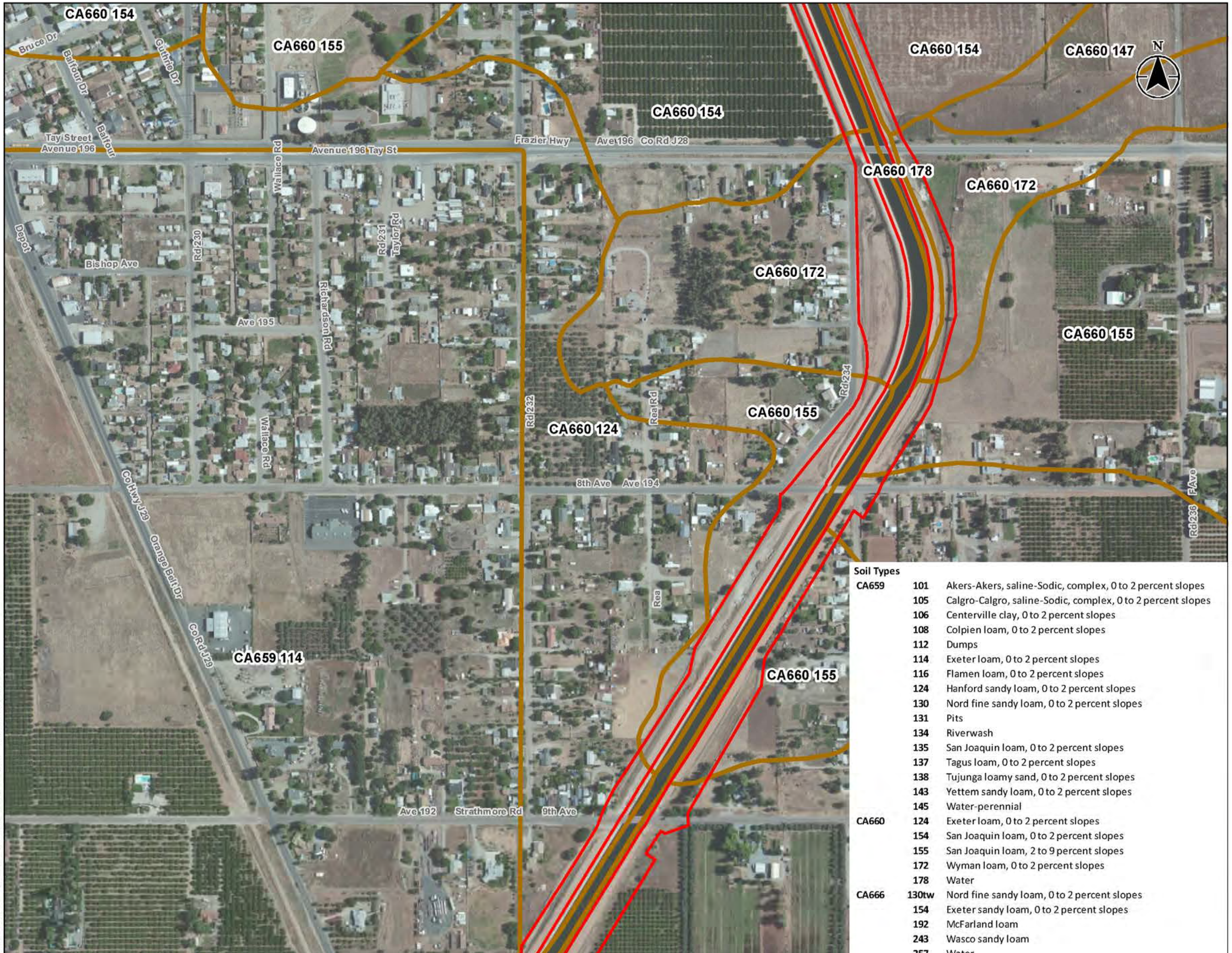
1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Soils

Notes

1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO), 1/28/2019
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2c

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Soils

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Gridded Soil Survey Geographic (gSSURGO), 1/28/2019
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
2d

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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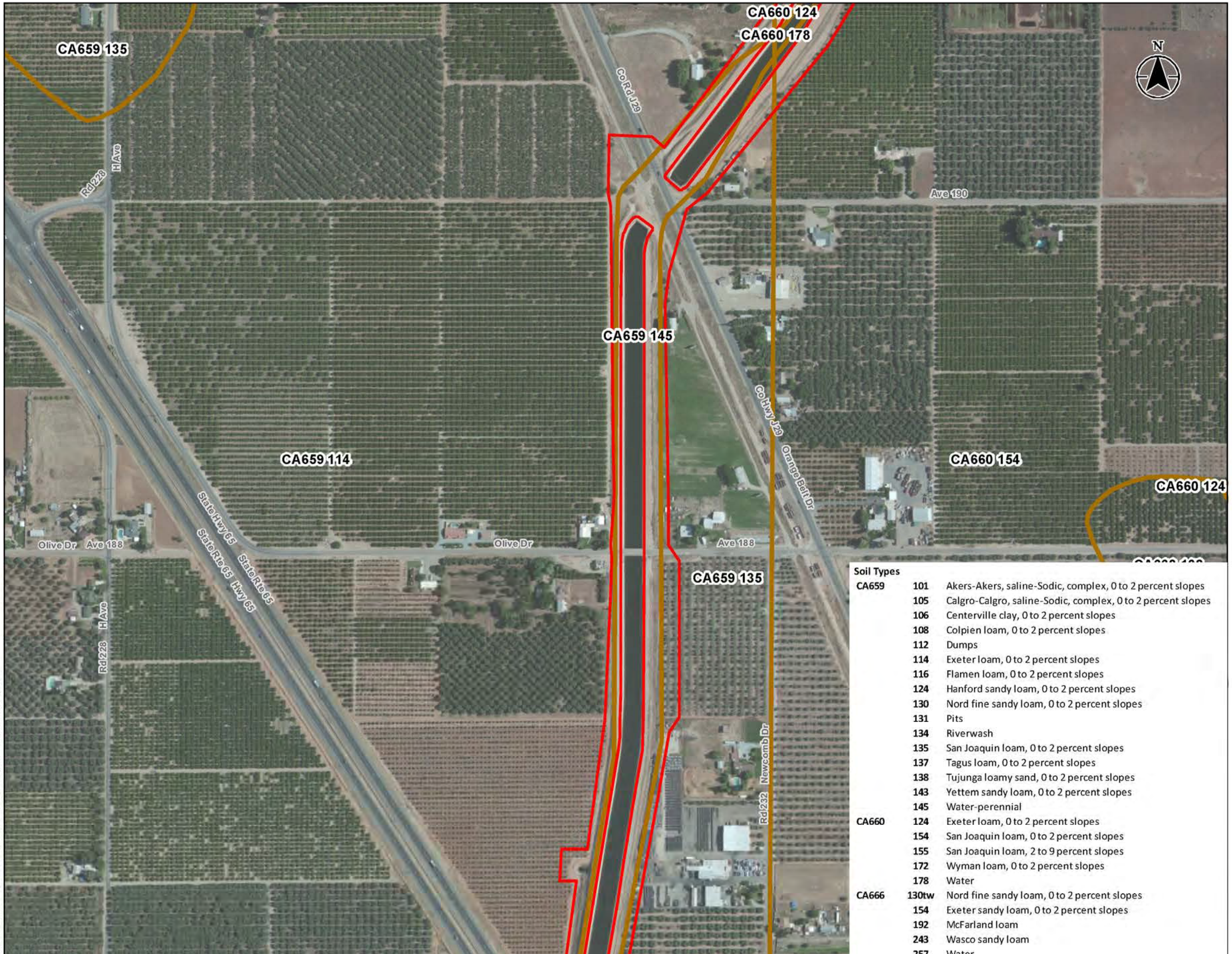
Study Area (2,249.49 acres)
Soils

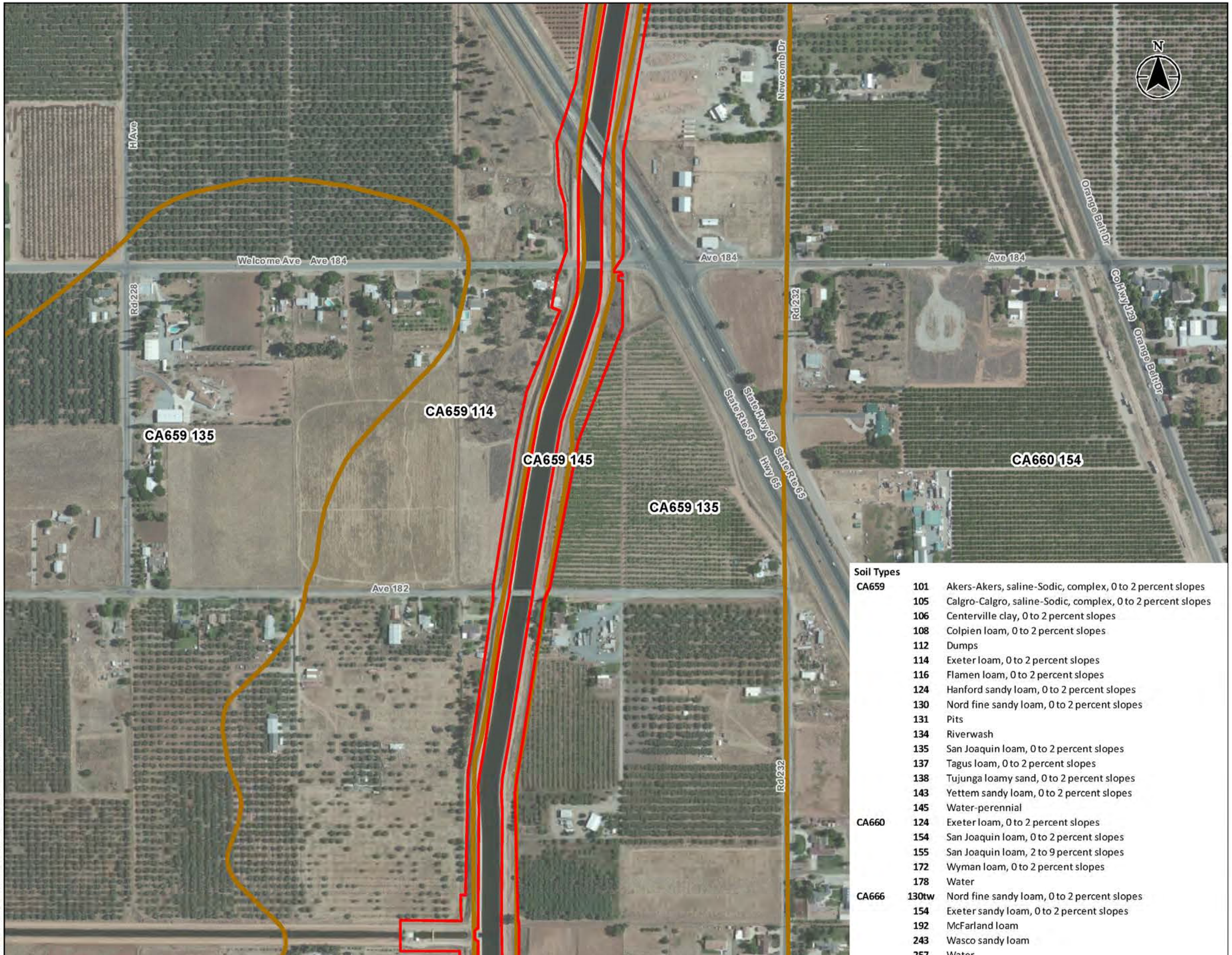


Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Gridded Soil Survey Geographic (gSSURGO), 1/28/2019
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
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	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2e

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Soils

Notes
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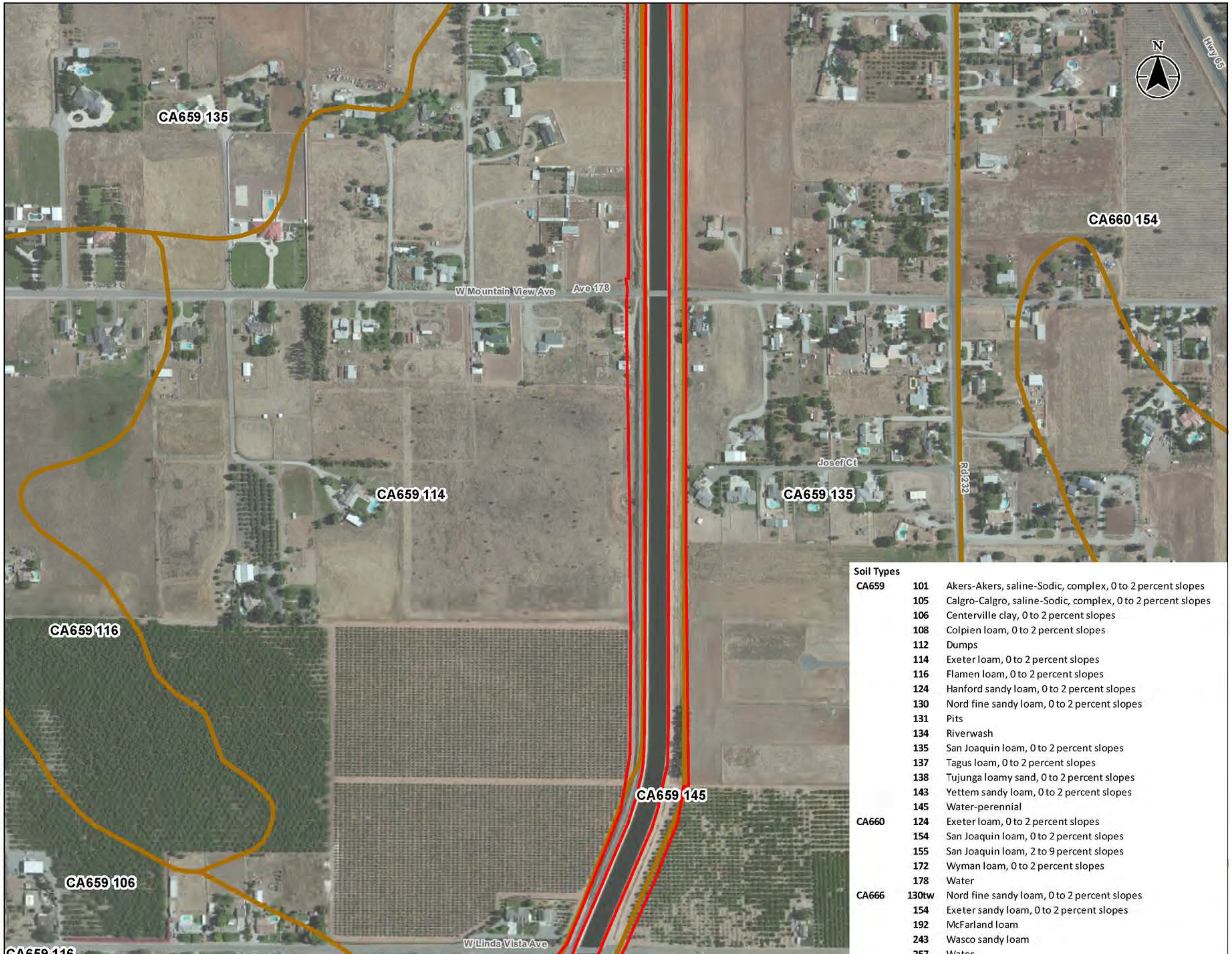
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO), 1/28/2019
3. Ortholmagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
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	131	Pits
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	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2f

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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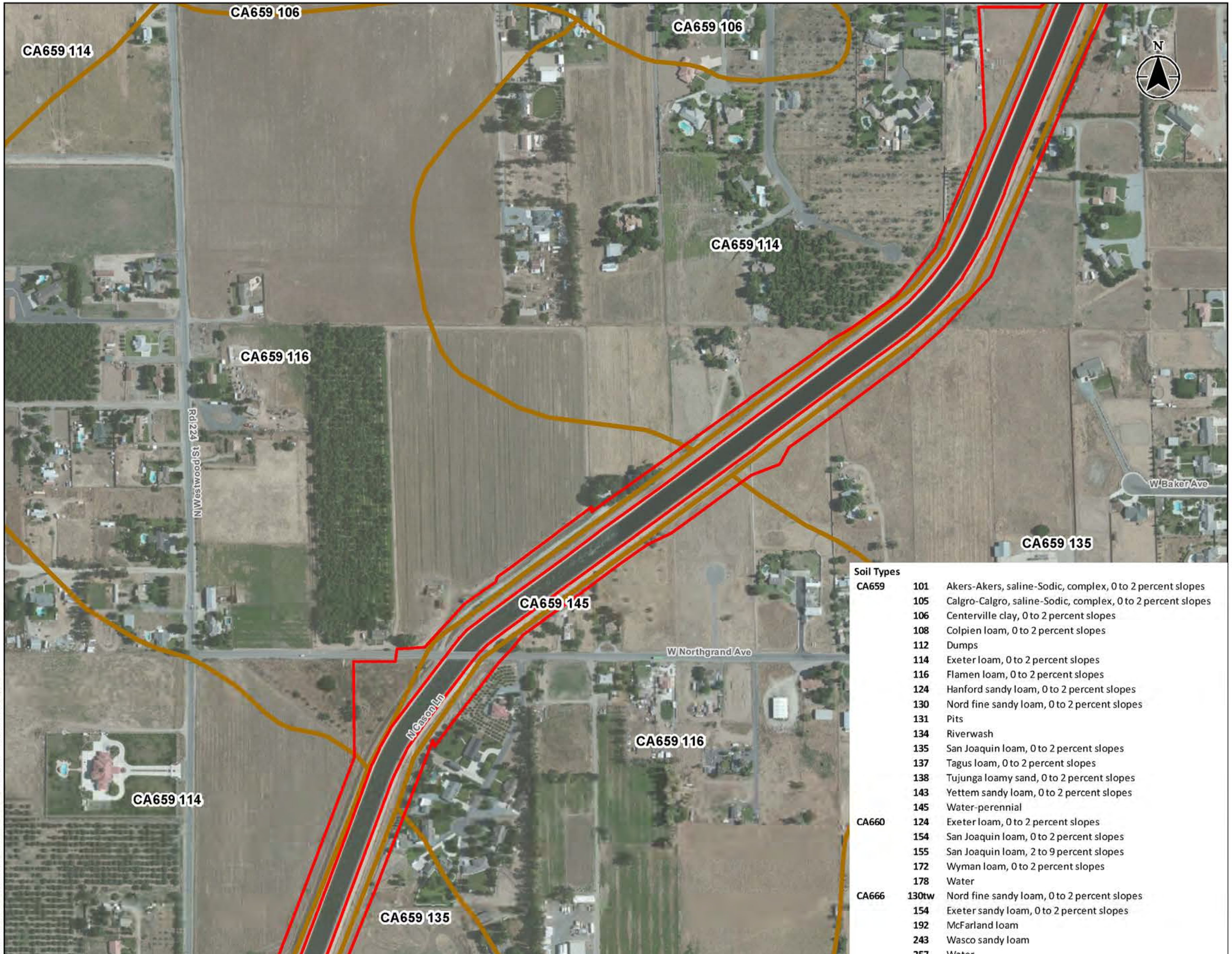
Study Area (2,249.49 acres)
Soils

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO), 1/28/2019
3. OrthoImagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
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	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2g

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Soils

Notes

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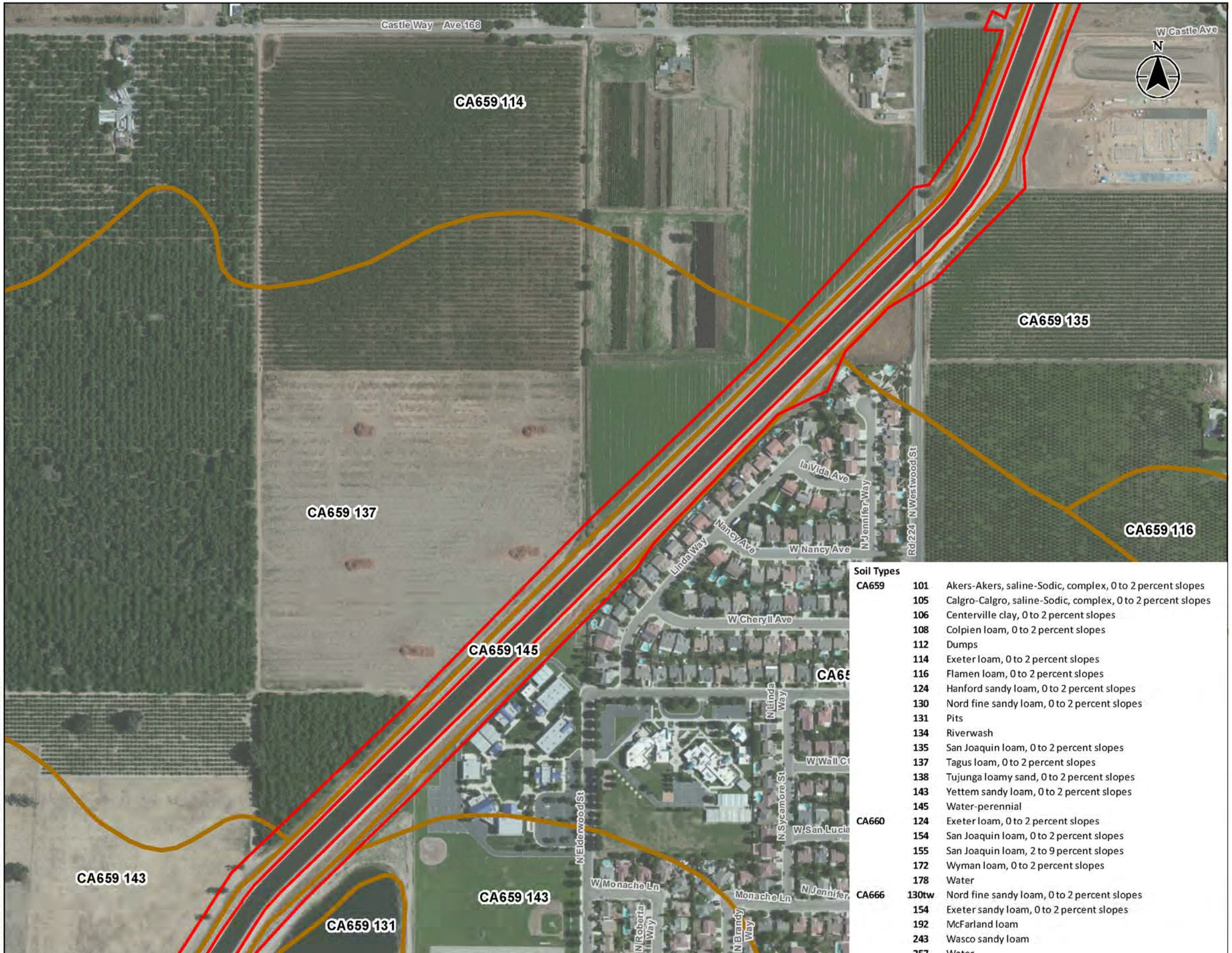
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO). 1/28/2019
3. Ortholmagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2h

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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Study Area (2,249.49 acres)
Soils

Notes
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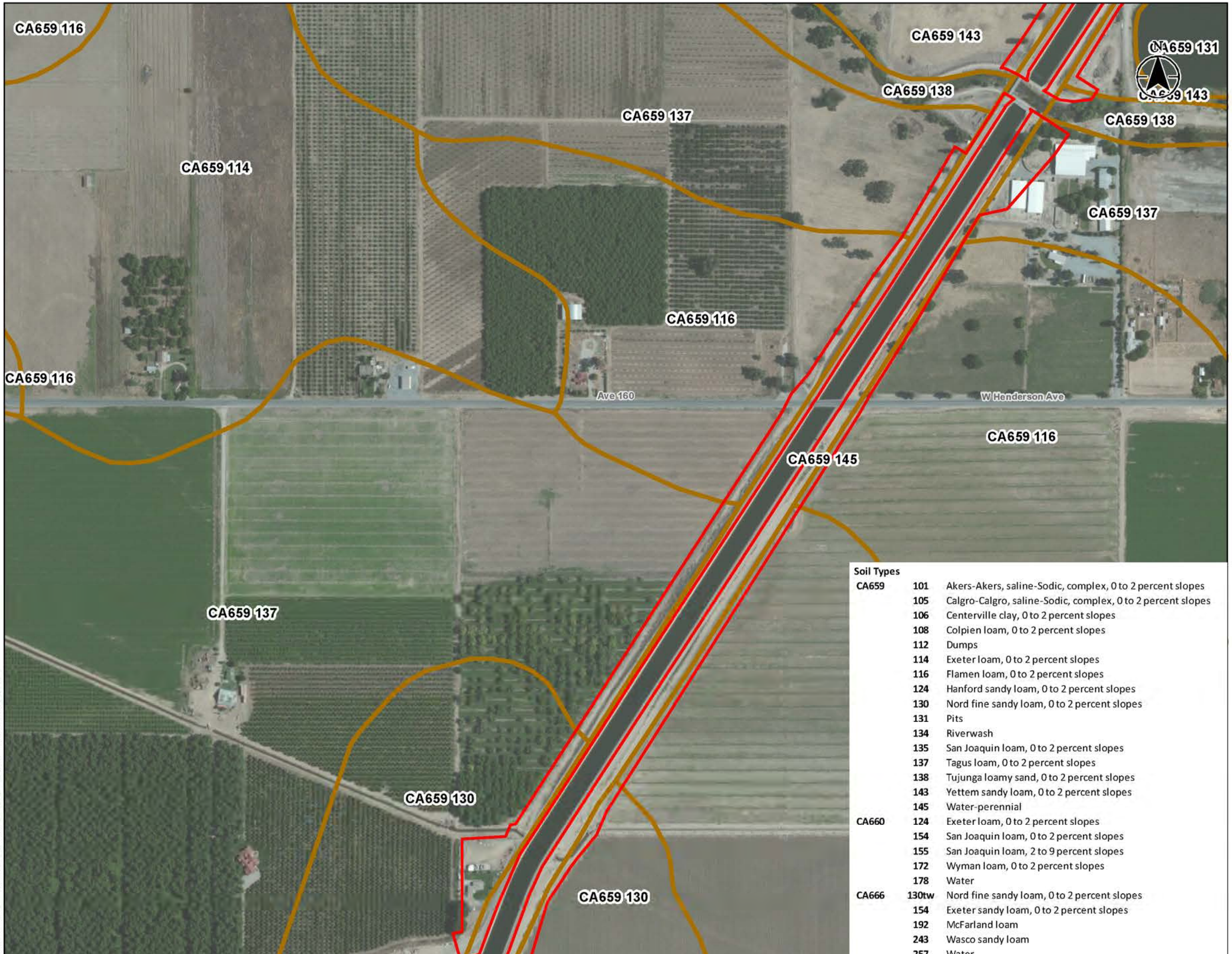
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
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	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2i

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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Study Area (2,249.49 acres)
Soils

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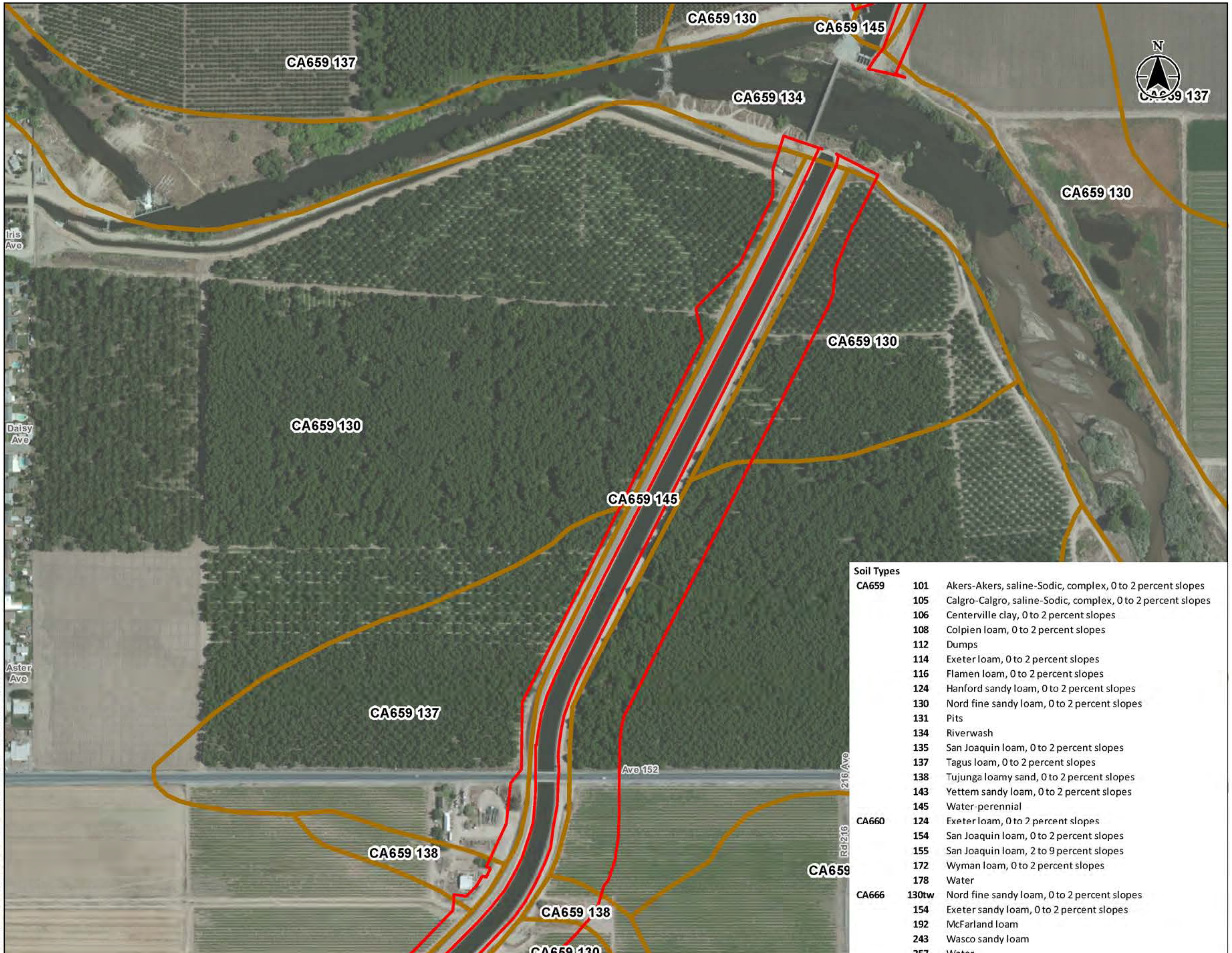

Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
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	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2j

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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Study Area (2,249.49 acres)
Soils

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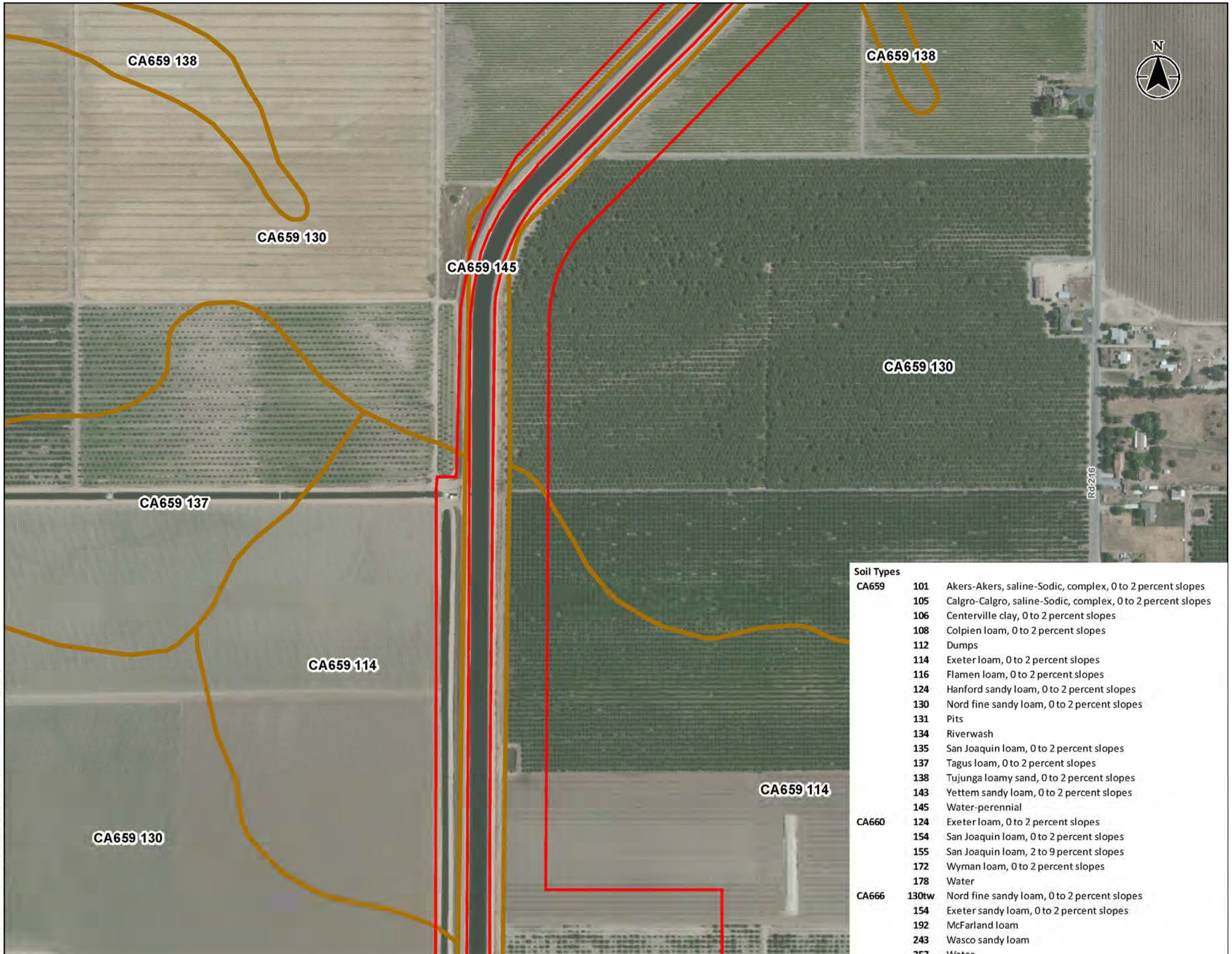
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
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CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
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	243	Wasco sandy loam
	257	Water

Figure No.
2k

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Soils

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO), 1/28/2019
3. Ortholmagery: ESRI World Imagery (Clarity), 2019

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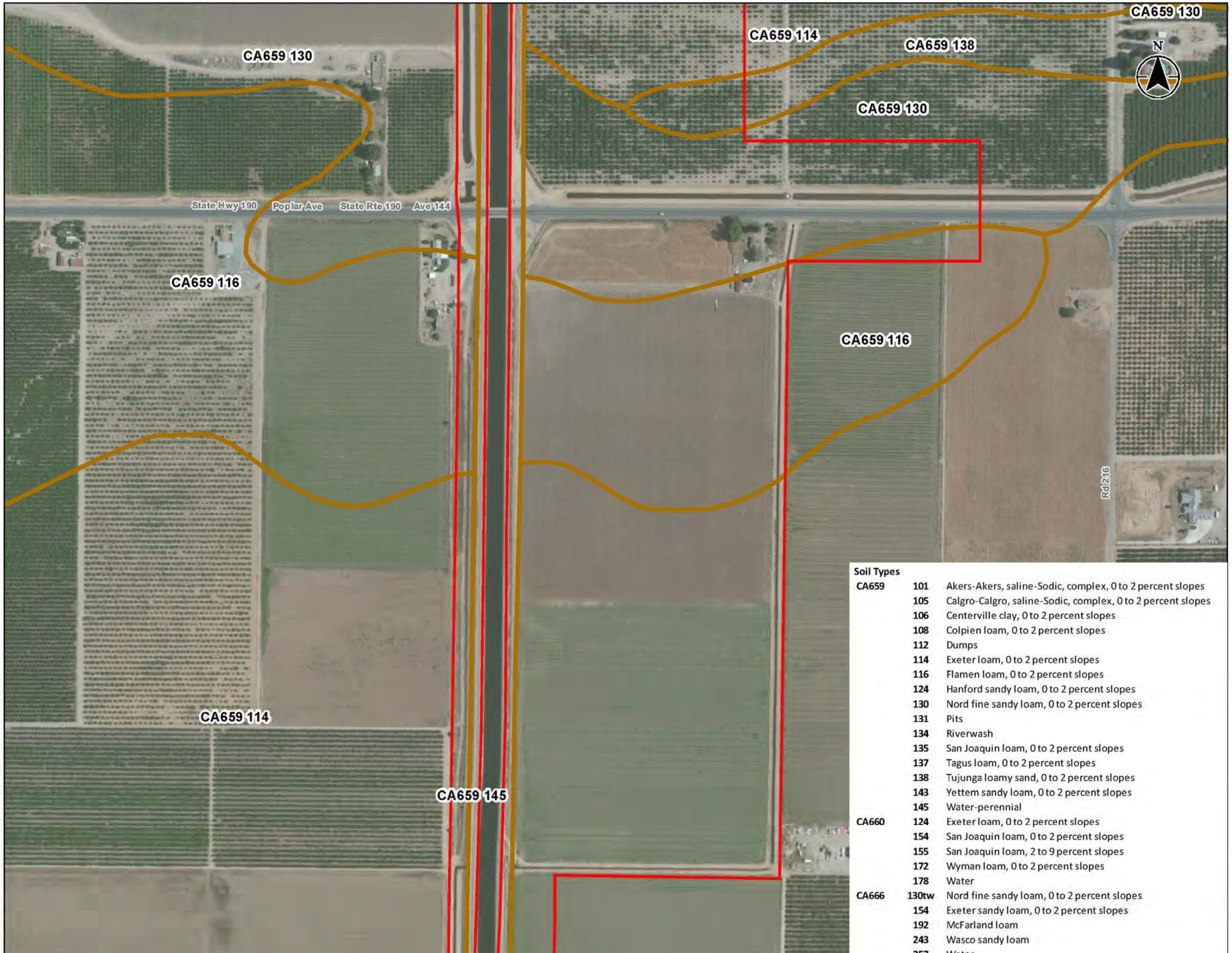
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2l

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

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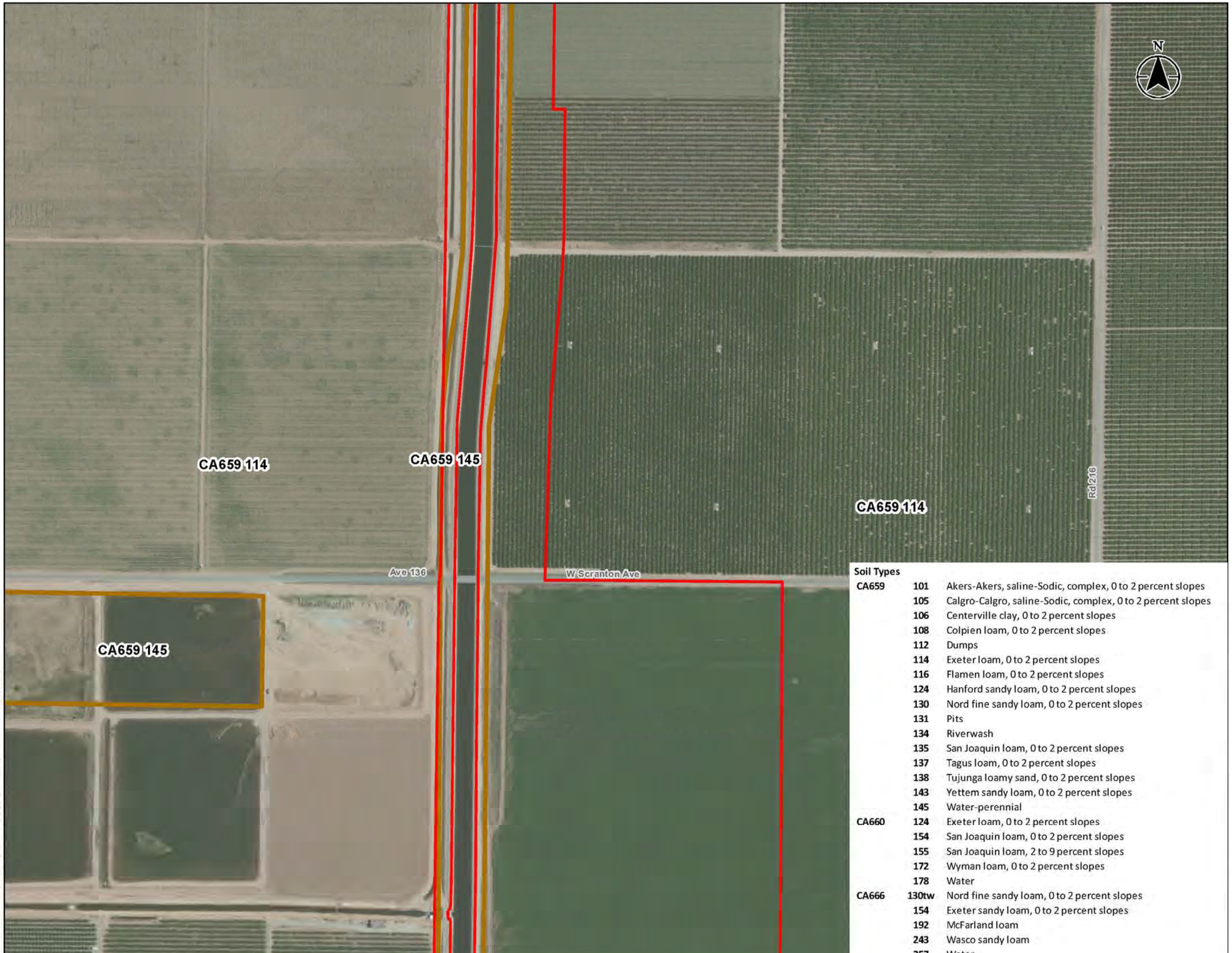

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	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
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	257	Water

Figure No.
2m

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
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Friant WATER AUTHORITY

Figure No.
2n

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
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Friant WATER AUTHORITY

Figure No.
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Soils

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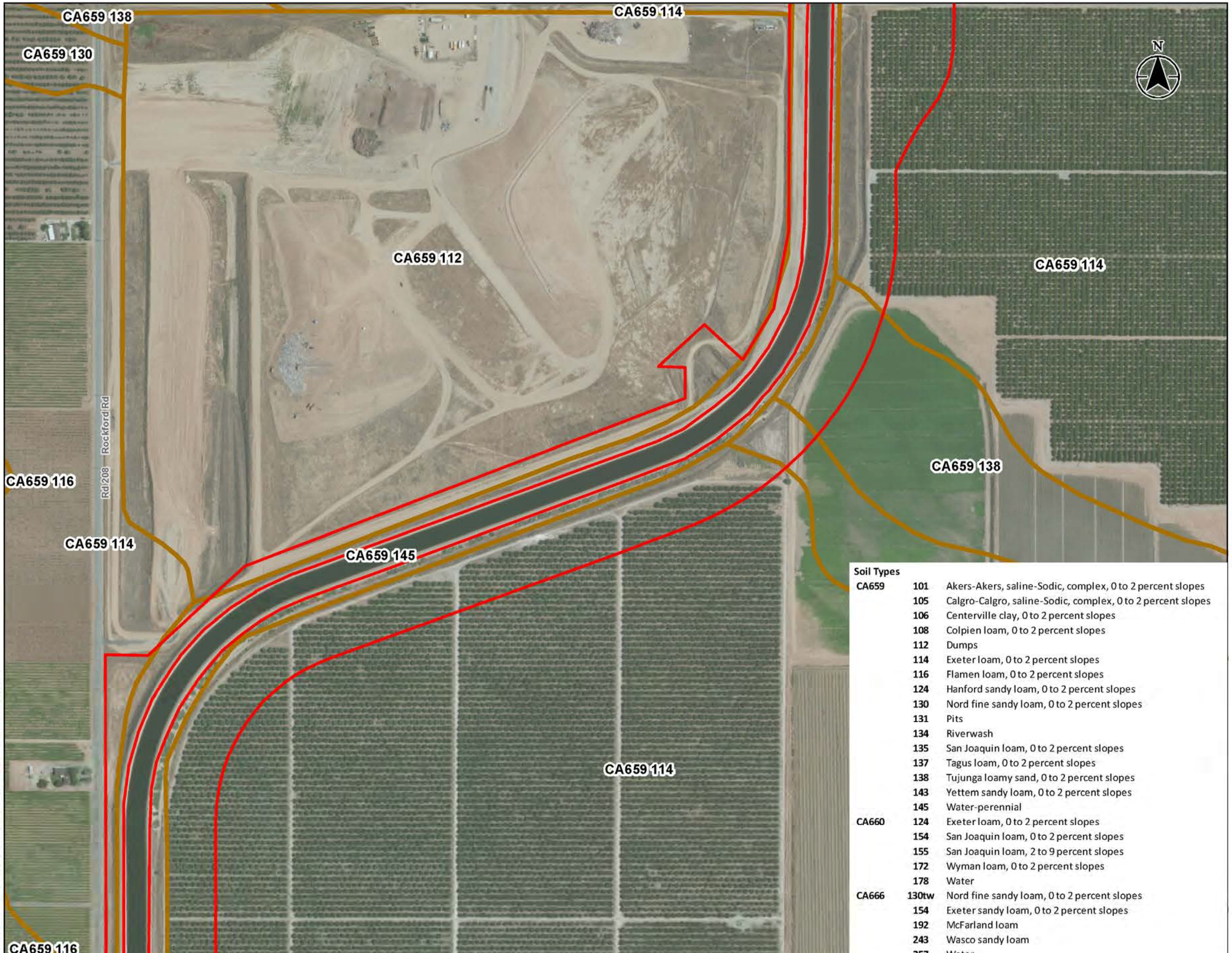

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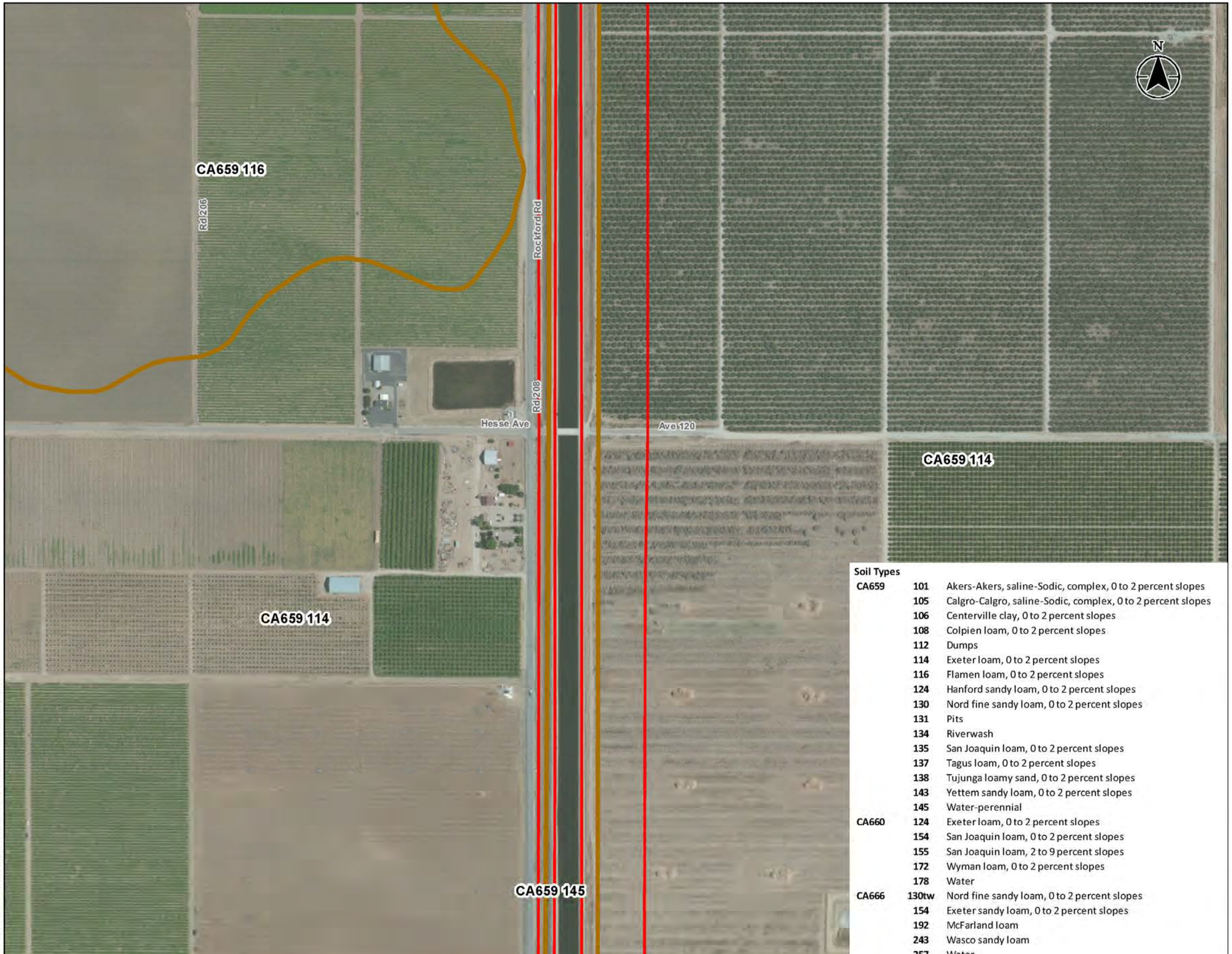

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Figure No.
2p

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

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Friant WATER AUTHORITY

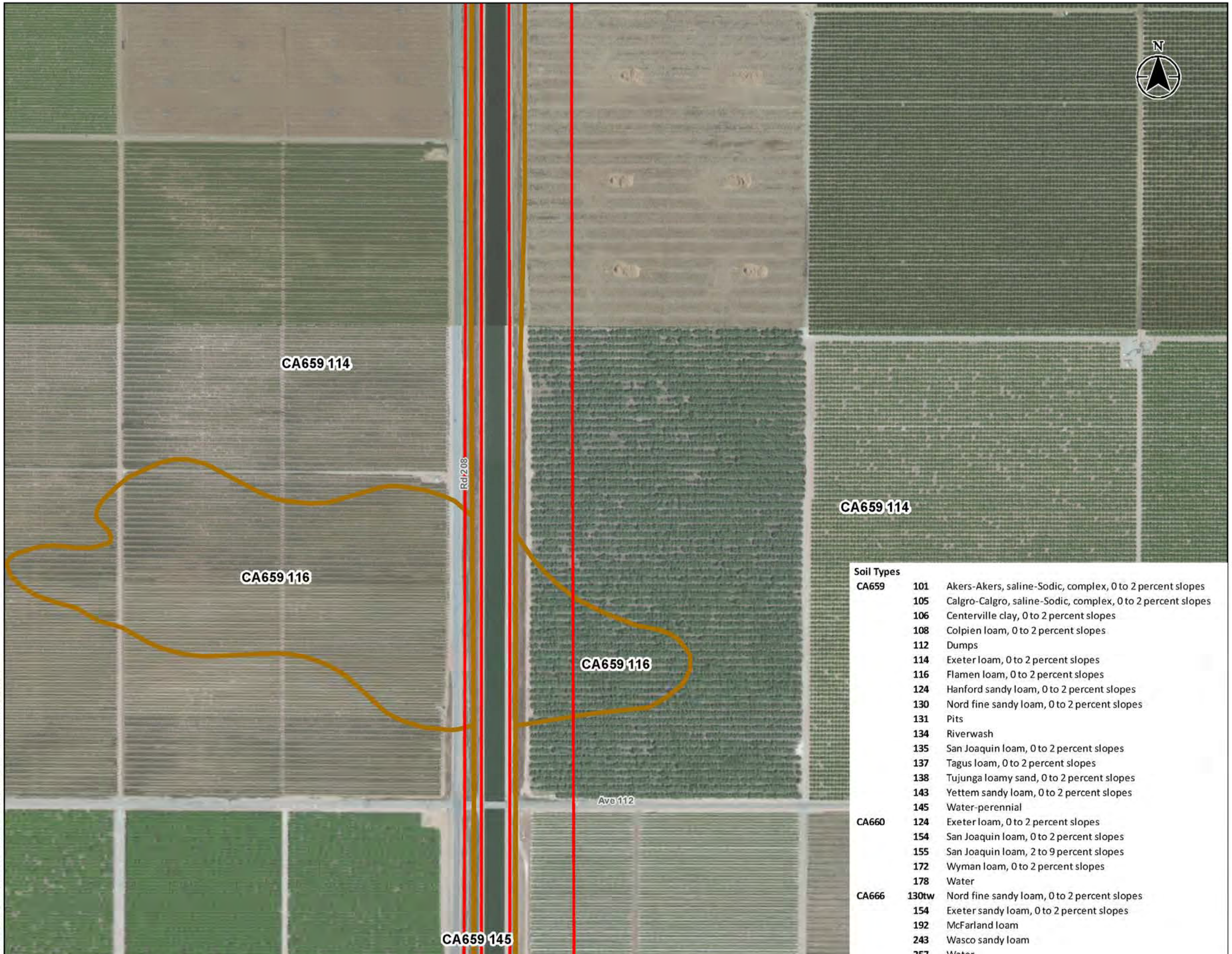

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Figure No.
2q

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
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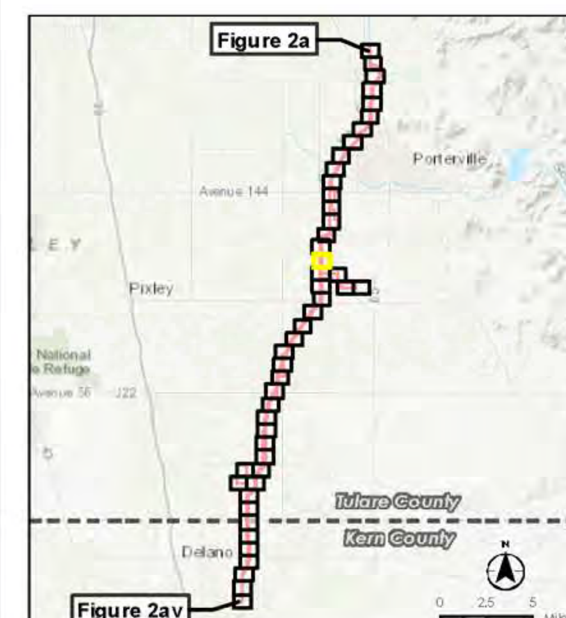
Study Area (2,249.49 acres)
Soils



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Friant WATER AUTHORITY

Figure No.
2r

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

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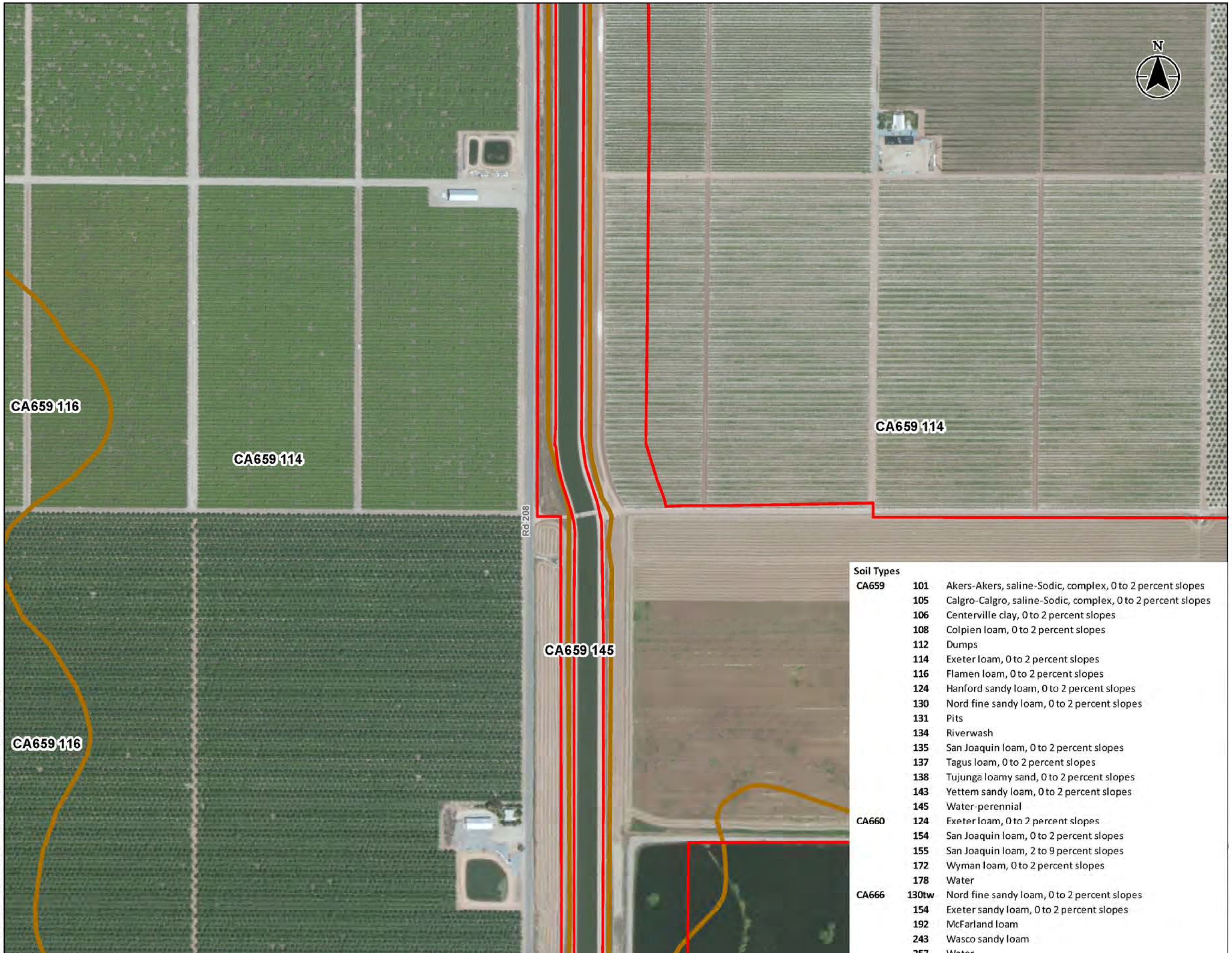
Study Area (2,249.49 acres)
Soils



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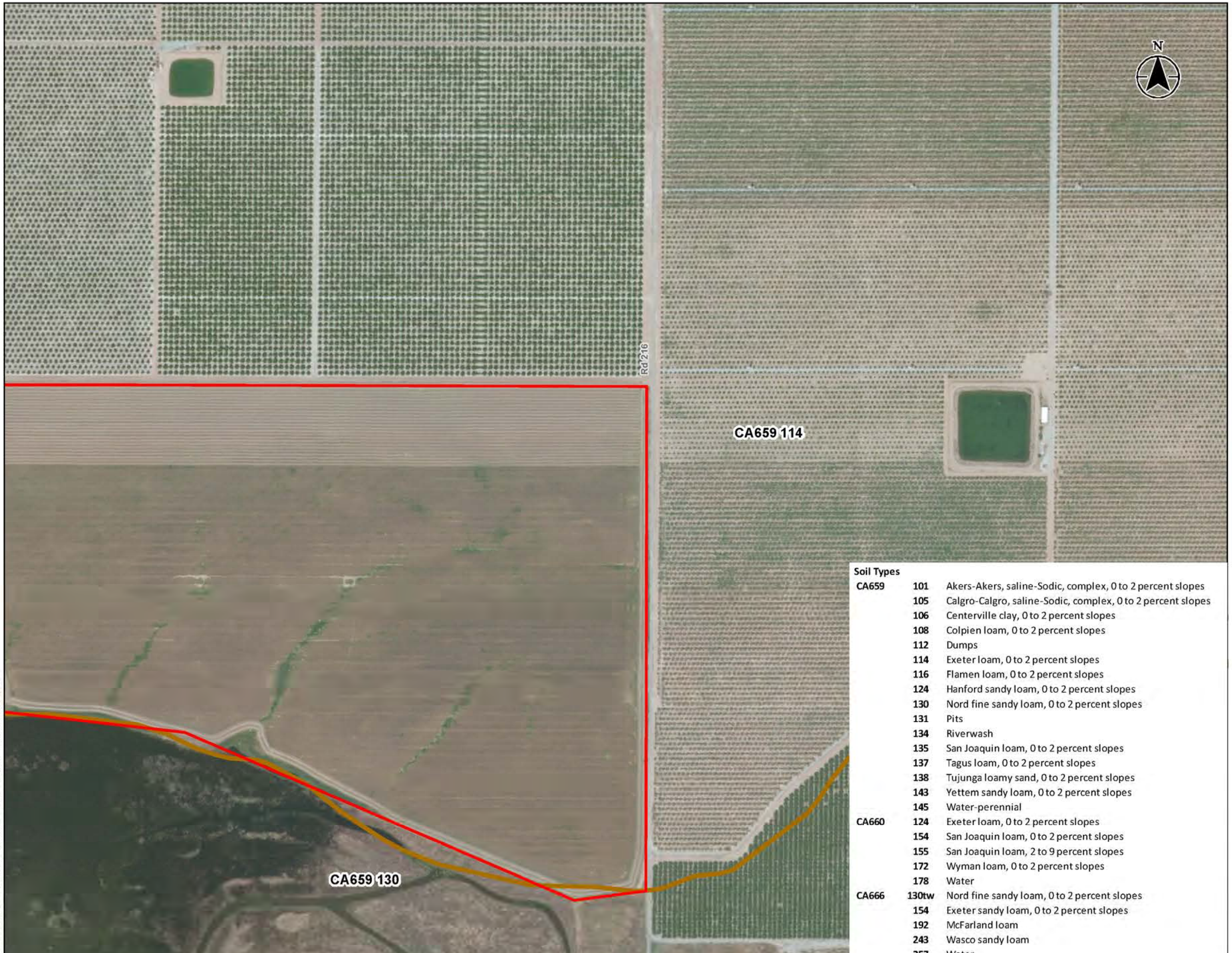

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Figure No.
2s

Title
Soils

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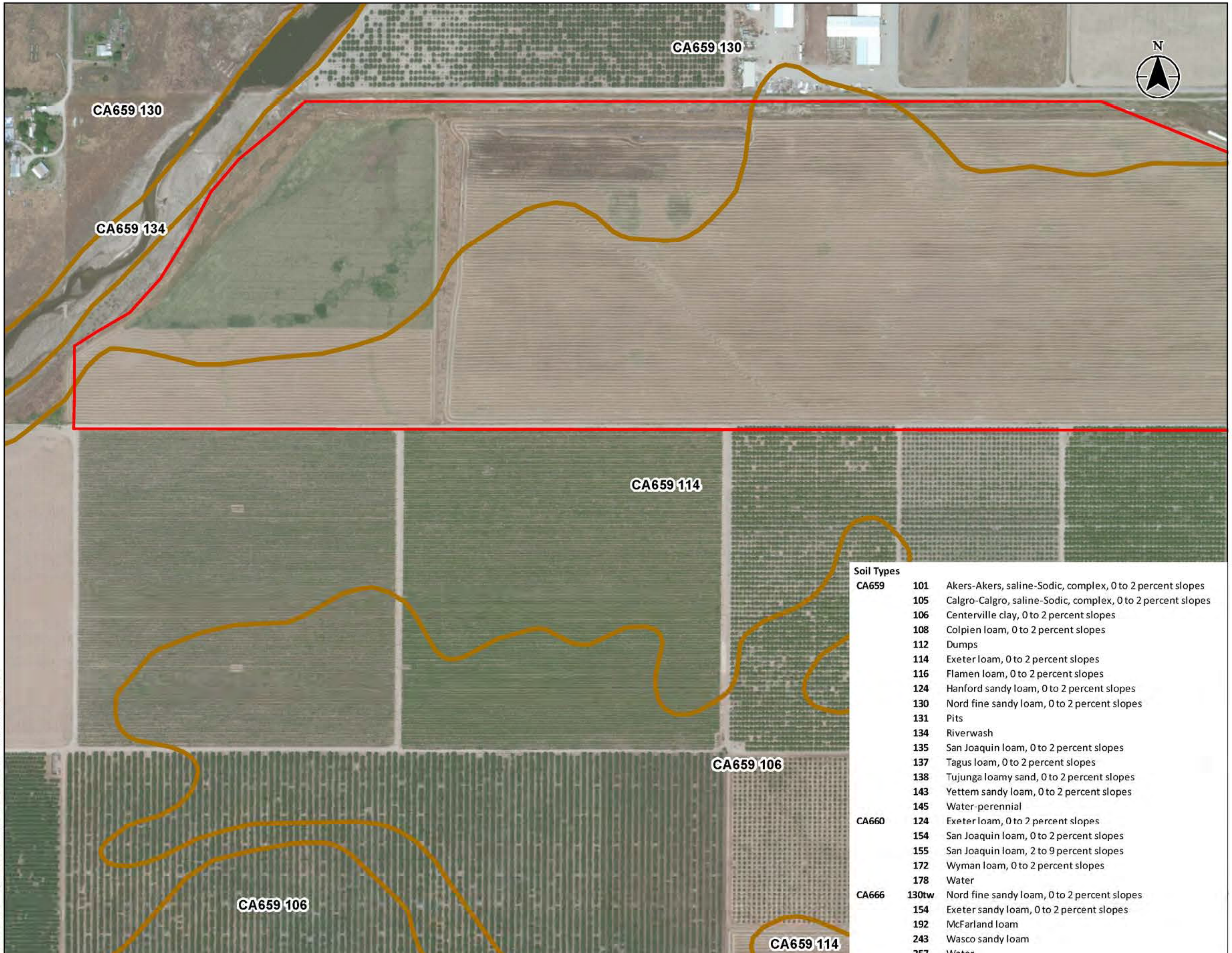

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2t

Title
Soils

Client/Project
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Friant WATER AUTHORITY

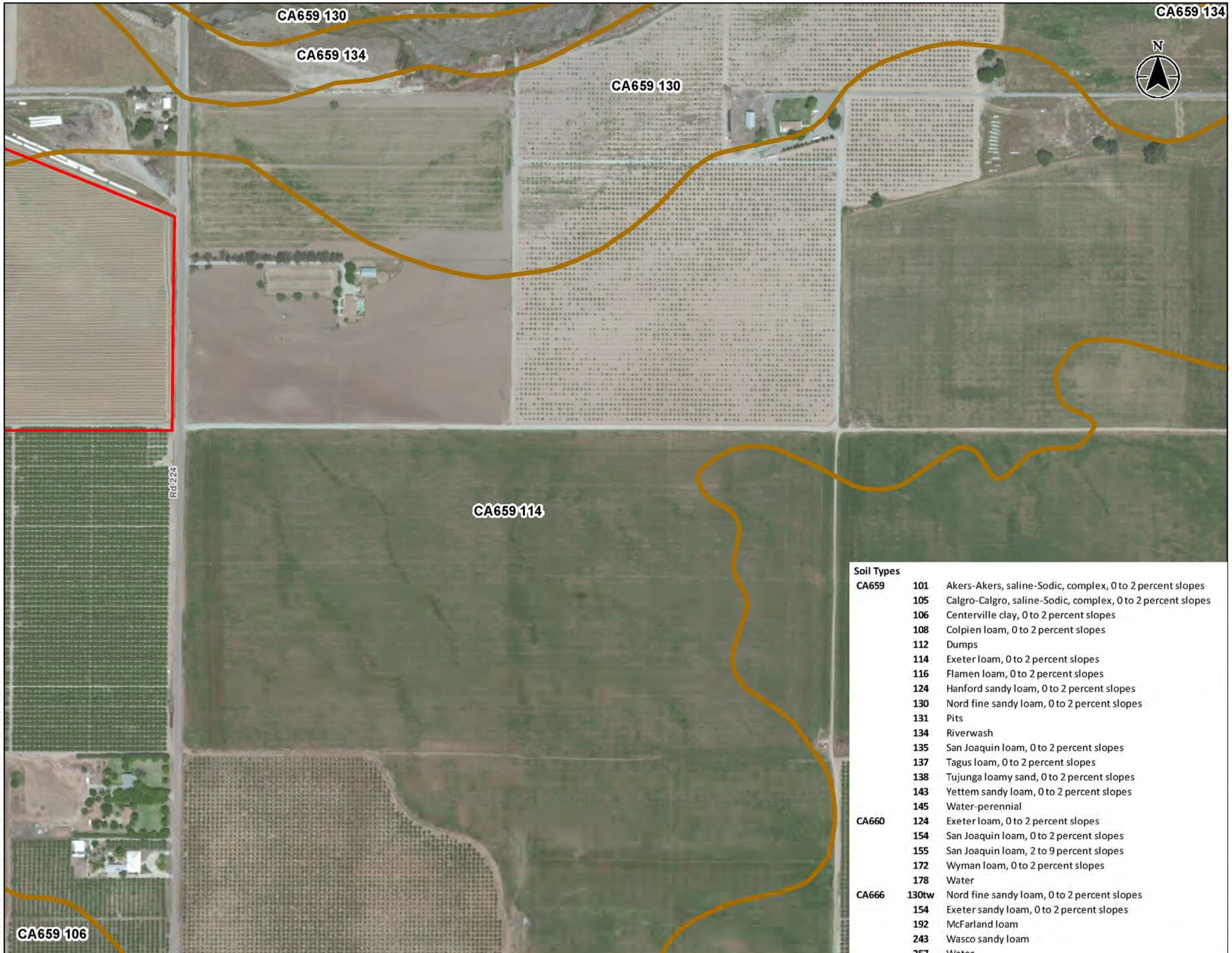

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Figure No.
2u

Title
Soils

Client/Project
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Friant WATER AUTHORITY

Figure No.
2v

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Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

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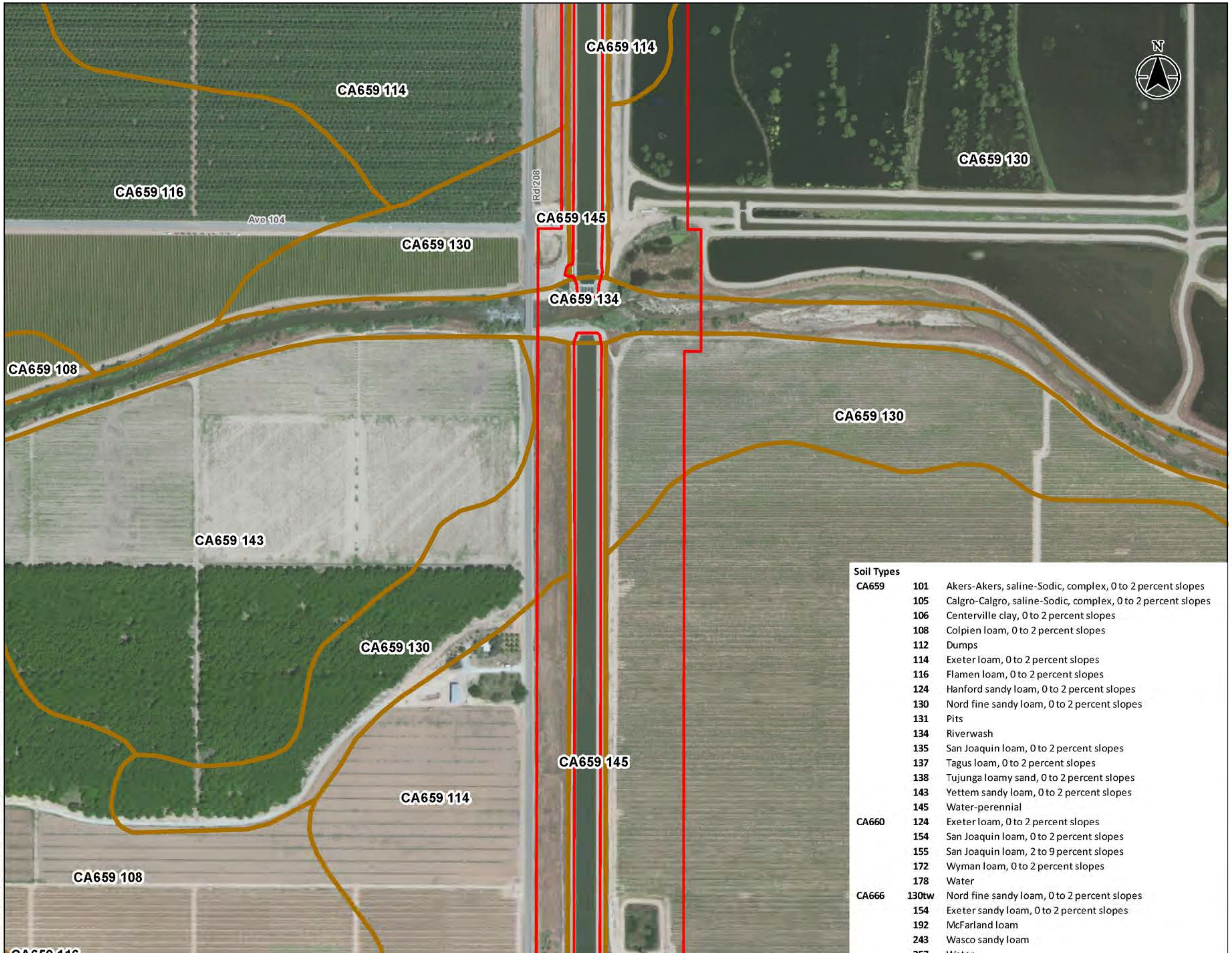

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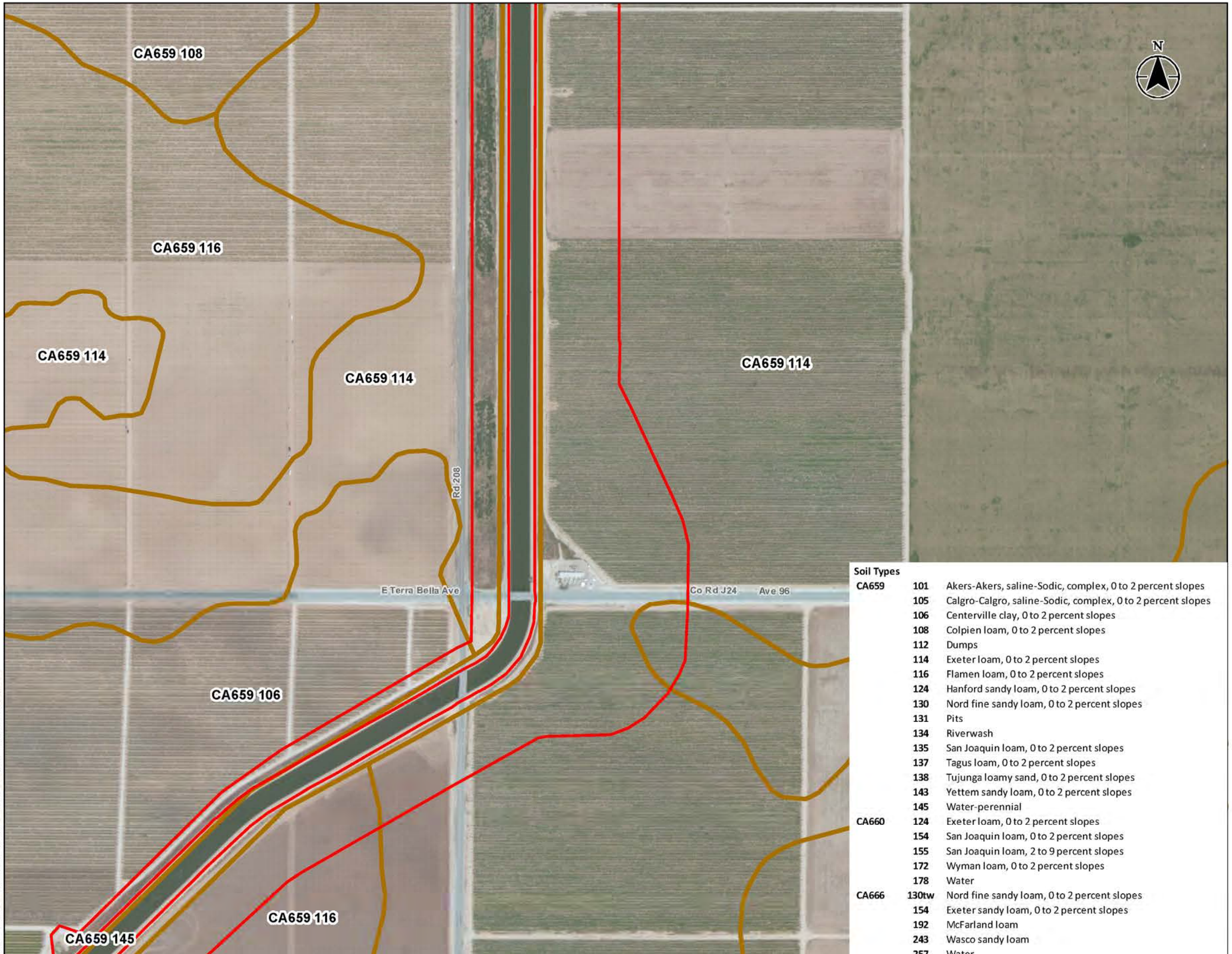

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	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2w

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

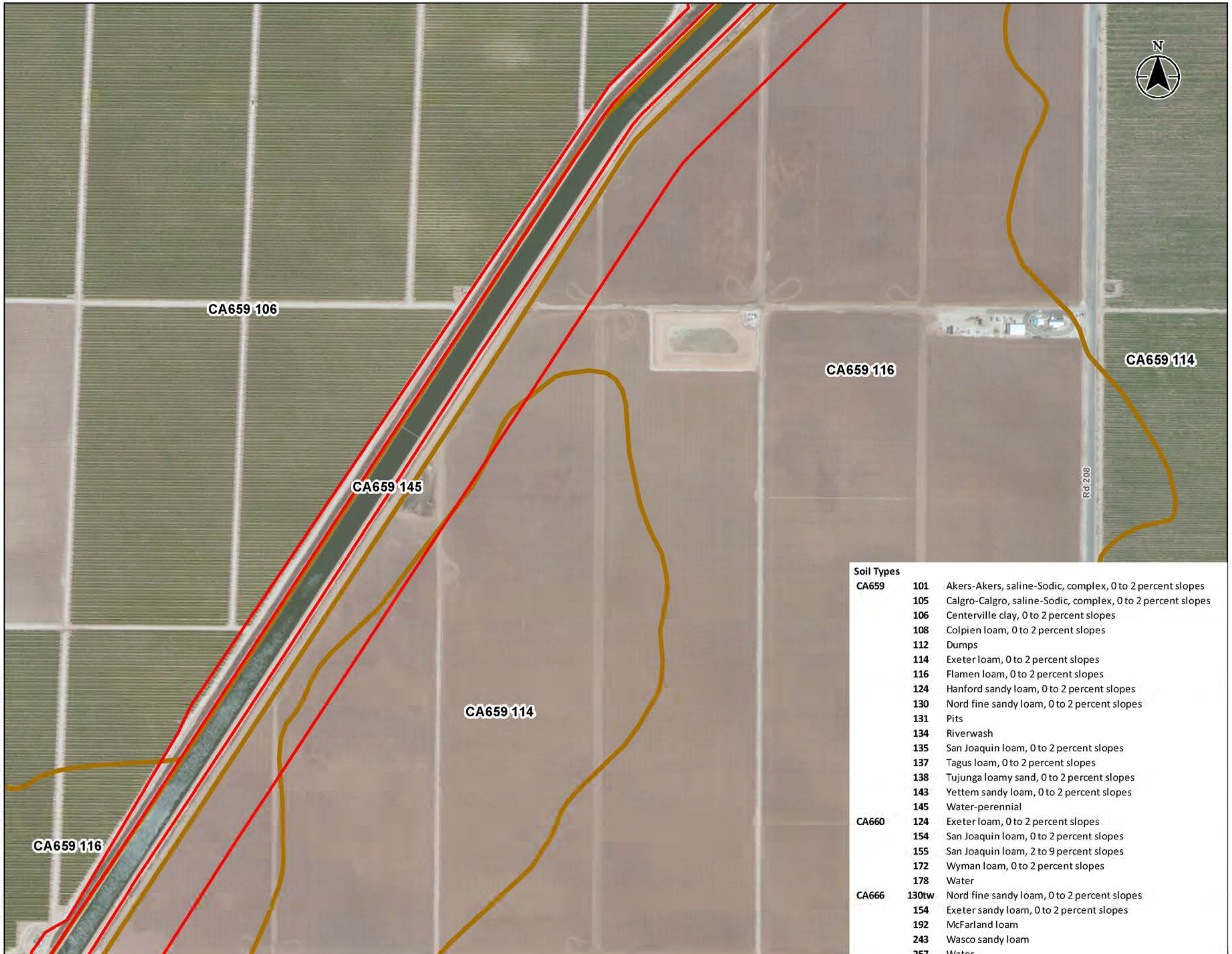
184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

1 inch = 400 feet
0 400 800
Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Soils

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Gridded Soil Survey Geographic (gSSURGO), 1/28/2019
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2x

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

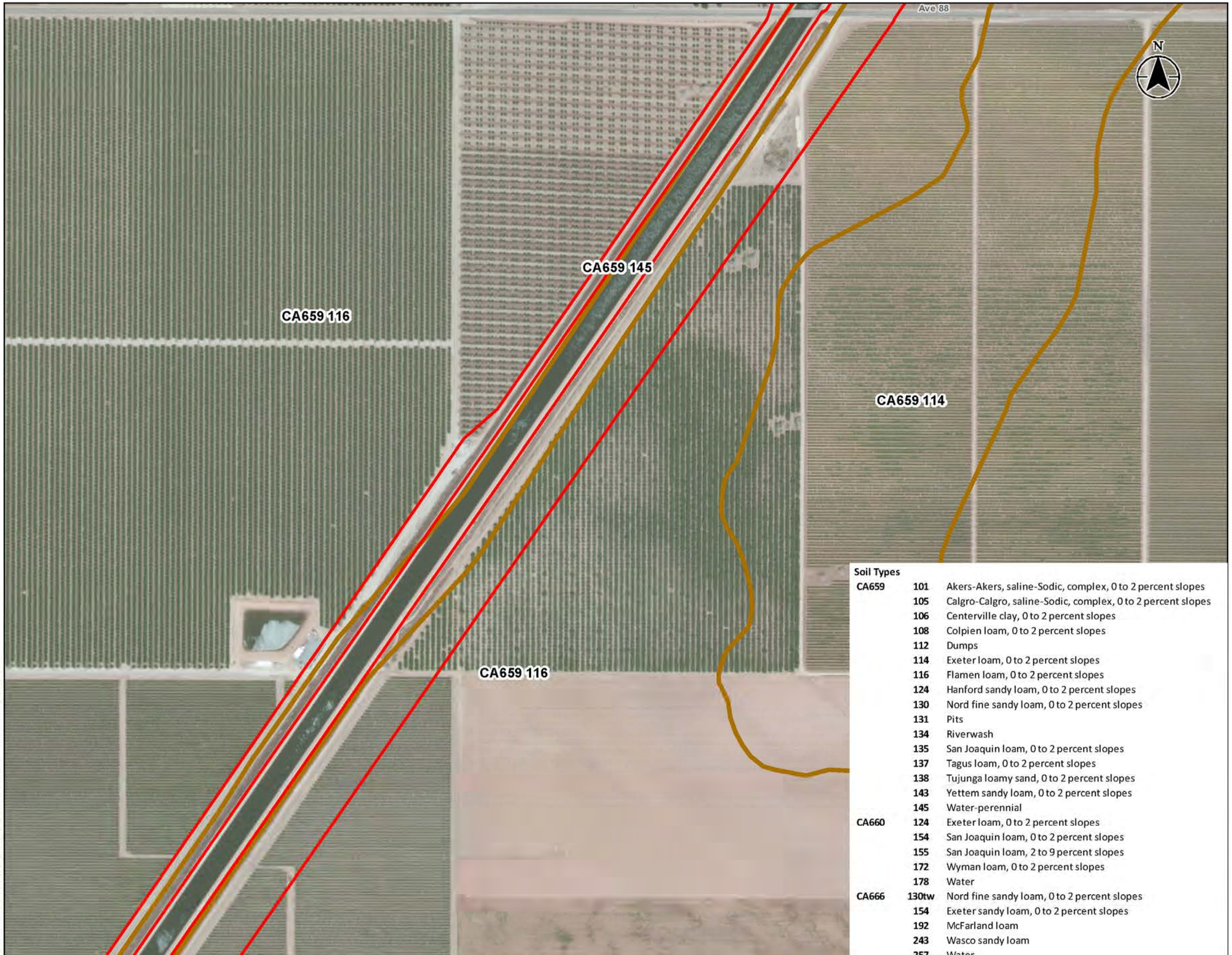
1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Soils

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO). 1/28/2019
3. OrthoImagery: ESRI World Imagery (Clarity). 2019

Stantec

Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2y

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

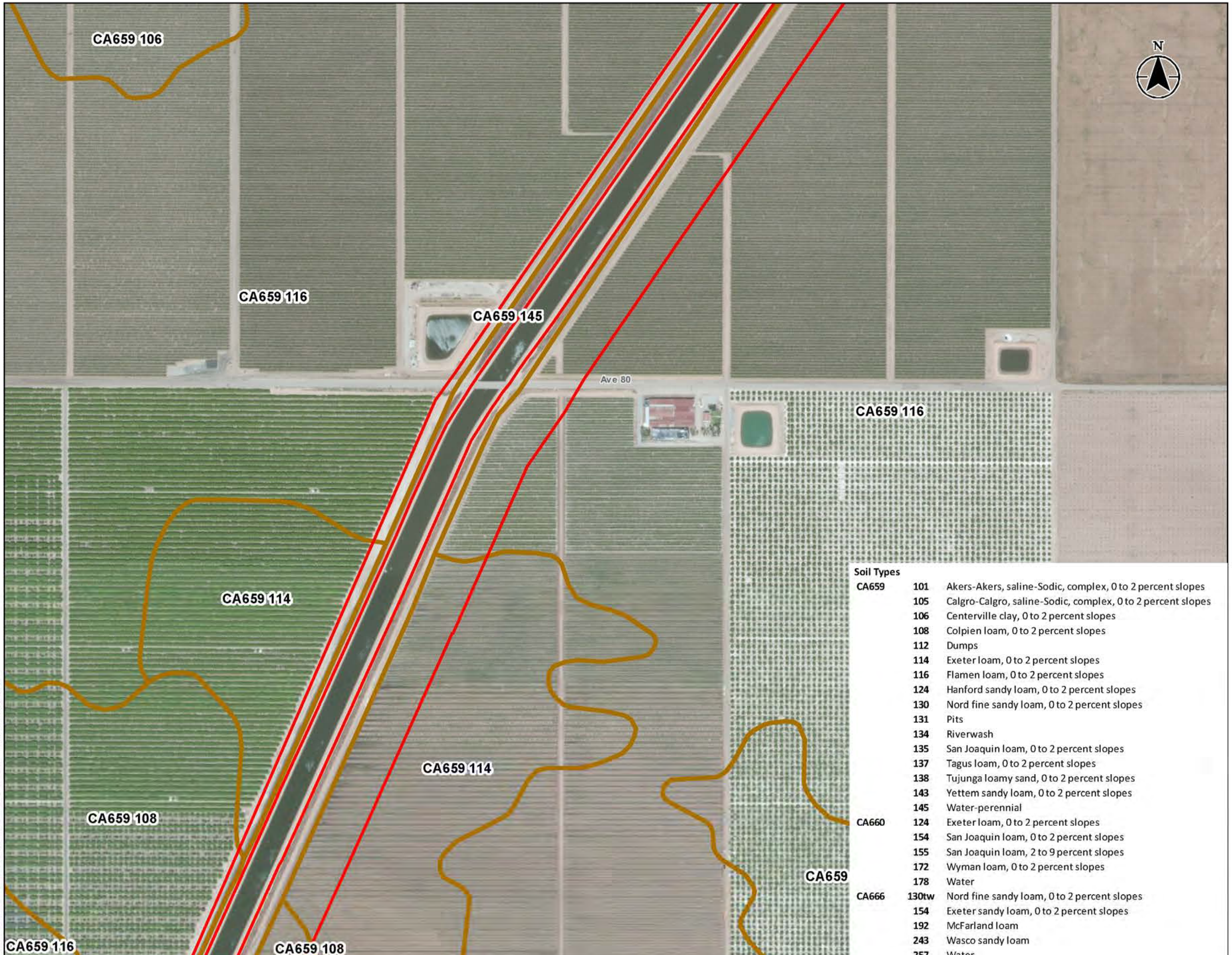
Study Area (2,249.49 acres)
Soils

Notes

1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO). 1/28/2019
3. OrthoImagery: ESRI World Imagery (Clarity). 2019

Stantec

Friant WATER AUTHORITY



Soil Types

CA659	**101**	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	**124**	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	**130tw**	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2z

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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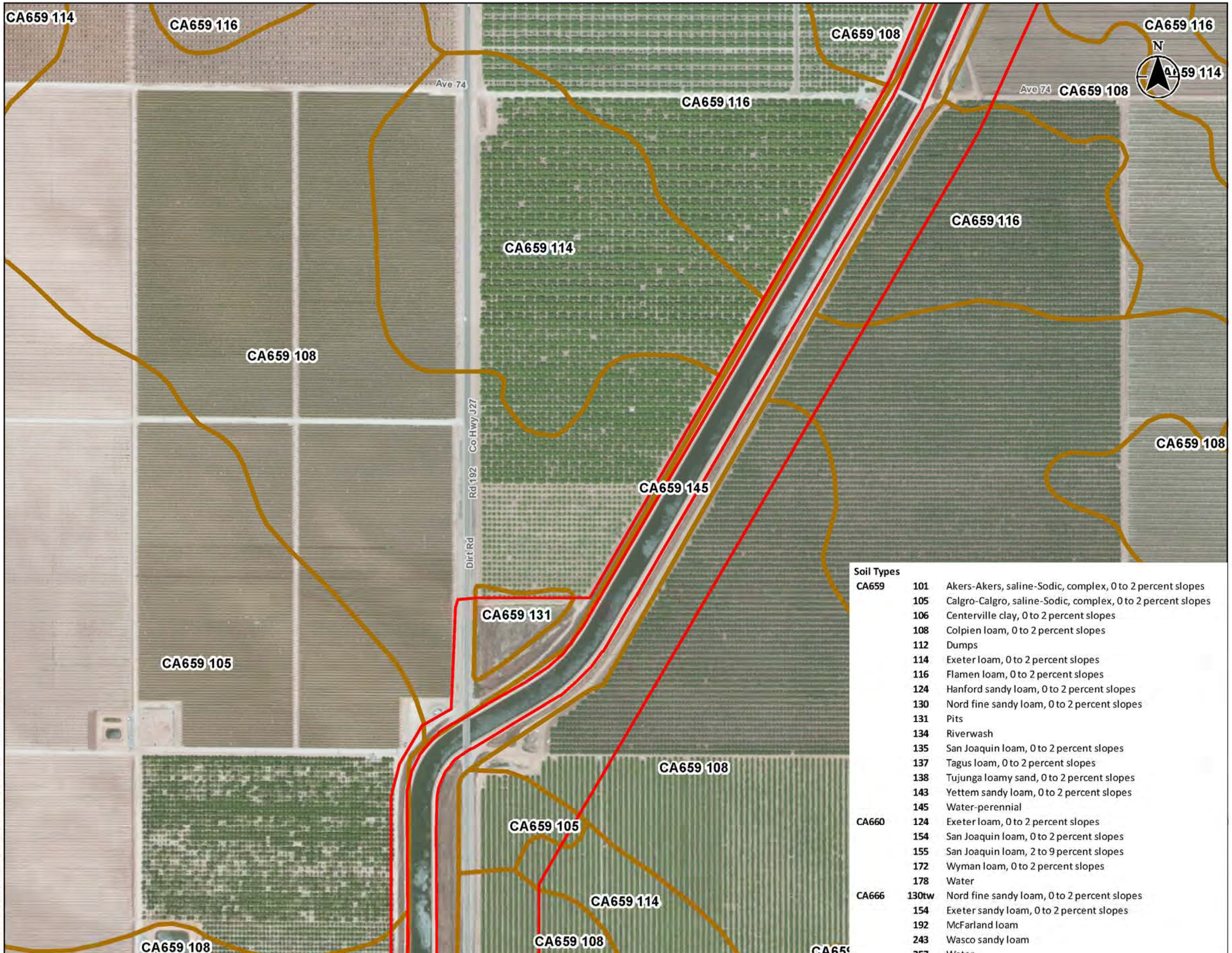
Study Area (2,249.49 acres)
Soils

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO), 1/28/2019
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types		
CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2aa

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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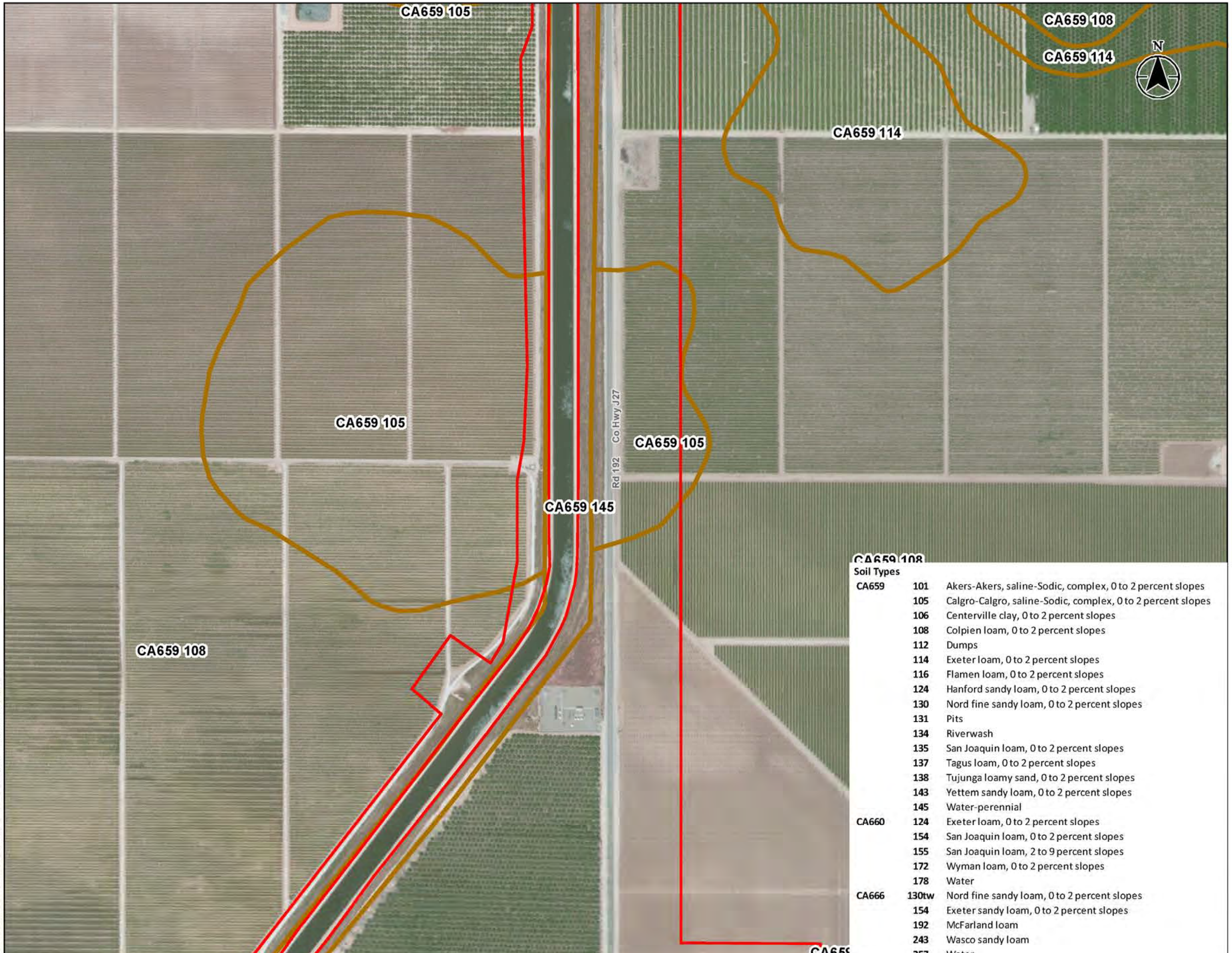
Study Area (2,249.49 acres)
Soils

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO), 1/28/2019
3. OrthoImagery: ESRI World Imagery (Clarity), 2019

Stantec

Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2ab

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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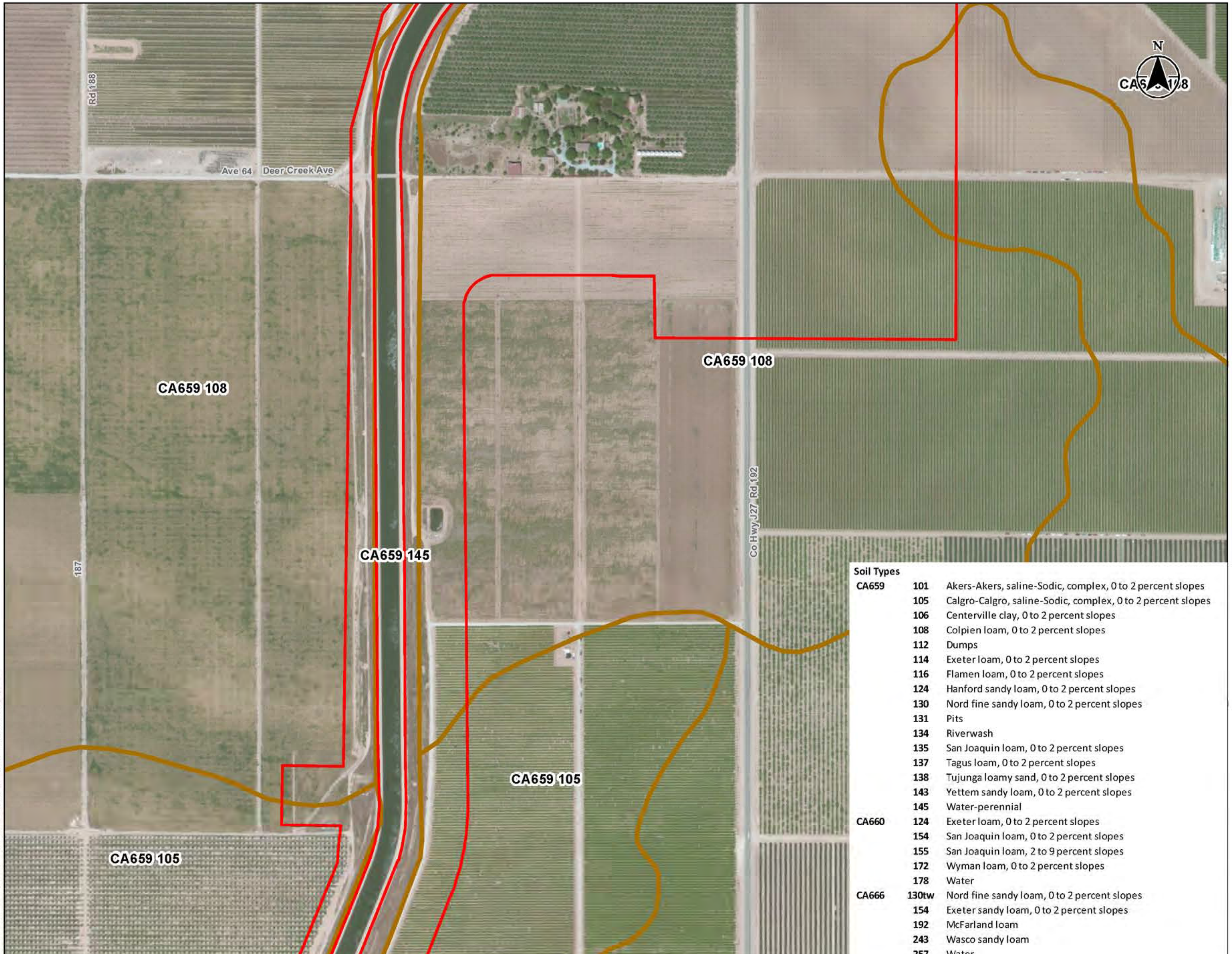
Study Area (2,249.49 acres)
Soils

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO). 1/28/2019
3. Orthoimagery: ESRI World Imagery (Clarity), 2019



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2ac

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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0 400 800 Feet
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Study Area (2,249.49 acres)
Soils

Notes
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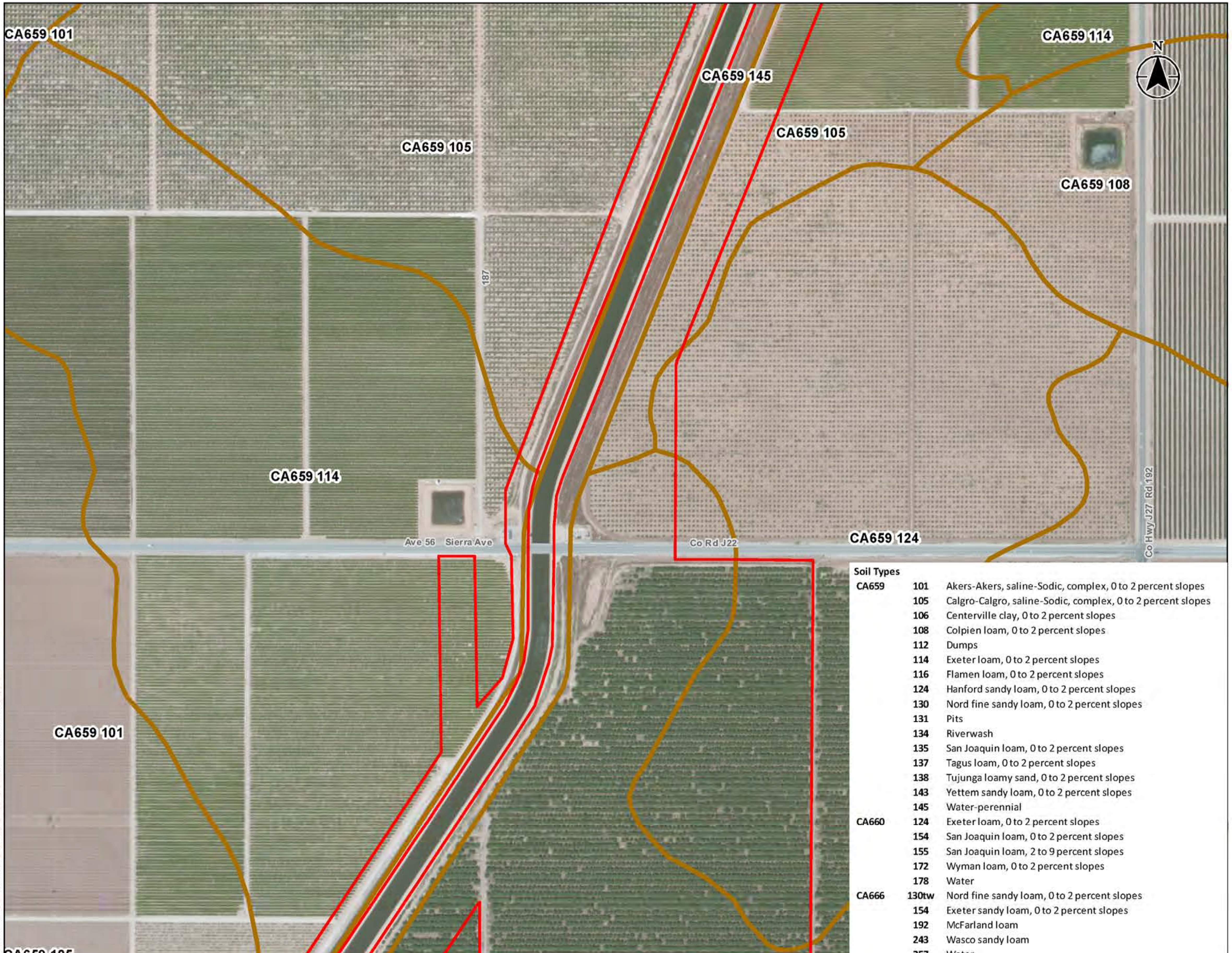
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2ad

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

1 inch = 400 feet
0 400 800 Feet
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Study Area (2,249.49 acres)
Soils

Notes
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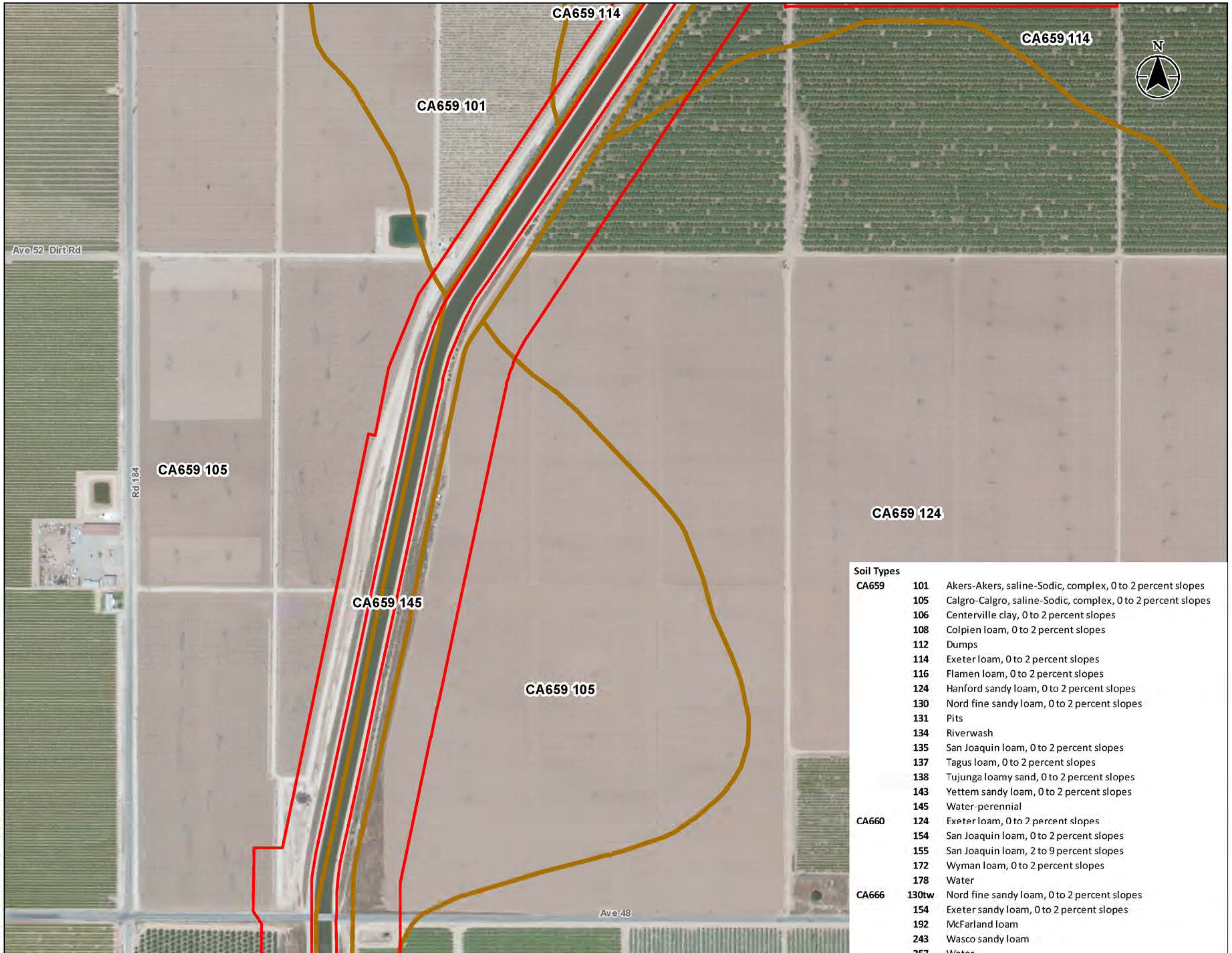
2. USDA NRCS Gridded Soil Survey Geographic (gSSURGO), 1/28/2019
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2ae

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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Study Area (2,249.49 acres)

Soils

Notes

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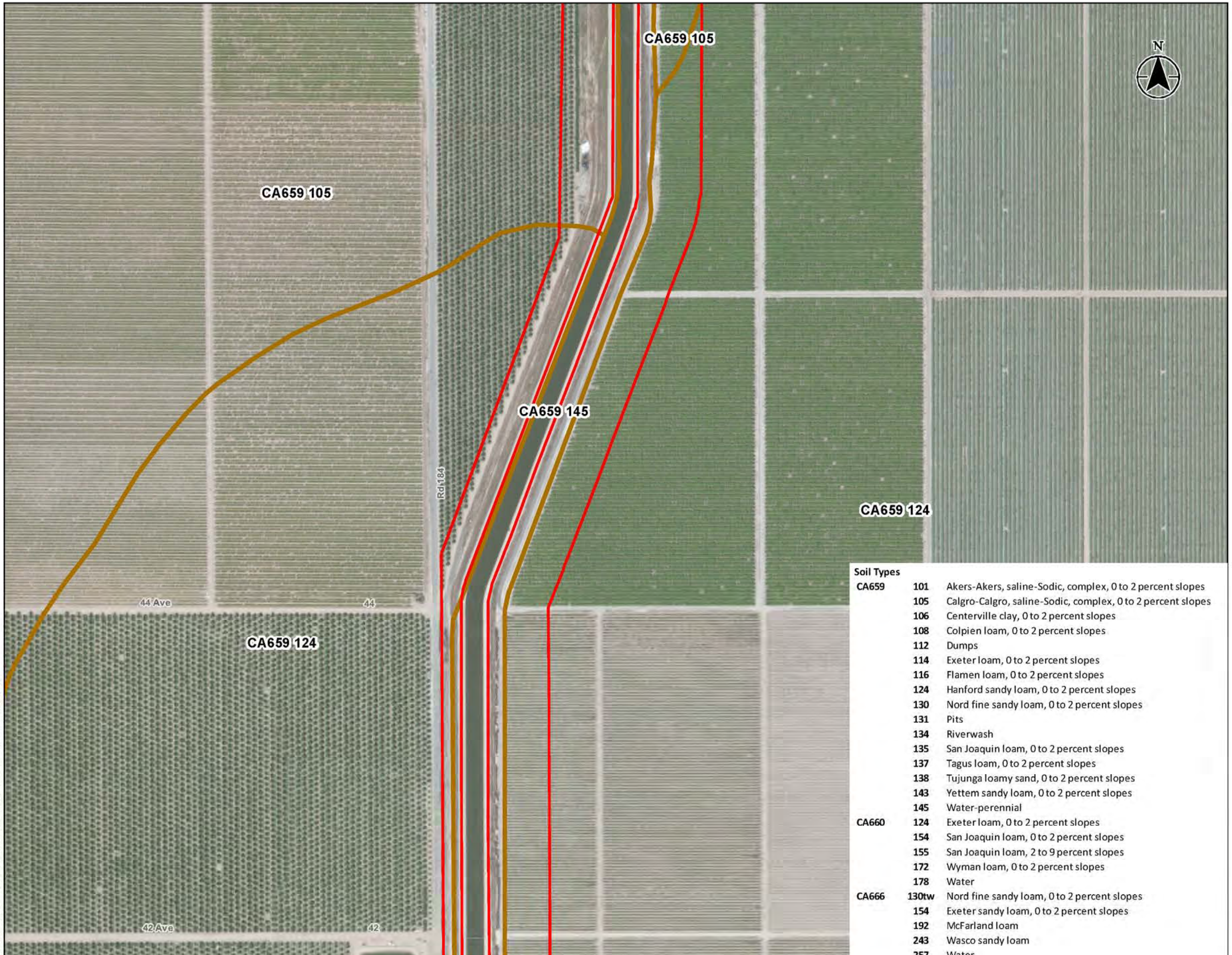
3. Ortholmagery: ESRI World Imagery (Clarity), 2019



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2af

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
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Study Area (2,249.49 acres)
Soils

Notes
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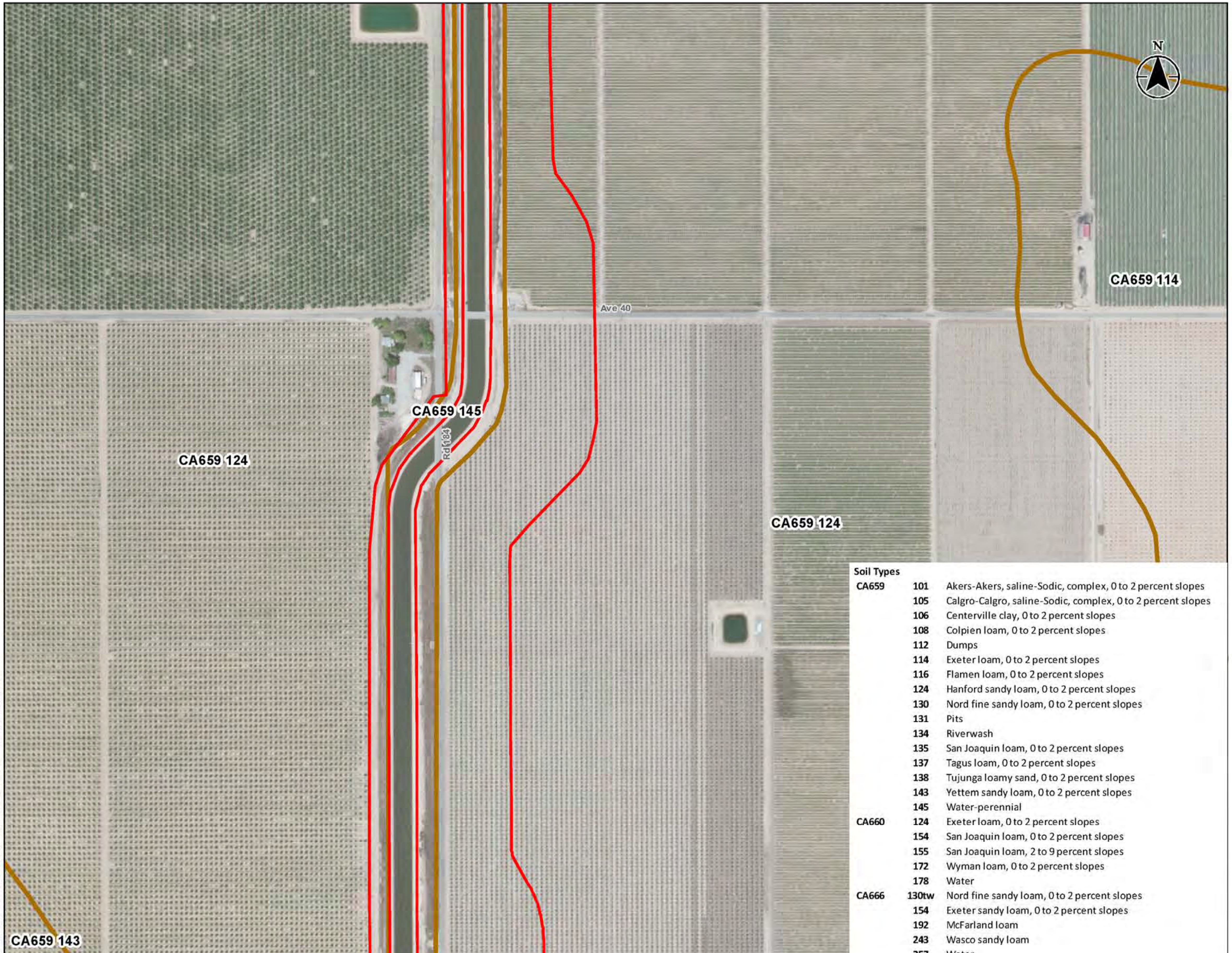
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
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	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2ag

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
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Study Area (2,249.49 acres)
Soils

Notes
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3. Ortholmagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
2ah

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
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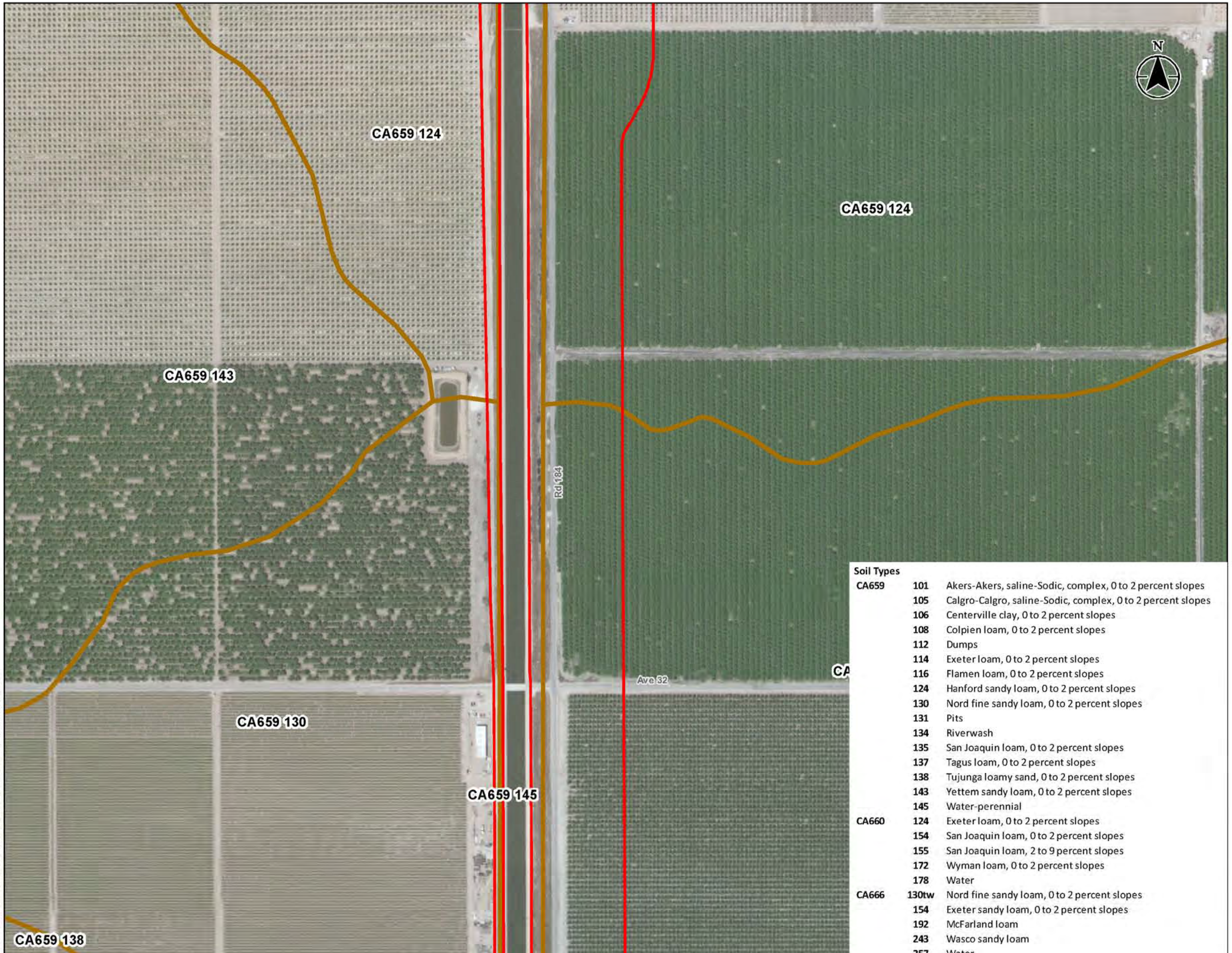
Study Area (2,249.49 acres)
Soils



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
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	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
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CA660	124	Exeter loam, 0 to 2 percent slopes
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	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
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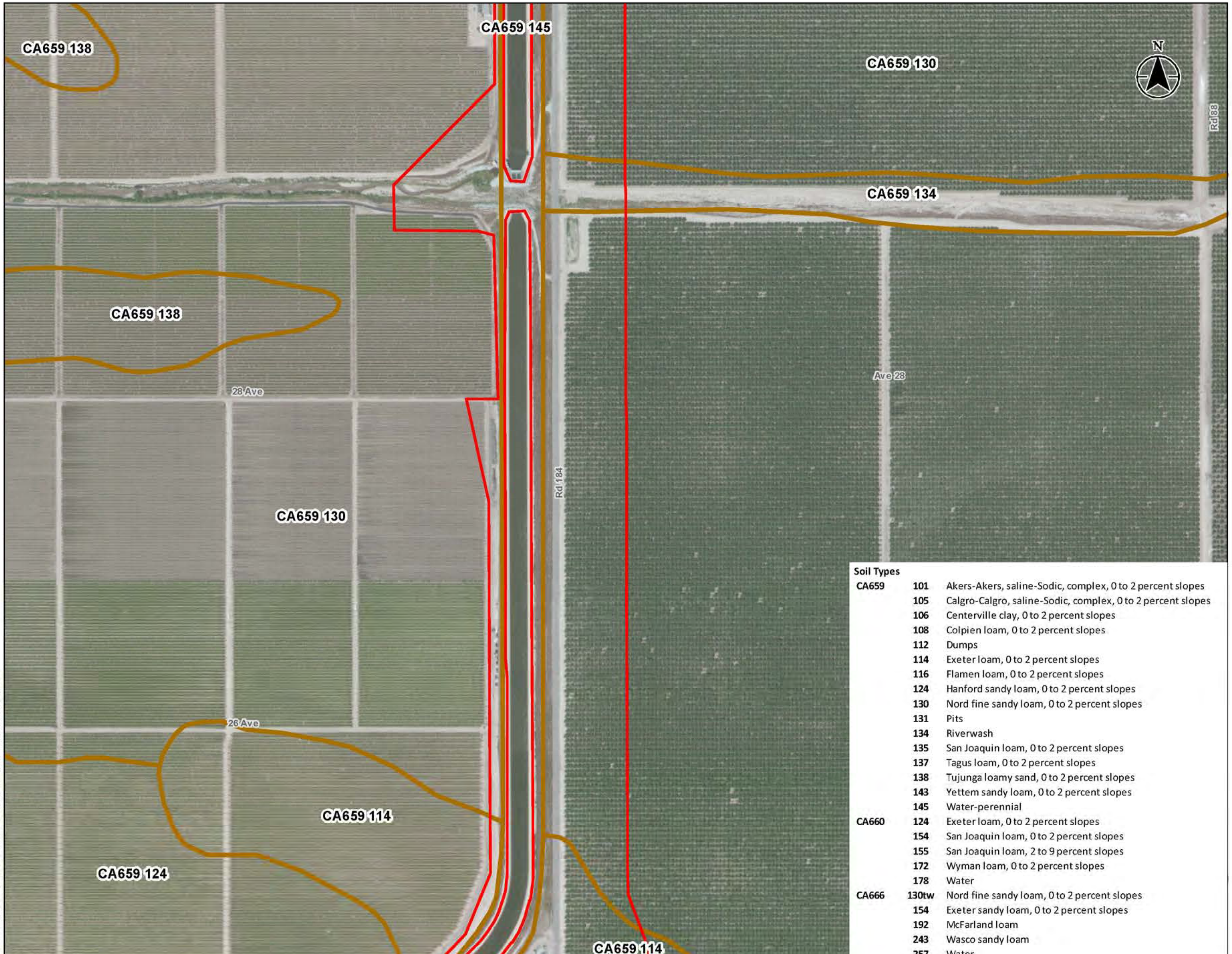
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO). 1/28/2019
3. OrthoImagery: ESRI World Imagery (Clarity), 2019



Soil Types		
CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2ai

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

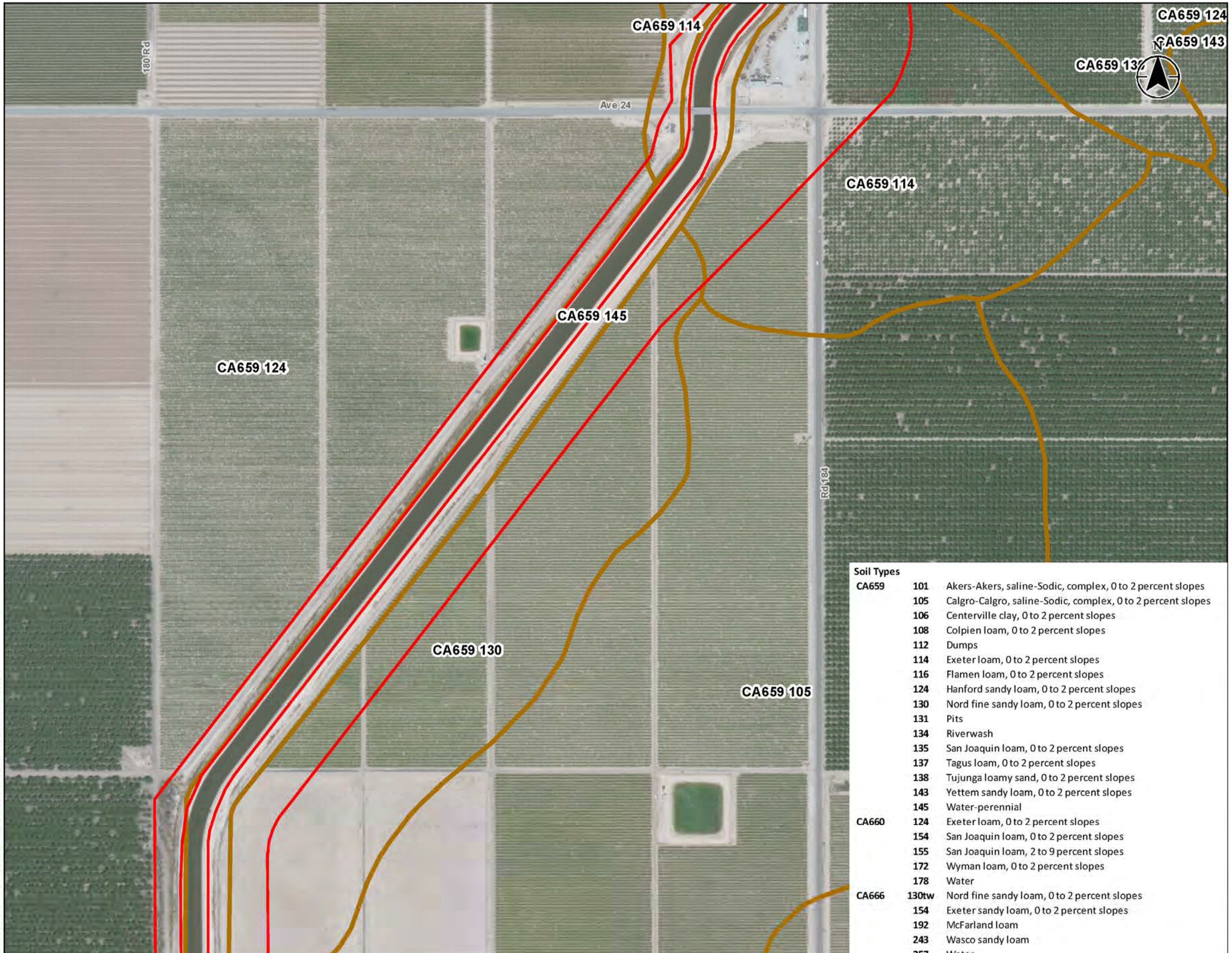
184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Soils

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Grided Soil Survey Geographic (gSSURGO), 1/28/2019
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
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	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
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	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2aj

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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Study Area (2,249.49 acres)
Soils

Notes
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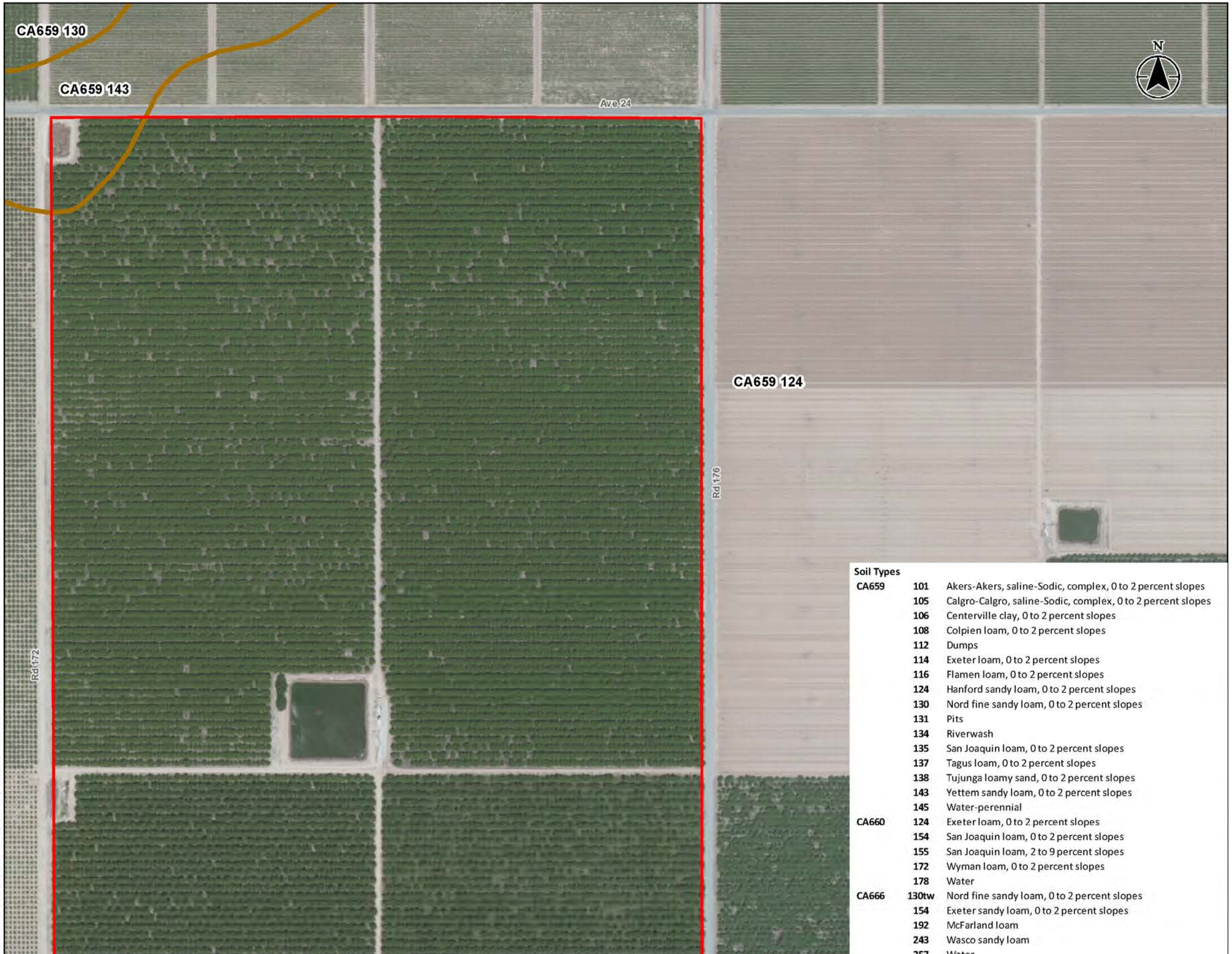
Stantec

Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2ak

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

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Study Area (2,249.49 acres)
Soils

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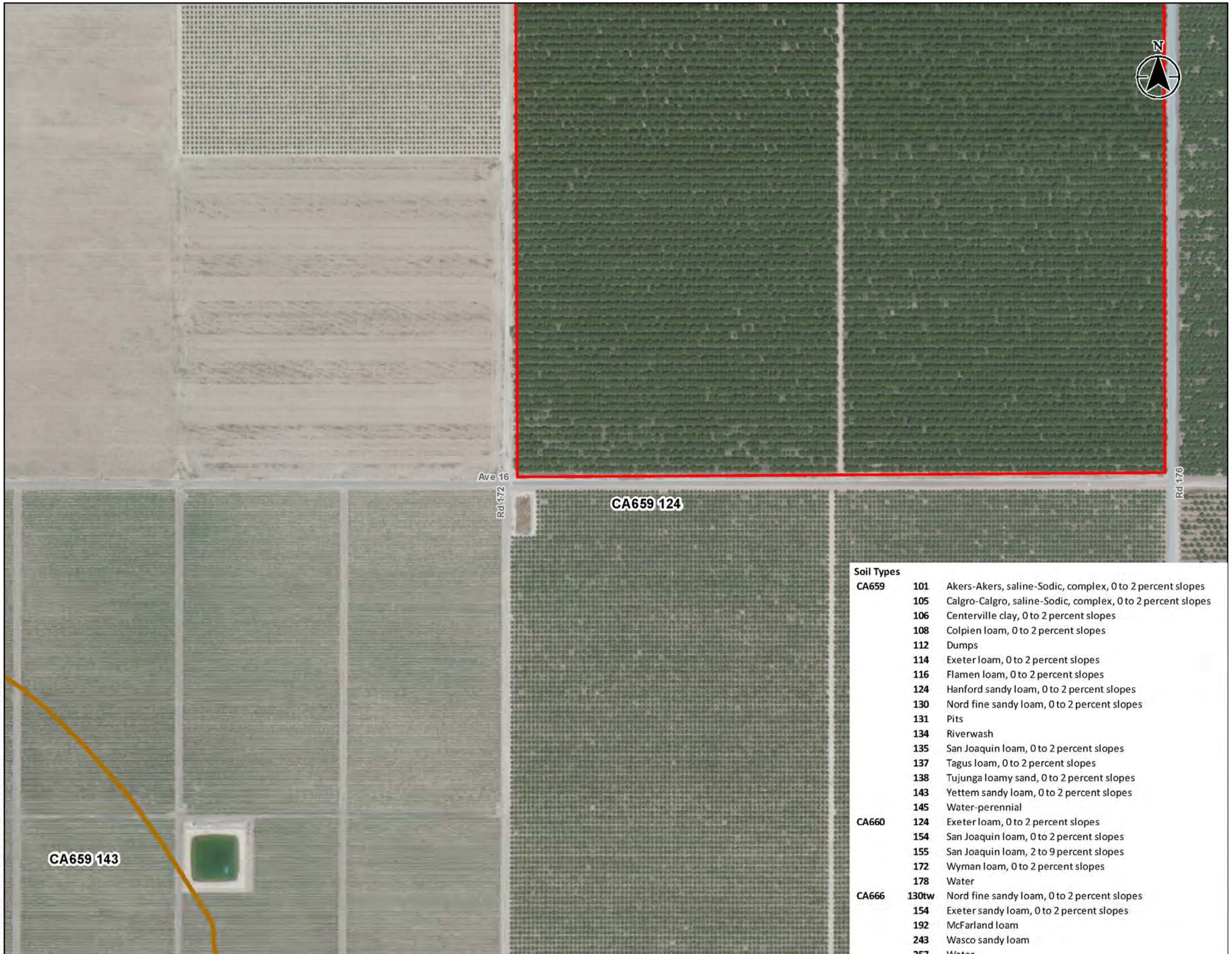
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
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	116	Flamen loam, 0 to 2 percent slopes
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	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2al

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
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Study Area (2,249.49 acres)
Soils

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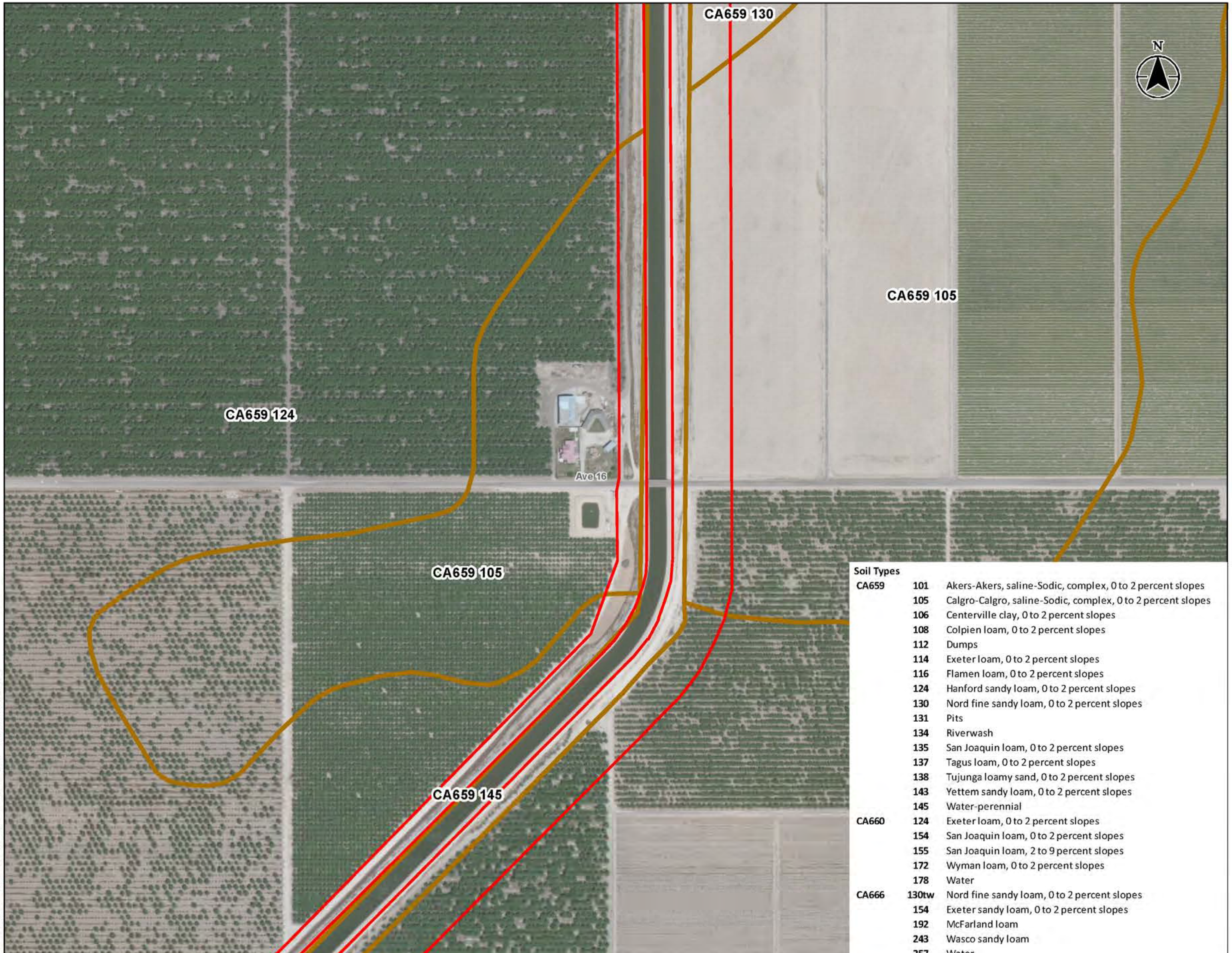
Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
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	116	Flamen loam, 0 to 2 percent slopes
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	130	Nord fine sandy loam, 0 to 2 percent slopes
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	134	Riverwash
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	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2am

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
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Study Area (2,249.49 acres)
Soils

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Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
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	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2an

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
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Study Area (2,249.49 acres)
Soils

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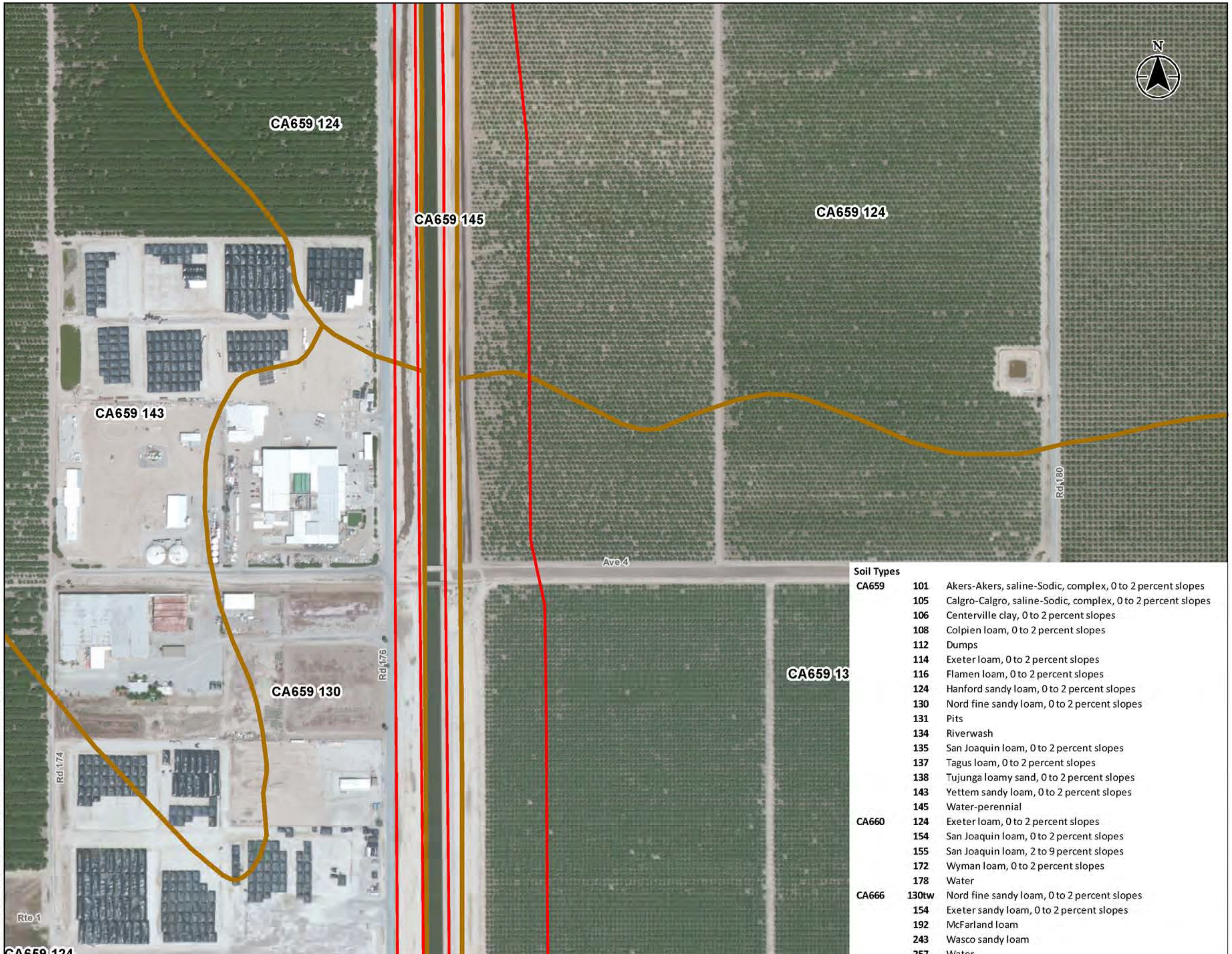
Stantec

Friant
WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
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	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2ao

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
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Study Area (2,249.49 acres)
Soils

Notes
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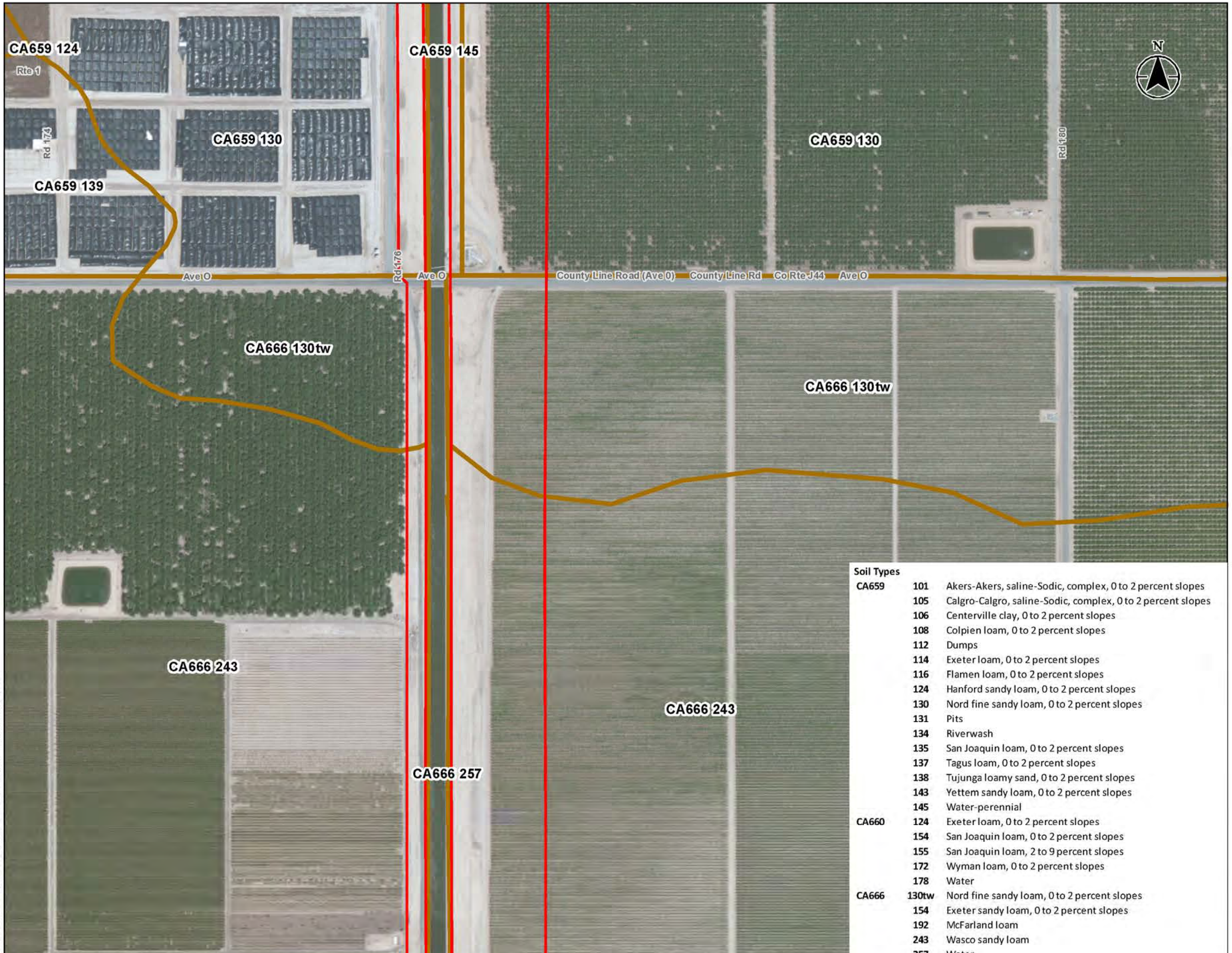
Stantec
Friant WATER AUTHORITY



Soil Types

CA659	**101**	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
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	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	**124**	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	**130tw**	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2ap

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
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Study Area (2,249.49 acres)
Soils

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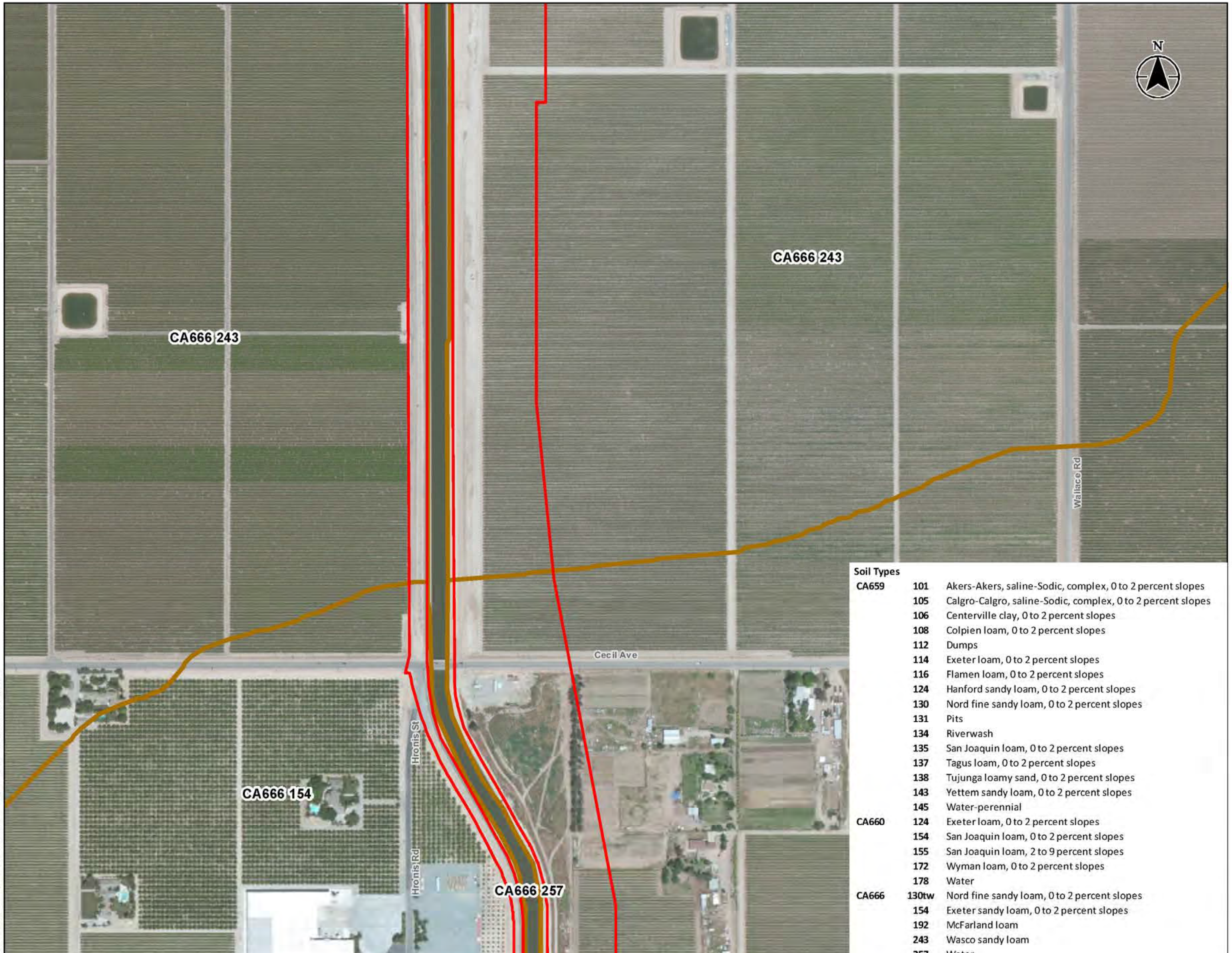
Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
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	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2aq

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
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Study Area (2,249.49 acres)
Soils

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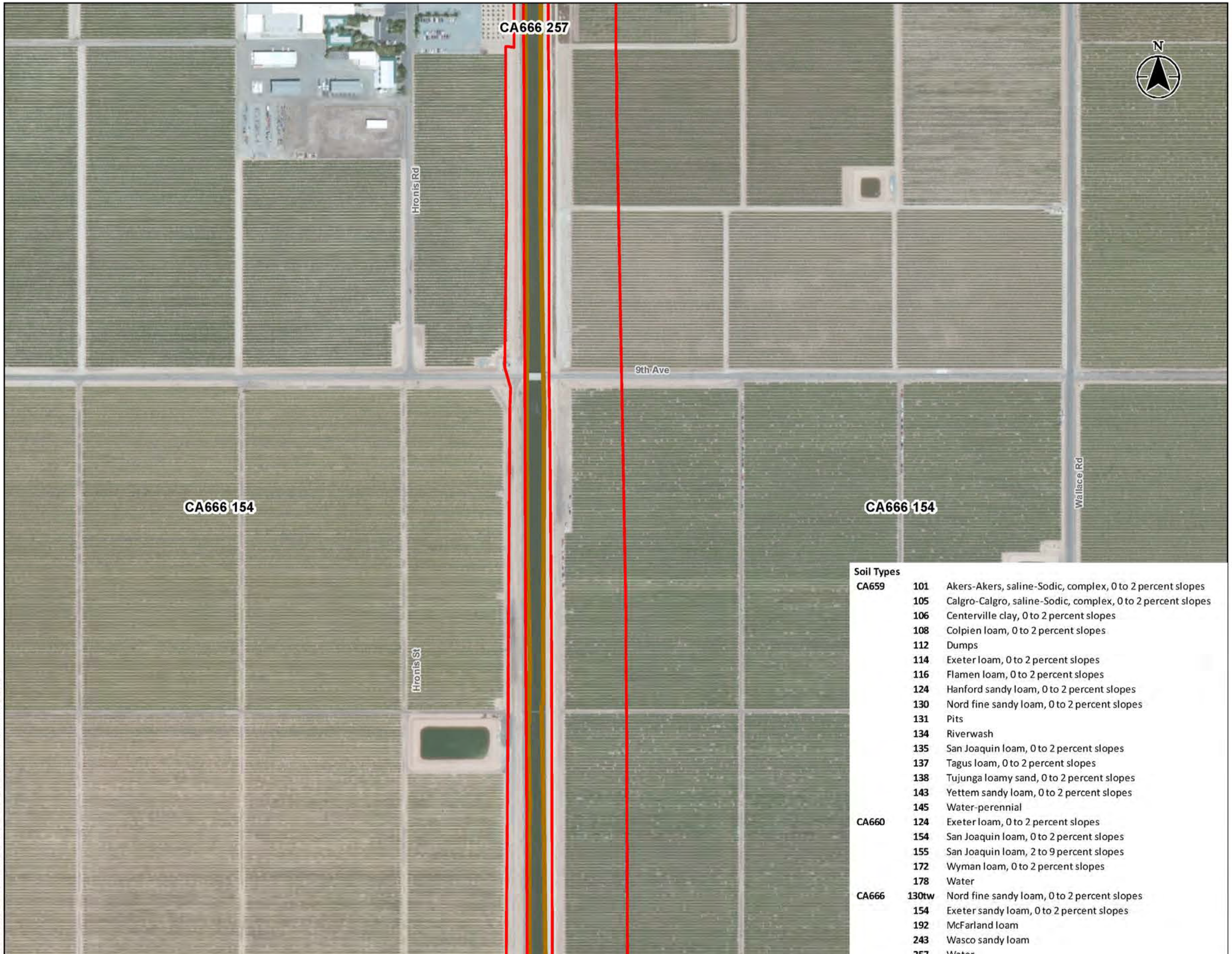

Soil Types		
CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
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	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2ar

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

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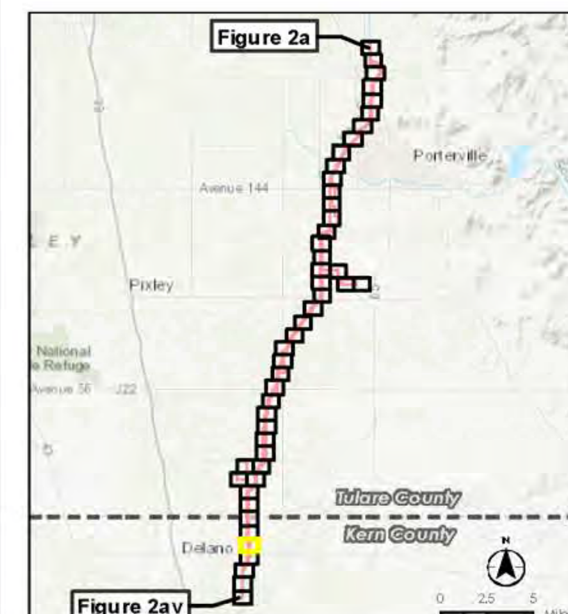
Study Area (2,249.49 acres)
Soils



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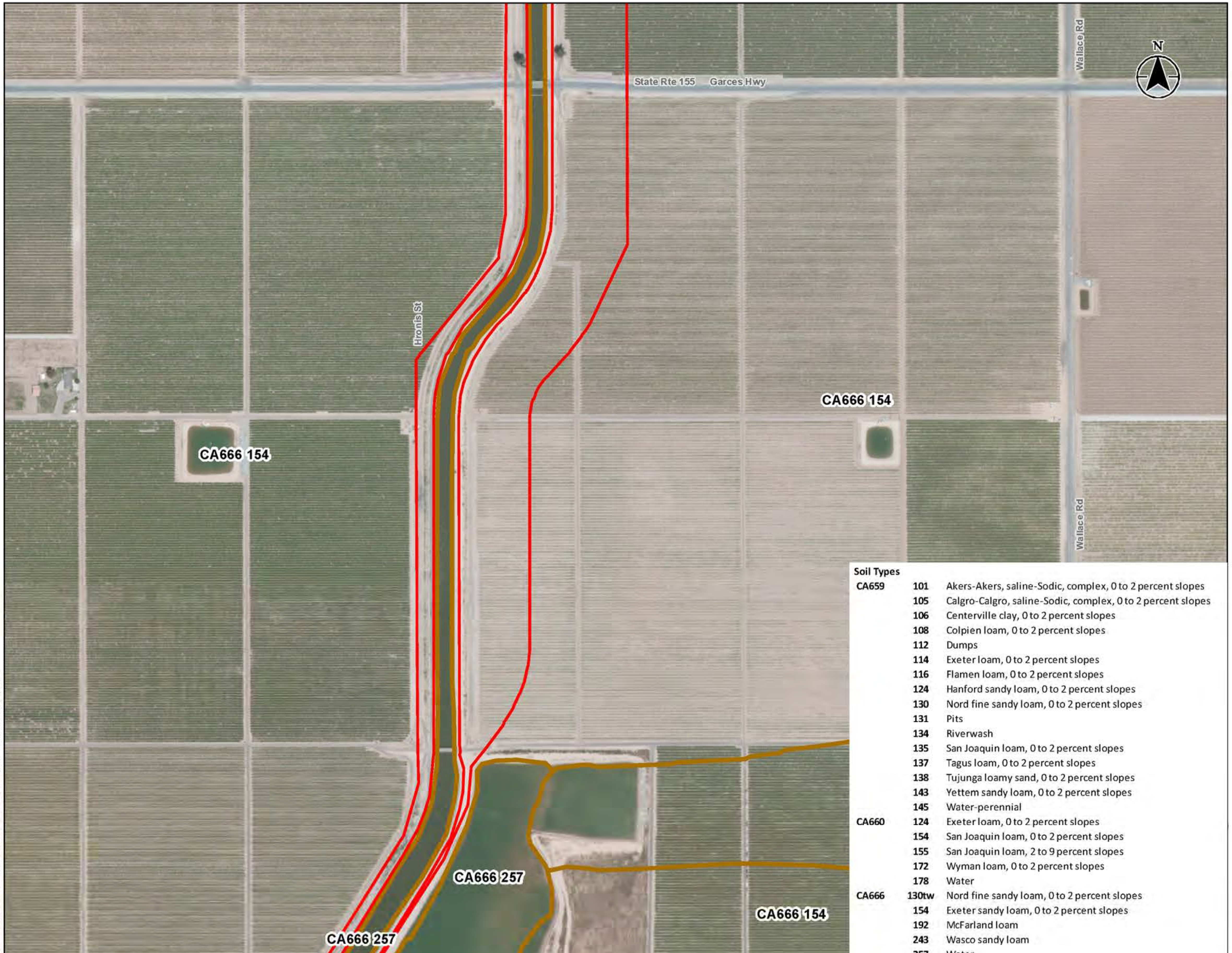

Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
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CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2as

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

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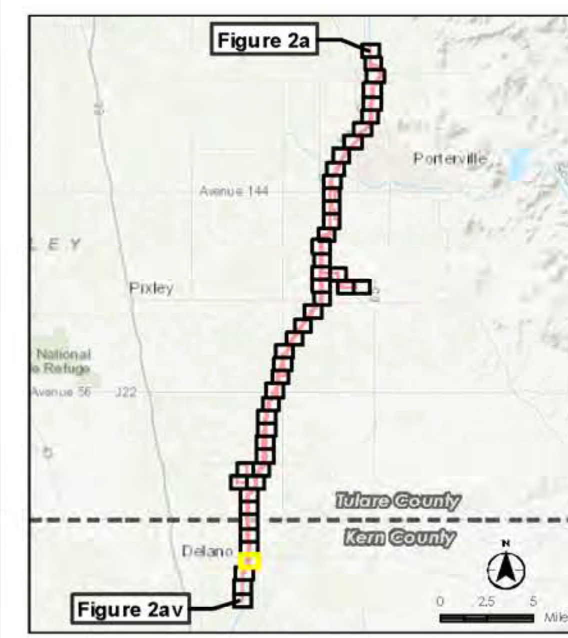
Study Area (2,249.49 acres)
Soils



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Stantec
Friant WATER AUTHORITY

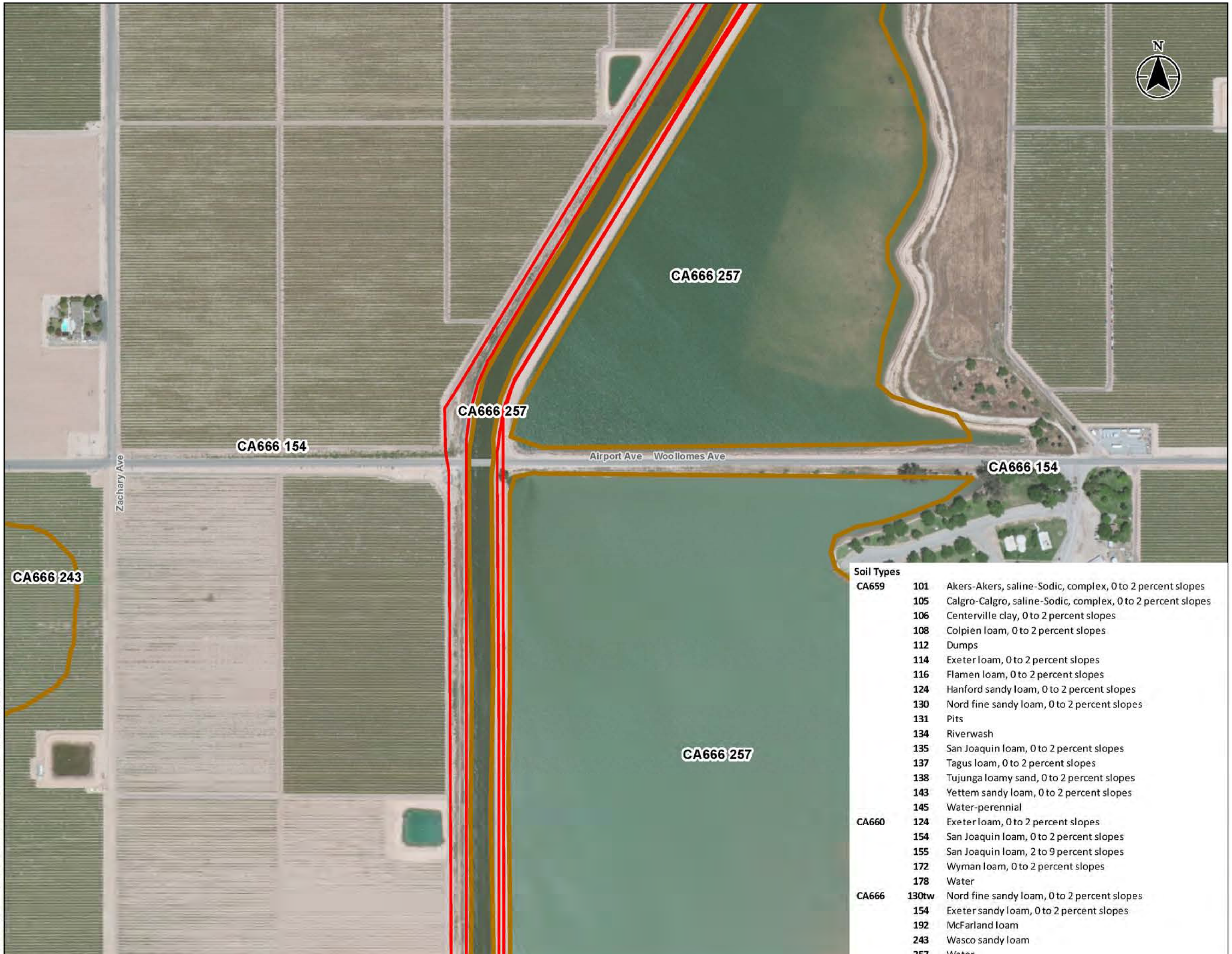

Figure No.
2at

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location 184031016
Tulare and Kern Counties, California
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Study Area (2,249.49 acres)
Soils

Soil Types

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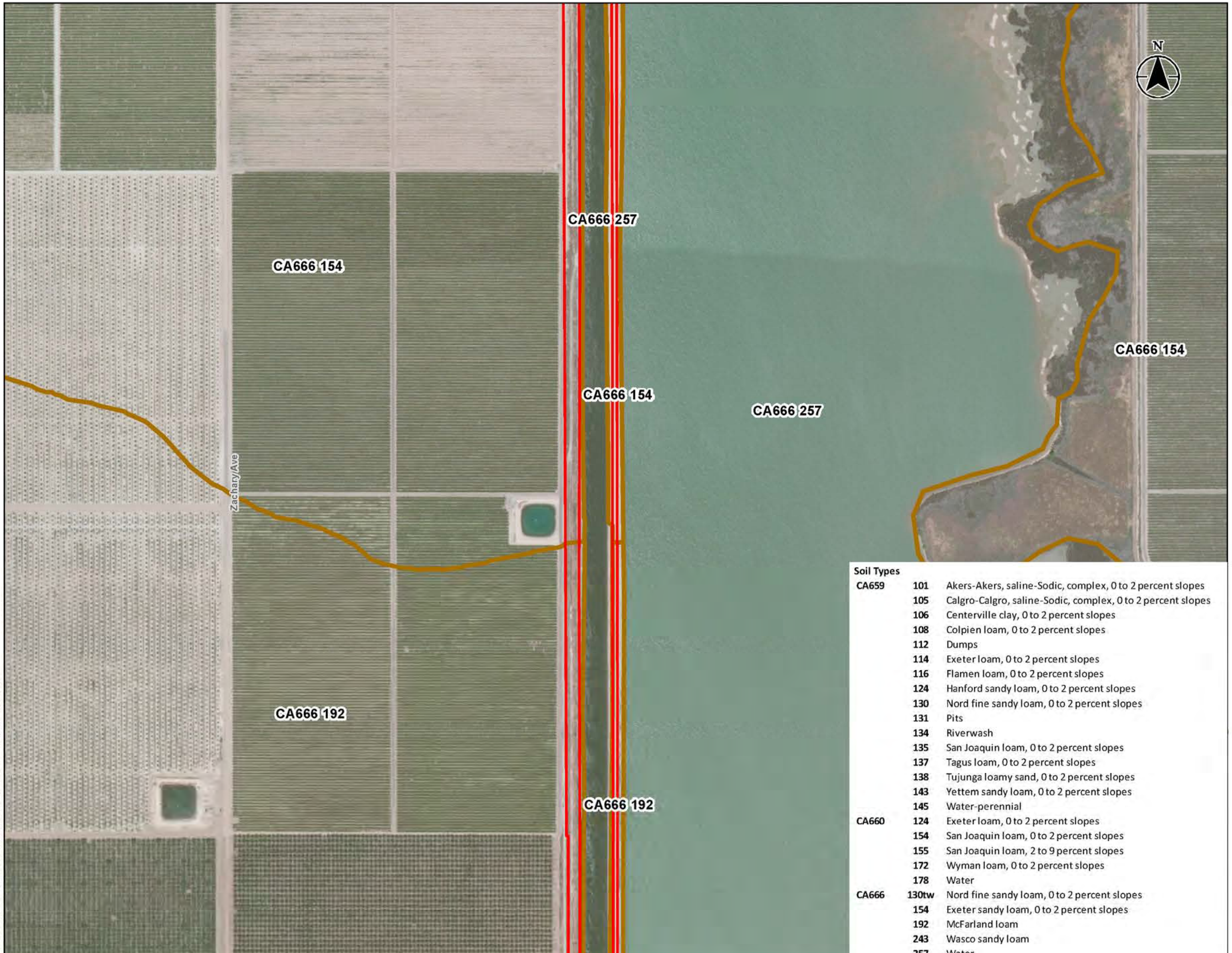
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	**124**	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	**130tw**	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Gridded Soil Survey Geographic (gSSURGO), 1/28/2019
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2au

Title
Soils

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

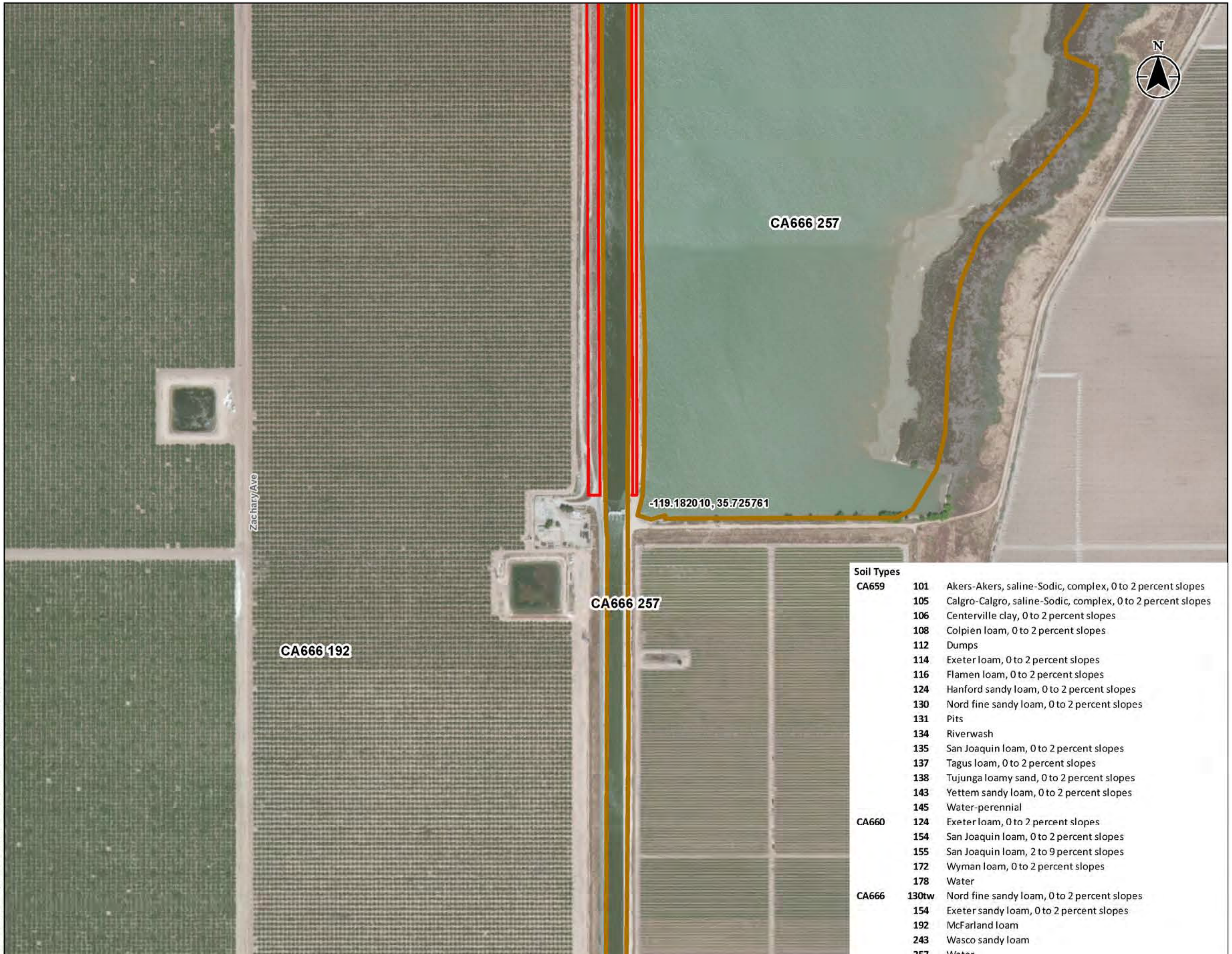
184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Soils

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Gridded Soil Survey Geographic (gSSURGO), 1/28/2019
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY



Soil Types

CA659	101	Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes
	105	Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes
	106	Centerville clay, 0 to 2 percent slopes
	108	Colpien loam, 0 to 2 percent slopes
	112	Dumps
	114	Exeter loam, 0 to 2 percent slopes
	116	Flamen loam, 0 to 2 percent slopes
	124	Hanford sandy loam, 0 to 2 percent slopes
	130	Nord fine sandy loam, 0 to 2 percent slopes
	131	Pits
	134	Riverwash
	135	San Joaquin loam, 0 to 2 percent slopes
	137	Tagus loam, 0 to 2 percent slopes
	138	Tujunga loamy sand, 0 to 2 percent slopes
	143	Yettem sandy loam, 0 to 2 percent slopes
	145	Water-perennial
CA660	124	Exeter loam, 0 to 2 percent slopes
	154	San Joaquin loam, 0 to 2 percent slopes
	155	San Joaquin loam, 2 to 9 percent slopes
	172	Wyman loam, 0 to 2 percent slopes
	178	Water
CA666	130tw	Nord fine sandy loam, 0 to 2 percent slopes
	154	Exeter sandy loam, 0 to 2 percent slopes
	192	McFarland loam
	243	Wasco sandy loam
	257	Water

Figure No.
2av

Title
Soils

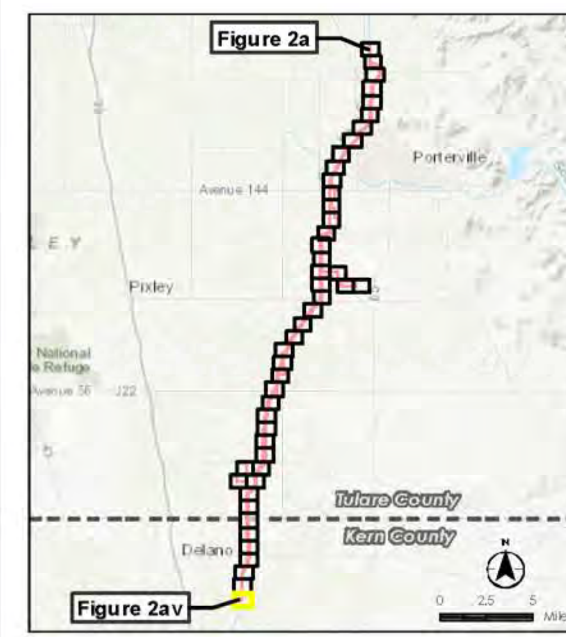
Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2019-12-20
Revised by SP on 2020-01-16

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Soils



Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. USDA NRCS Gridded Soil Survey Geographic (gSSURGO), 1/28/2019
3. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

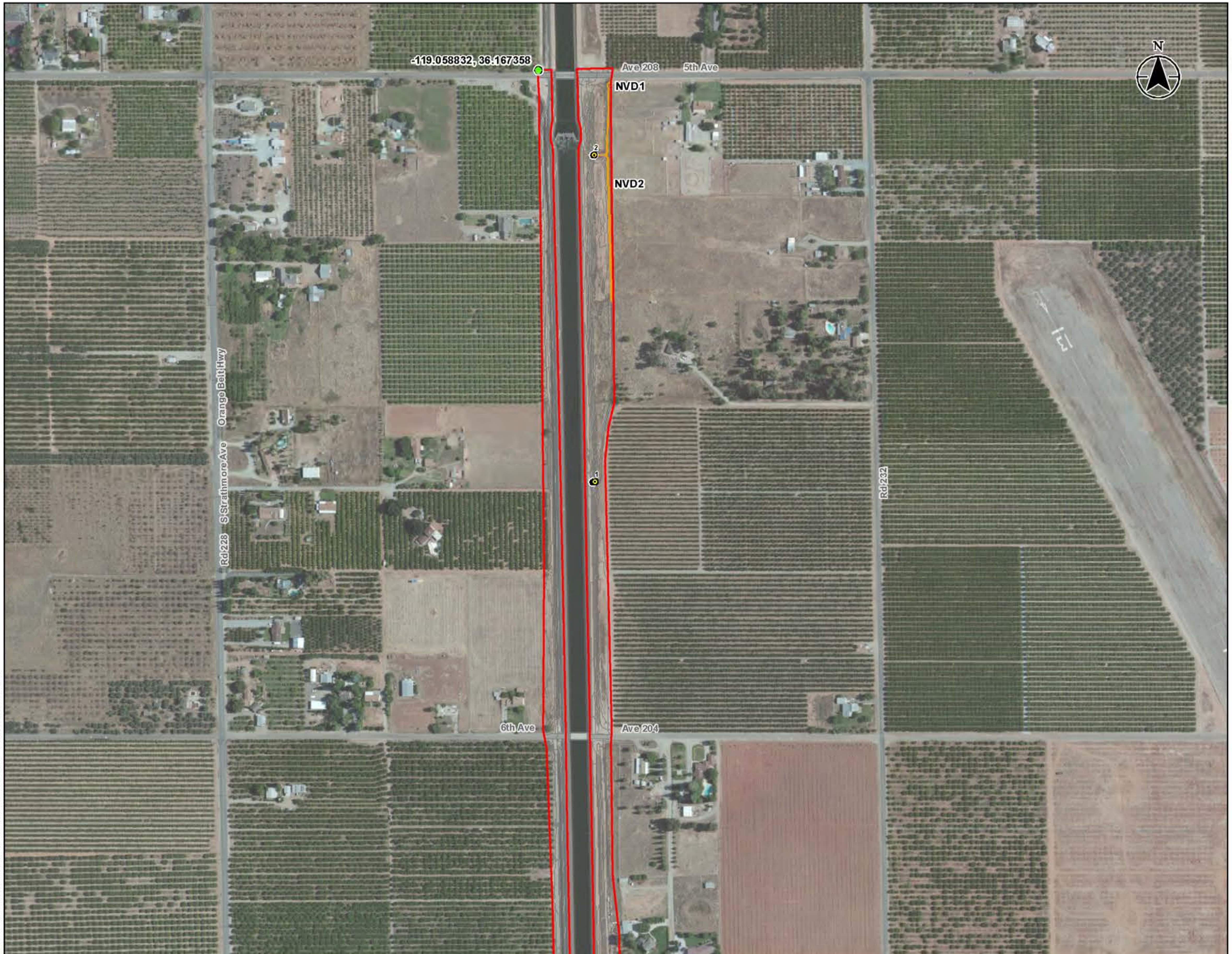


Figure No.
3a

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

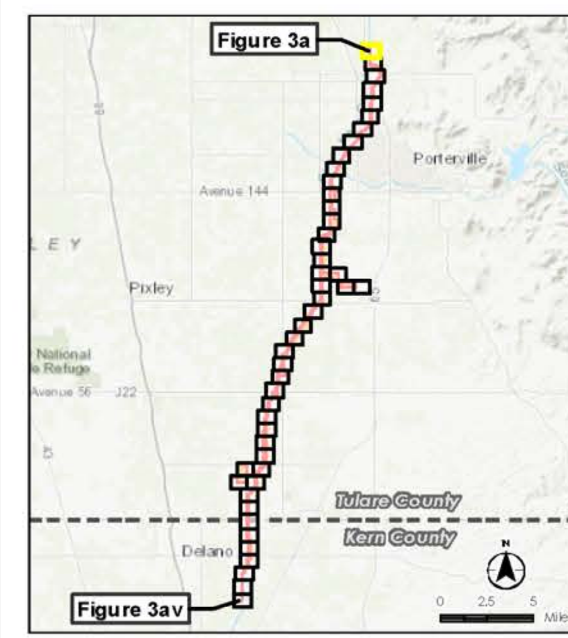
184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
- Intermittent Stream (2.114 acres, 2,294 linear feet)
- Irrigation Canal (4.650 acres, 12,229 linear feet)
- Non-Vegetated Ditch (0.601 acre, 4,816 linear feet)
- Pond (5.799 acres)
- Riparian/Fresh Emergent Wetland Complex (0.011 acre)
- Riparian Wetland (1.874 acres)
- Seasonal Wetland (0.355 acre)



Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3b

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet

0 400 800 Feet

1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
- Intermittent Stream (2.114 acres, 2,294 linear feet)
- Irrigation Canal (4.650 acres, 12,229 linear feet)
- Non-Vegetated Ditch (0.601 acre, 4,816 linear feet)
- Pond (5.799 acres)
- Riparian/Fresh Emergent Wetland Complex (0.011 acre)
- Riparian Wetland (1.874 acres)
- Seasonal Wetland (0.355 acre)

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec

Friant WATER AUTHORITY

Figure No.
3c

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location 184031016
Tulare and Kern Counties, California

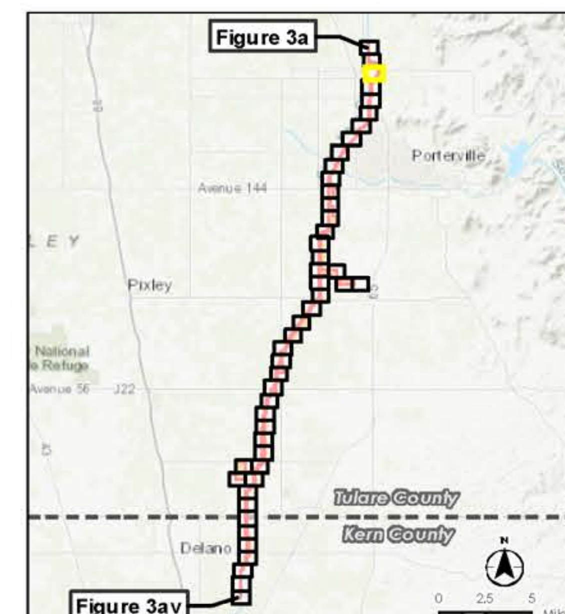
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
- Intermittent Stream (2.114 acres, 2,294 linear feet)
- Irrigation Canal (4.650 acres, 12,229 linear feet)
- Non-Vegetated Ditch (0.601 acre, 4,816 linear feet)
- Pond (5.799 acres)
- Riparian/Fresh Emergent Wetland Complex (0.011 acre)
- Riparian Wetland (1.874 acres)
- Seasonal Wetland (0.355 acre)



Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3d

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

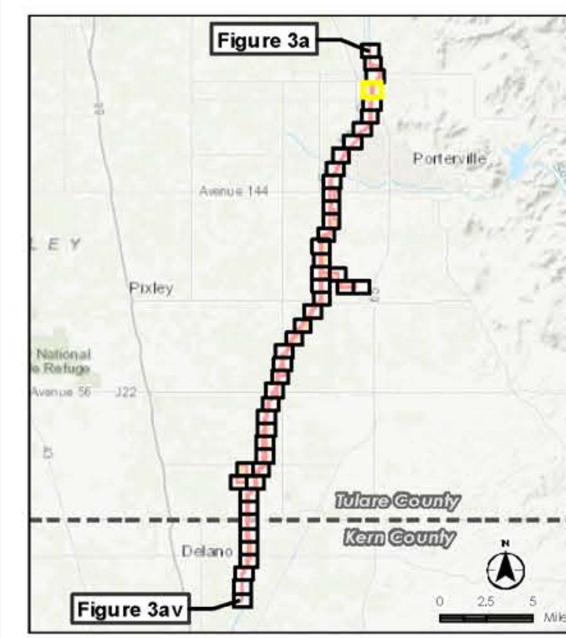
184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
- Intermittent Stream (2.114 acres, 2,294 linear feet)
- Irrigation Canal (4.650 acres, 12,229 linear feet)
- Non-Vegetated Ditch (0.601 acre, 4,816 linear feet)
- Pond (5.799 acres)
- Riparian/Fresh Emergent Wetland Complex (0.011 acre)
- Riparian Wetland (1.874 acres)
- Seasonal Wetland (0.355 acre)



Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

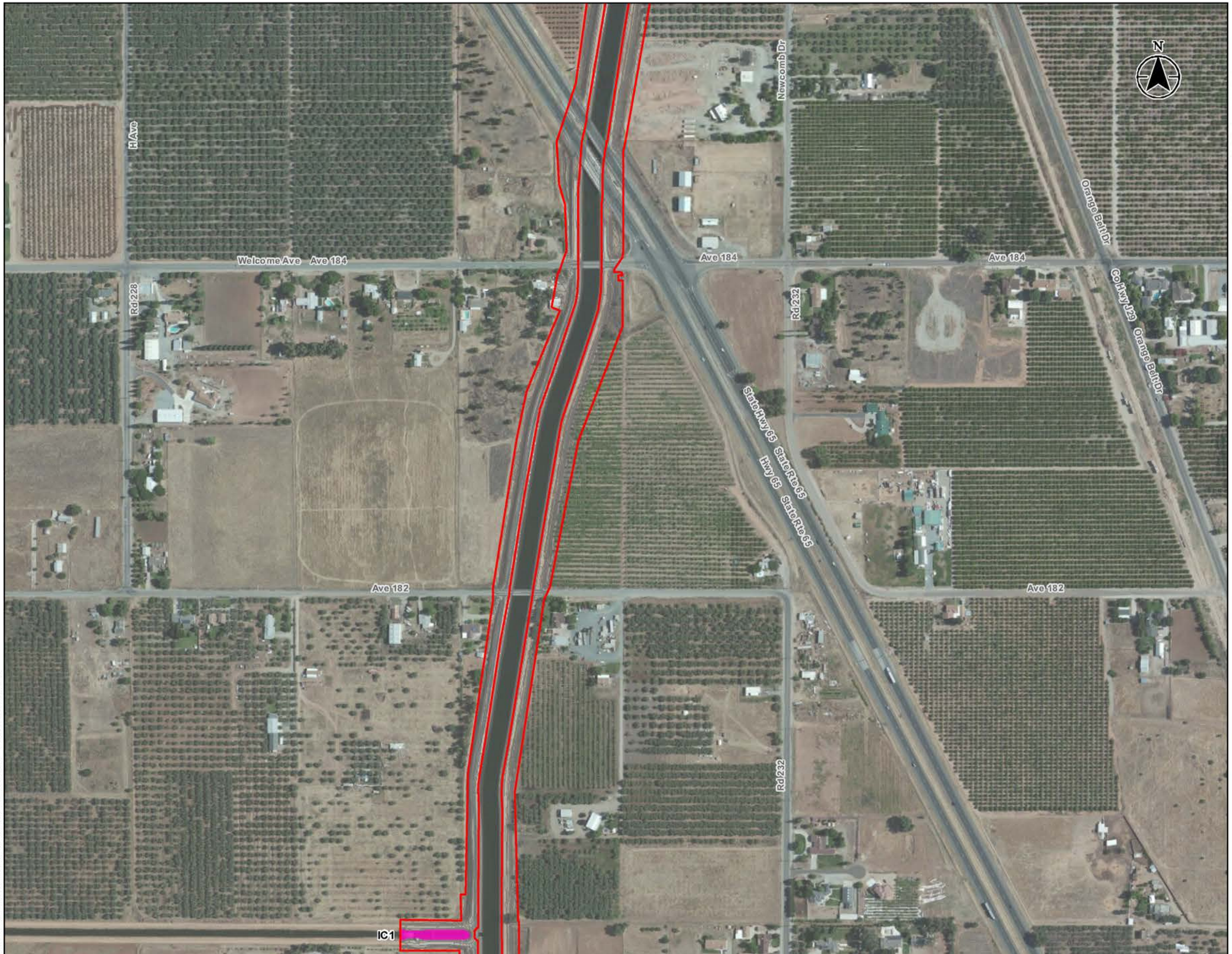


Figure No.
3e

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

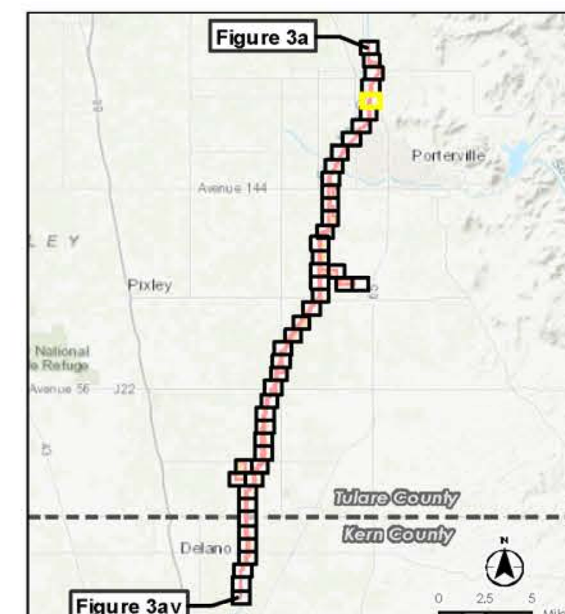
Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Contour
Ordinary High Water Mark
Culvert
Data Point
Map Reference Point

Excluded Features
Groundwater Recharge Basin (20.460 acres)
Intermittent Stream (2.114 acres, 2,294 linear feet)
Irrigation Canal (4.650 acres, 12,229 linear feet)
Non-Vegetated Ditch (0.601 acre, 4,816 linear feet)
Pond (5.799 acres)
Riparian/Fresh Emergent Wetland Complex (0.011 acre)
Riparian Wetland (1.874 acres)
Seasonal Wetland (0.355 acre)



Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3f

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

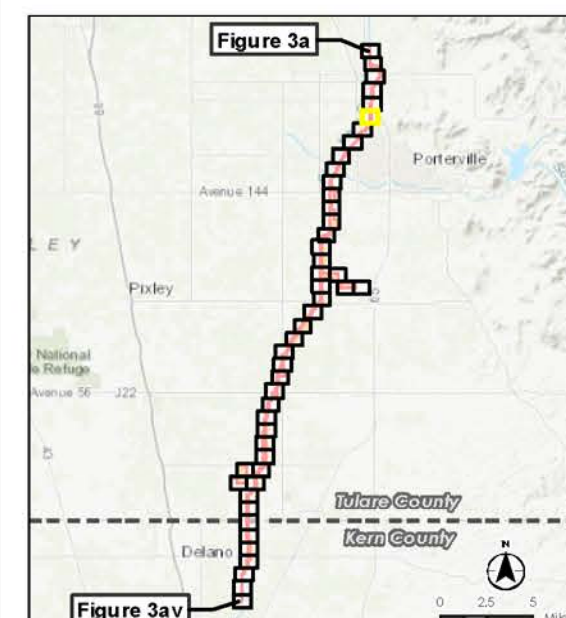
184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
- Intermittent Stream (2.114 acres, 2,294 linear feet)
- Irrigation Canal (4.650 acres, 12,229 linear feet)
- Non-Vegetated Ditch (0.601 acre, 4,816 linear feet)
- Pond (5.799 acres)
- Riparian/Fresh Emergent Wetland Complex (0.011 acre)
- Riparian Wetland (1.874 acres)
- Seasonal Wetland (0.355 acre)



Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3g

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet

0 400 800 Feet

1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
- Intermittent Stream (2.114 acres, 2,294 linear feet)
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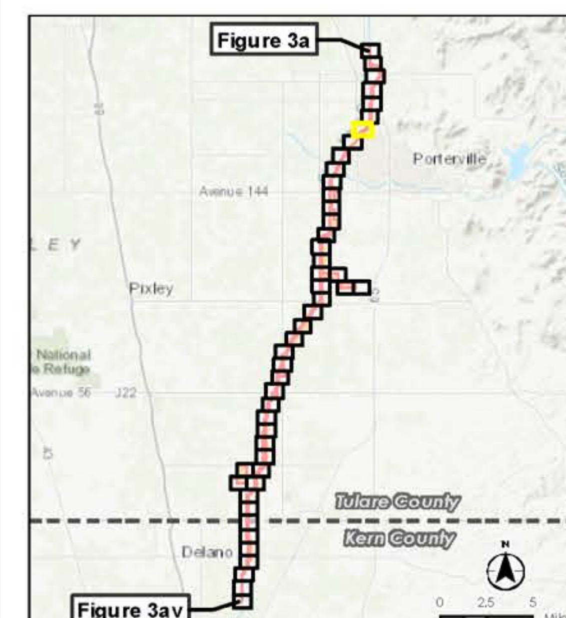
- Riparian/Fresh Emergent Wetland Complex (0.011 acre)
- Riparian Wetland (1.874 acres)
- Seasonal Wetland (0.355 acre)



Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec

Friant WATER AUTHORITY

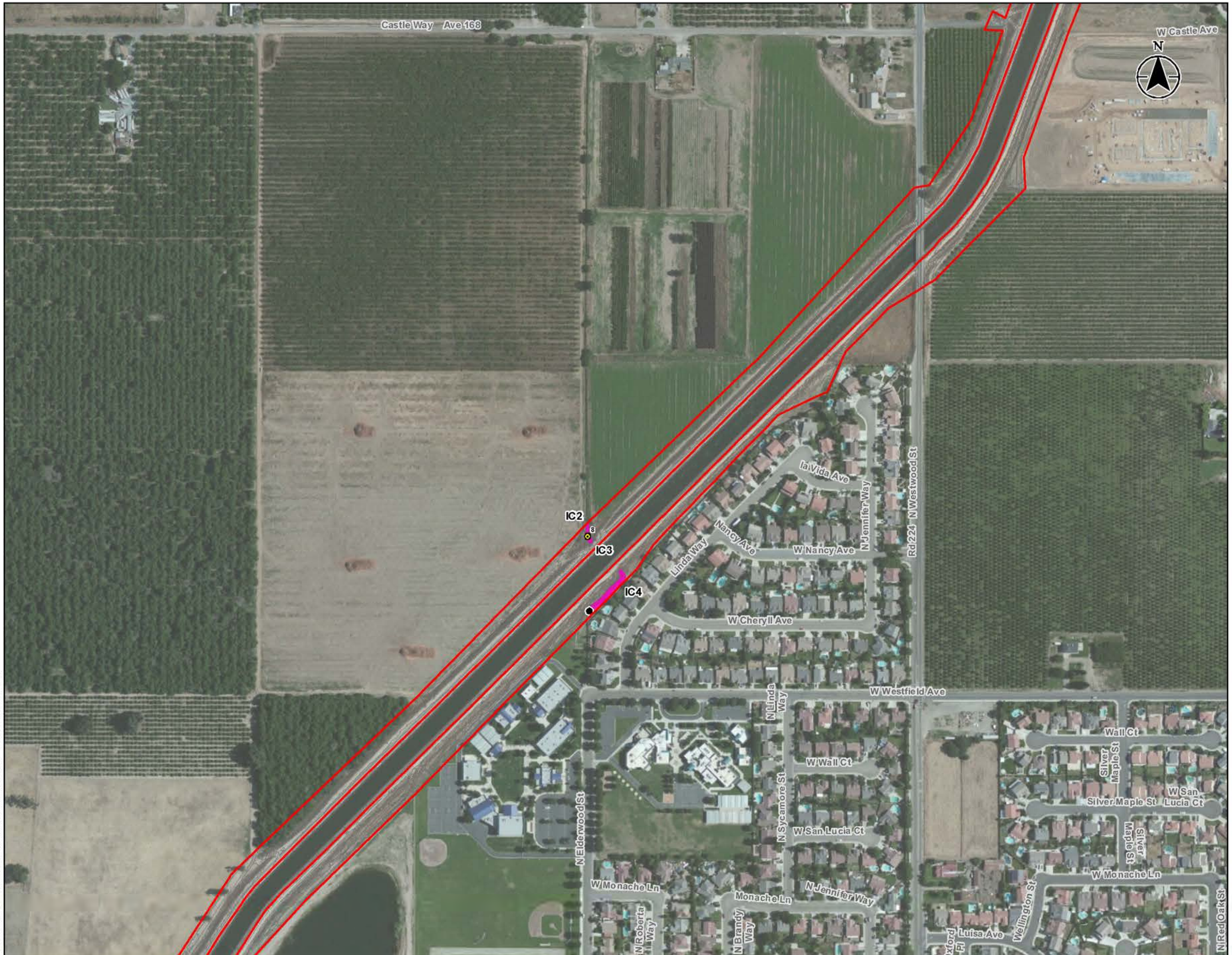


Figure No.
3h

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet

0 400 800 Feet

1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
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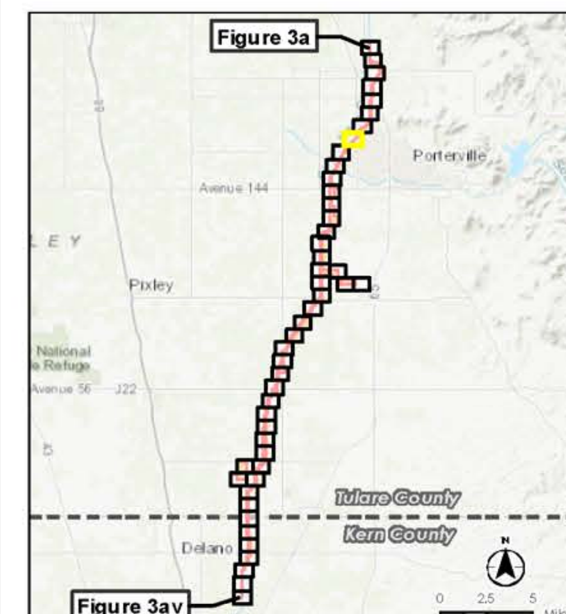

Notes

1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec

Friant WATER AUTHORITY

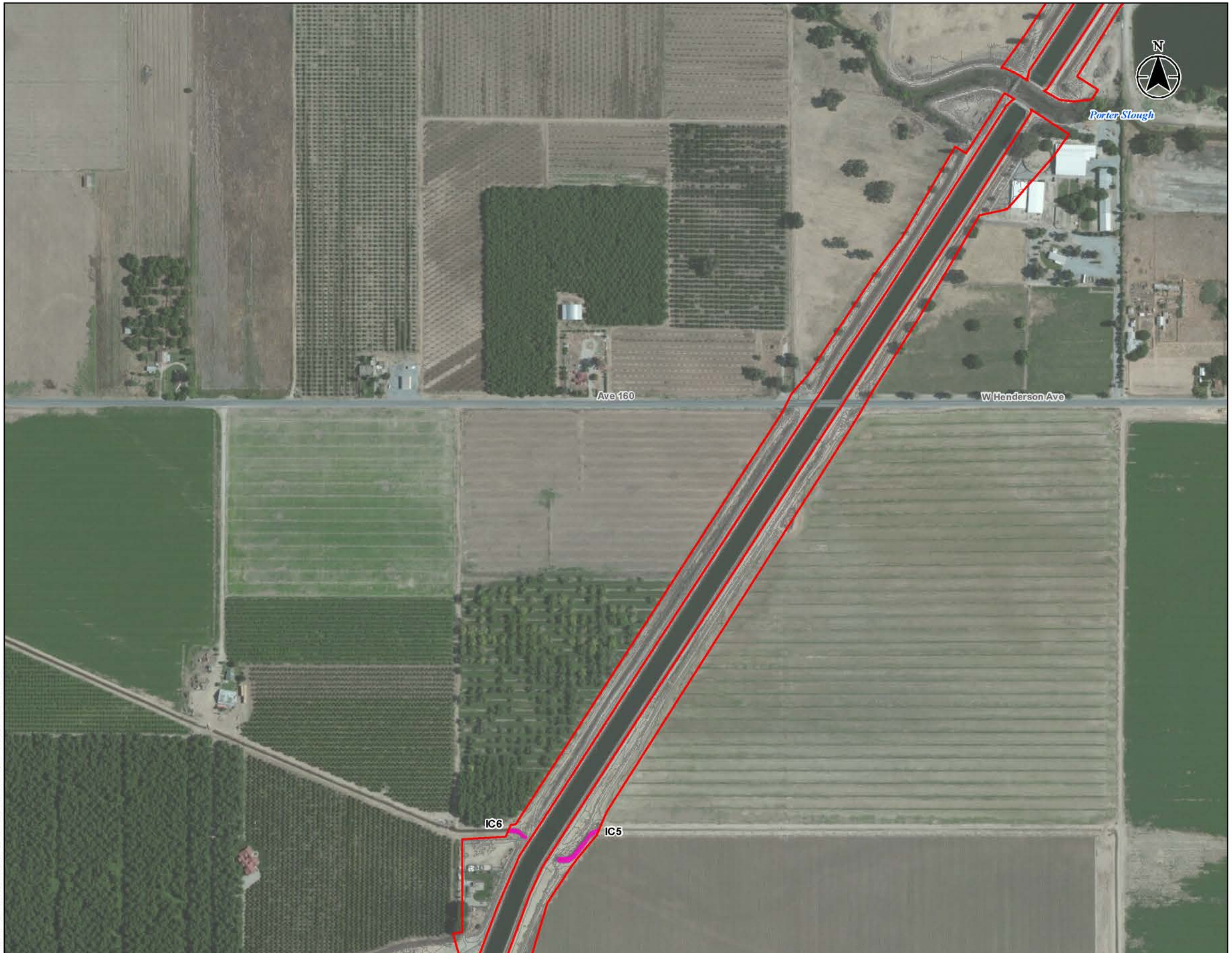

Figure No.
3i

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
- Intermittent Stream (2.114 acres, 2,294 linear feet)
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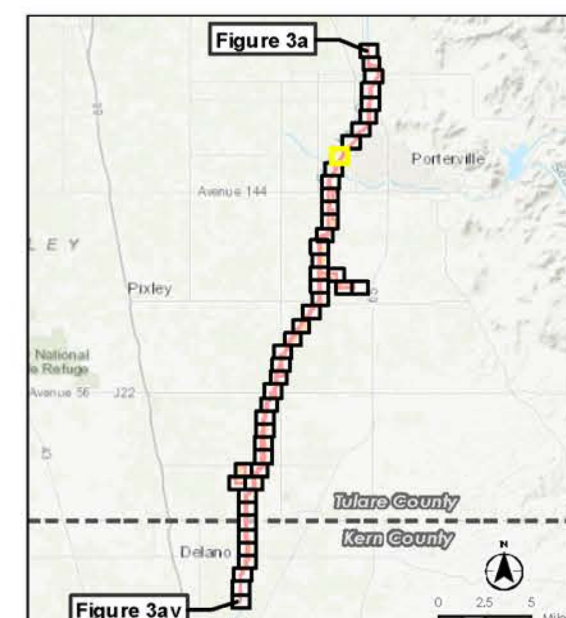
- Seasonal Wetland (0.355 acre)



Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec

Friant WATER AUTHORITY

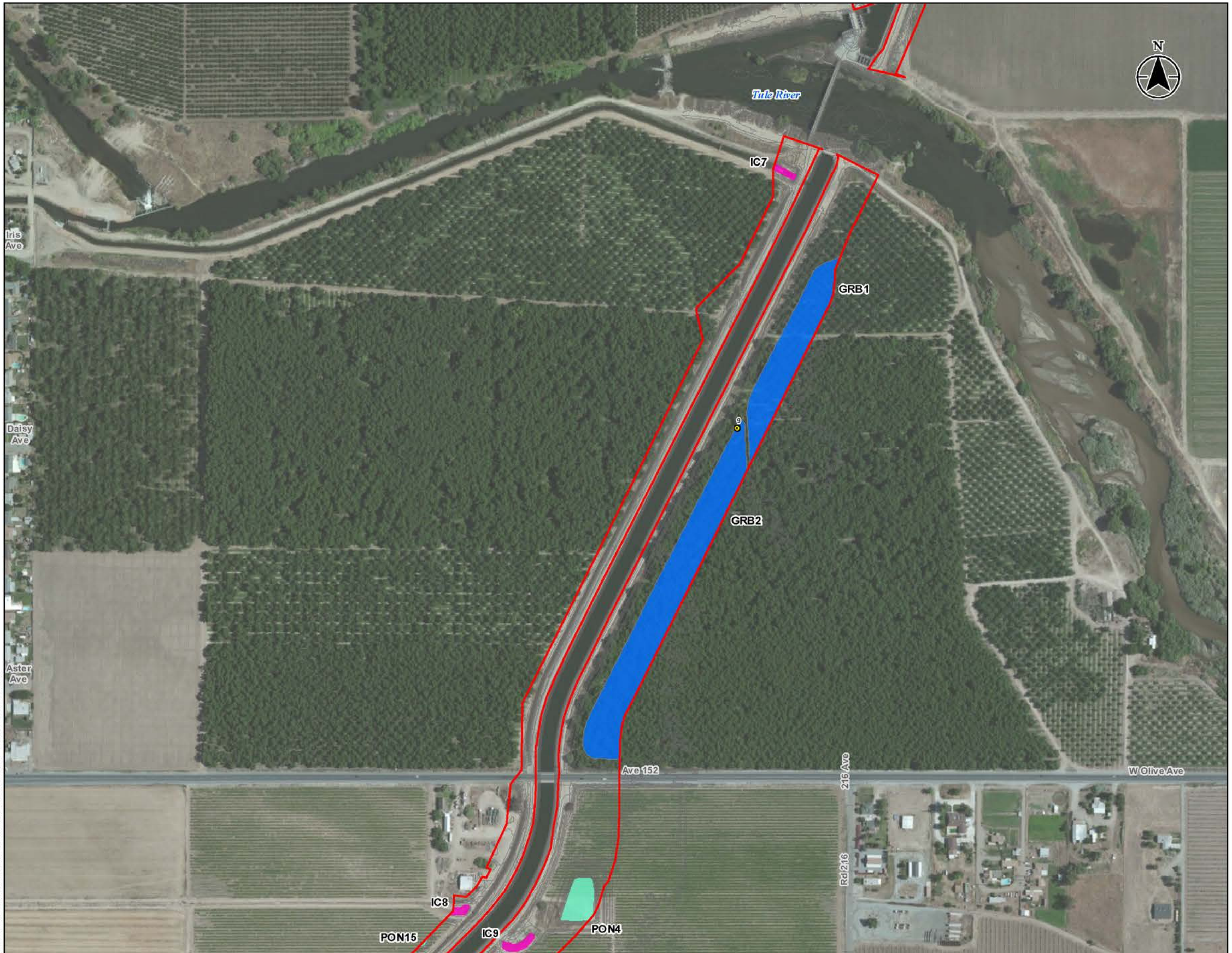


Figure No.
3j

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

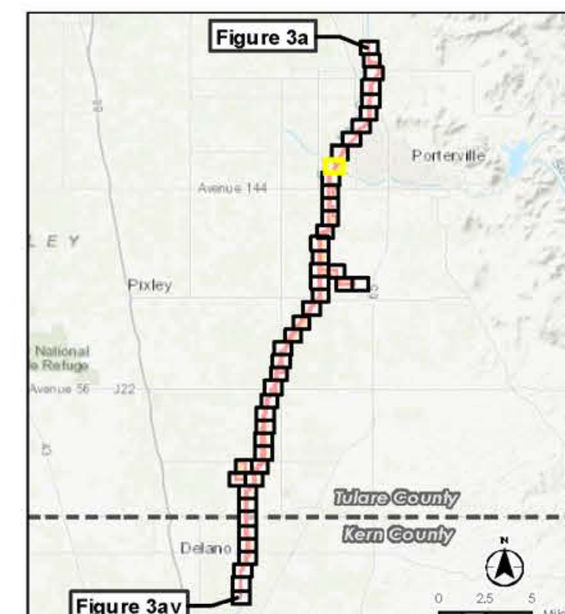
184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Contour
Ordinary High Water Mark
Culvert
Data Point
Map Reference Point

Excluded Features

Groundwater Recharge Basin (20.460 acres)
Intermittent Stream (2.114 acres, 2,294 linear feet)
Irrigation Canal (4.650 acres, 12,229 linear feet)
Non-Vegetated Ditch (0.601 acre, 4,816 linear feet)
Pond (5.799 acres)
Riparian/Fresh Emergent Wetland Complex (0.011 acre)
Riparian Wetland (1.874 acres)
Seasonal Wetland (0.355 acre)



Notes
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2. Orthoimagery: ESRI World Imagery (Clarity), 2019

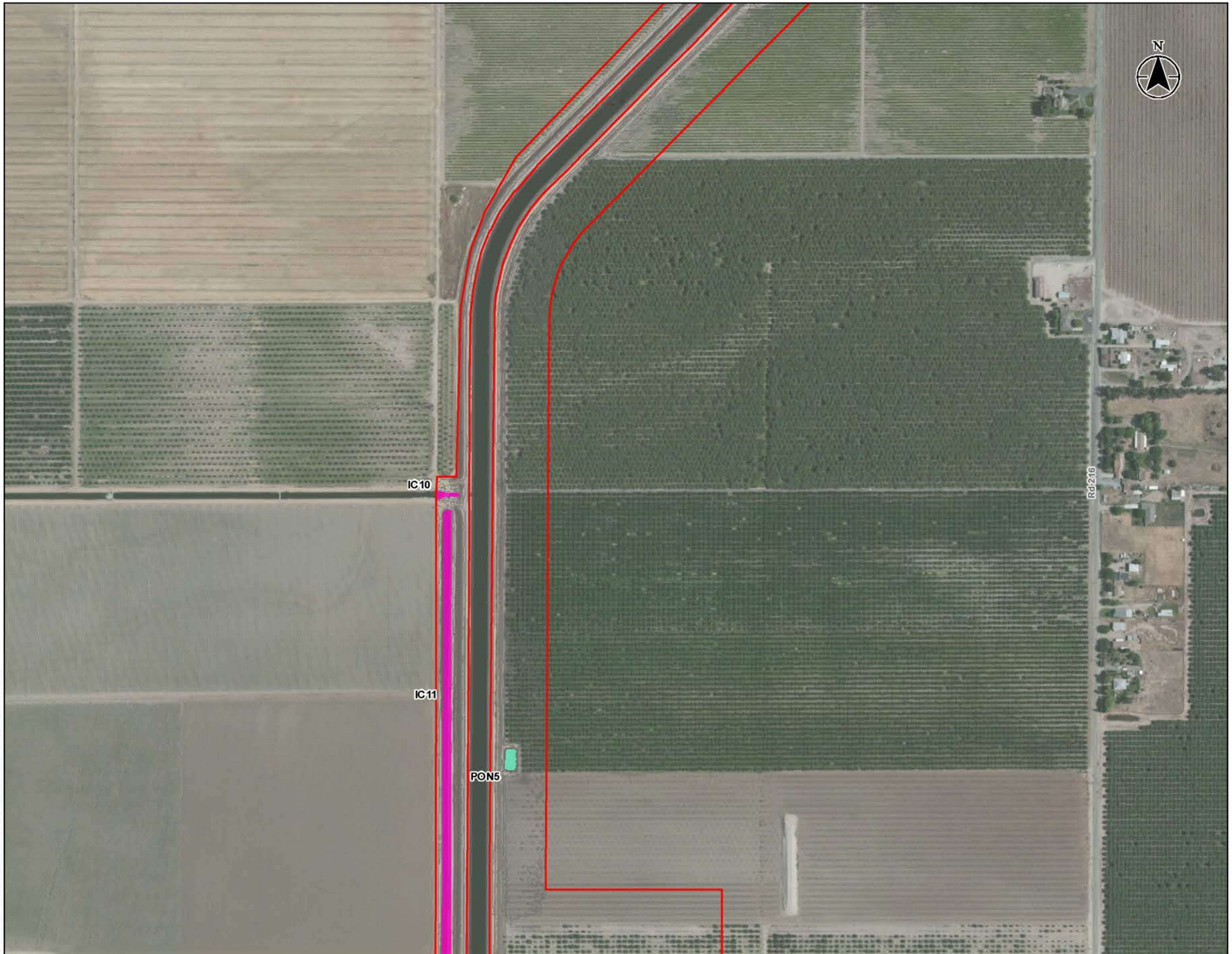

Figure No.
3k

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
- Intermittent Stream (2.114 acres, 2,294 linear feet)
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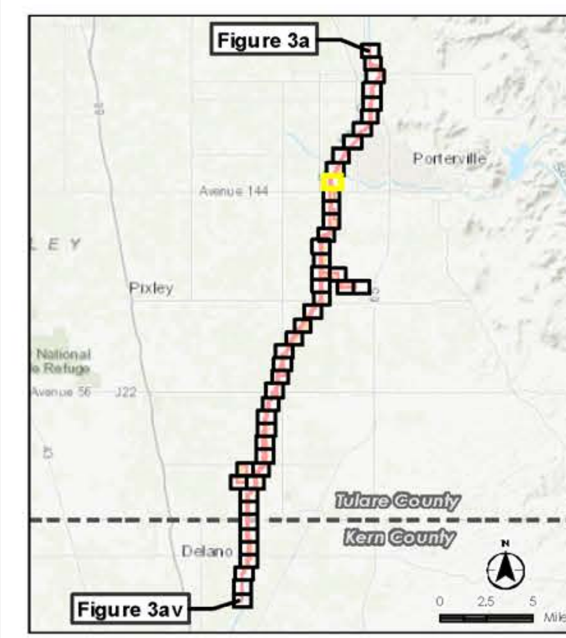
- Riparian Wetland (1.874 acres)
- Seasonal Wetland (0.355 acre)



Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec

Friant
WATER AUTHORITY

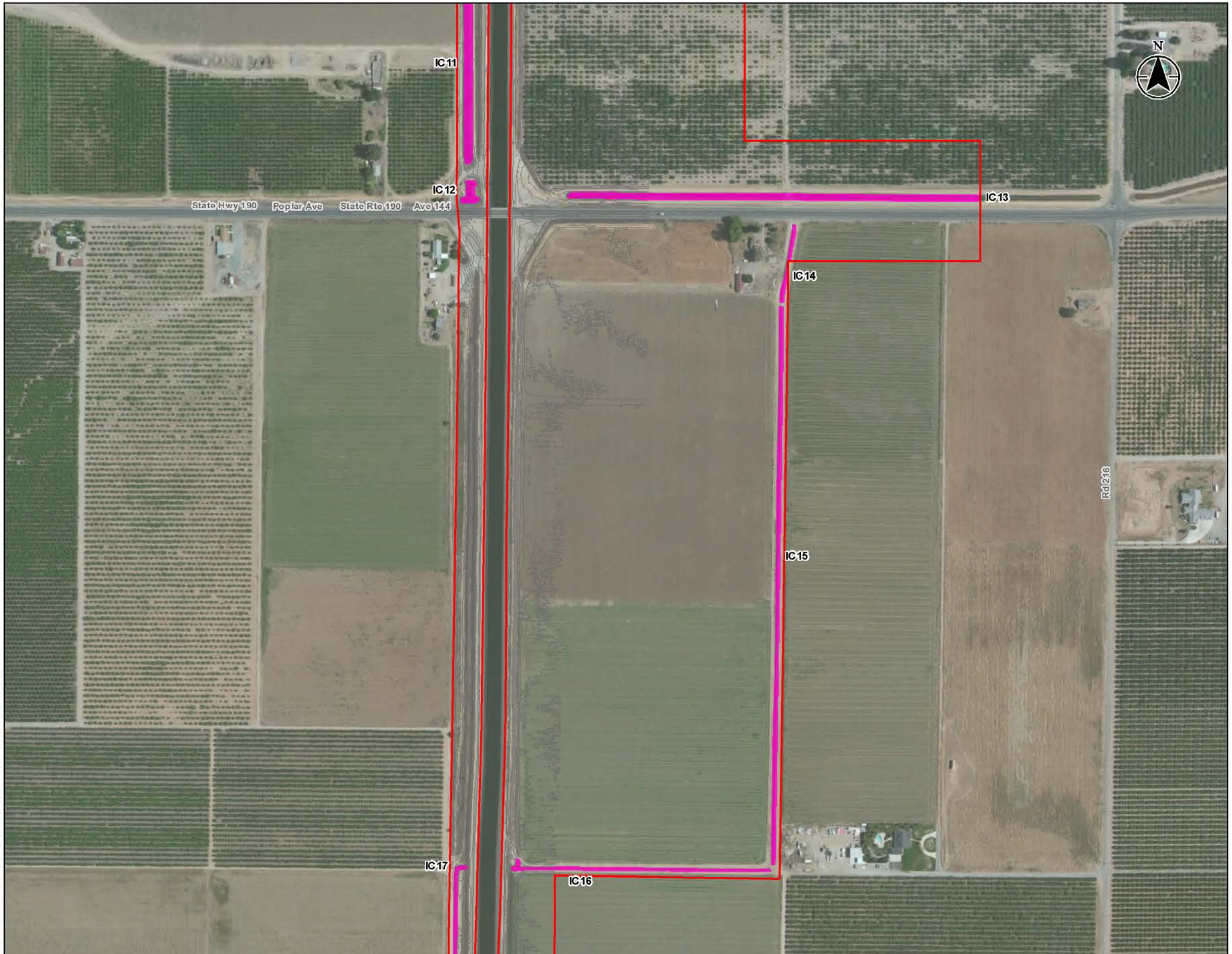


Figure No.
3l

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
- Intermittent Stream (2.114 acres, 2,294 linear feet)
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- Non-Vegetated Ditch (0.601 acre, 4,816 linear feet)
- Pond (5.799 acres)
- Riparian/Fresh Emergent Wetland Complex (0.011 acre)
- Riparian Wetland (1.874 acres)
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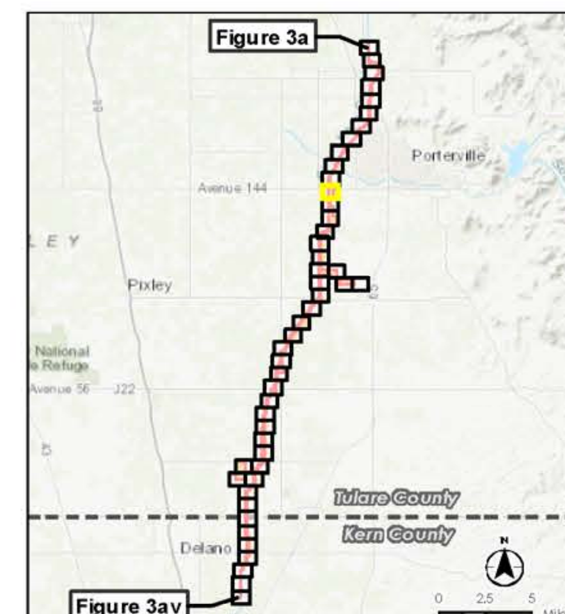


Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3m

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

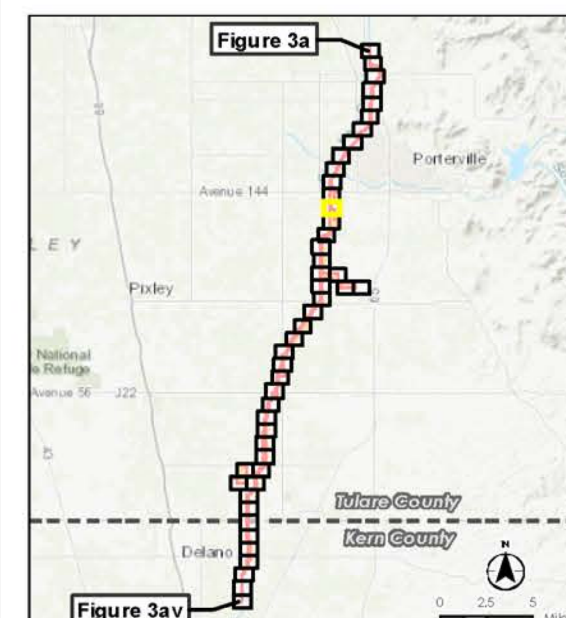
184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
- Intermittent Stream (2.114 acres, 2,294 linear feet)
- Irrigation Canal (4.650 acres, 12,229 linear feet)
- Non-Vegetated Ditch (0.601 acre, 4,816 linear feet)
- Pond (5.799 acres)
- Riparian/Fresh Emergent Wetland Complex (0.011 acre)
- Riparian Wetland (1.874 acres)
- Seasonal Wetland (0.355 acre)



Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3n

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location 184031016
Tulare and Kern Counties, California
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Contour
Ordinary High Water Mark
Culvert
Data Point
Map Reference Point

Excluded Features

Groundwater Recharge Basin (20.460 acres)
Intermittent Stream (2.114 acres, 2,294 linear feet)
Irrigation Canal (4.650 acres, 12,229 linear feet)
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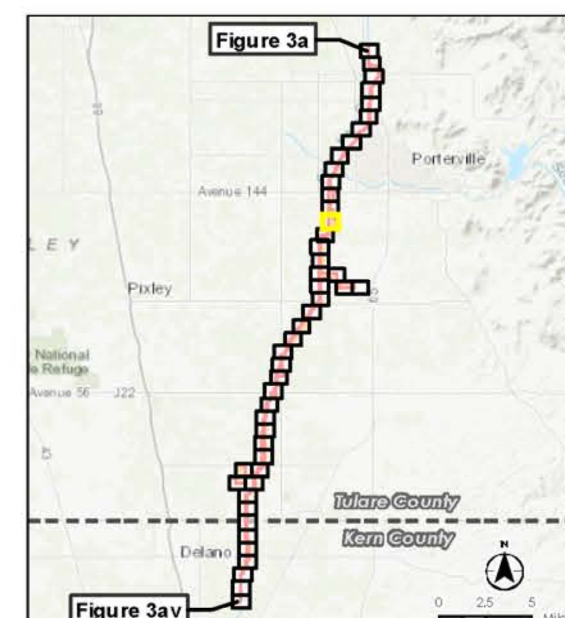

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3o

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
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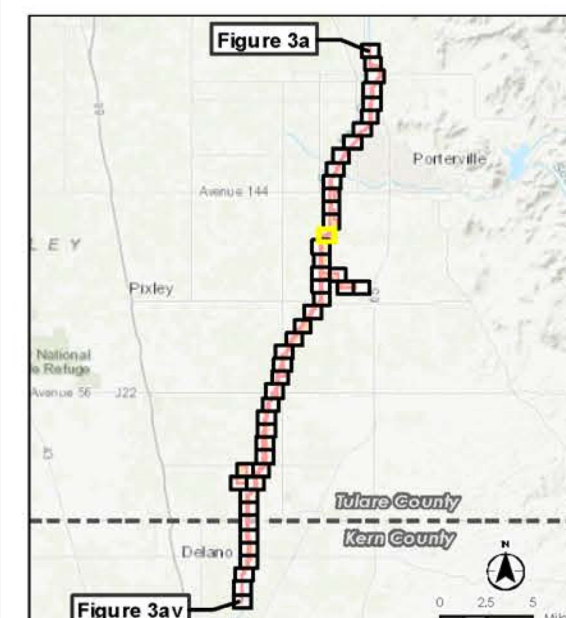

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3p

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
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1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
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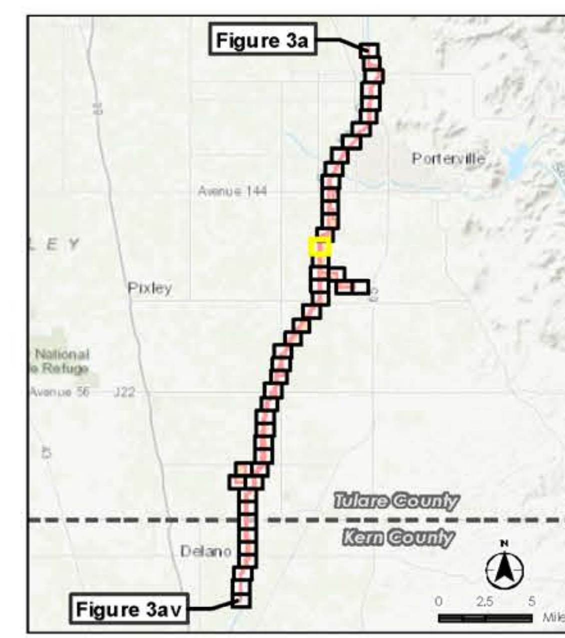

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Figure No.
3q

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Contour
Ordinary High Water Mark
Culvert
Data Point
Map Reference Point

Excluded Features

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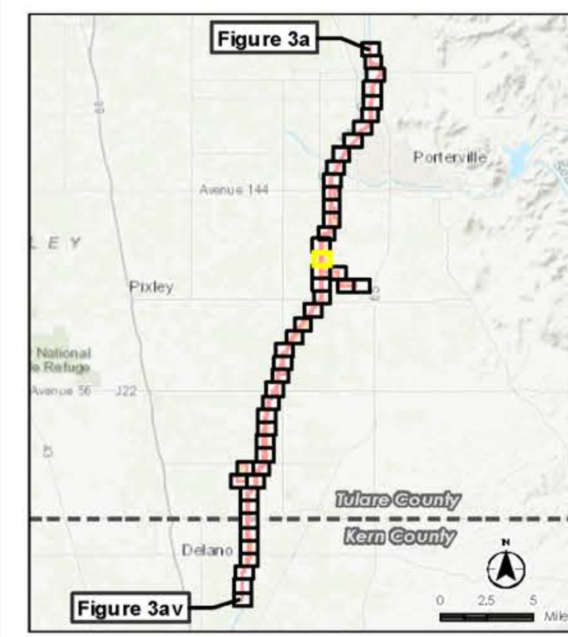

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

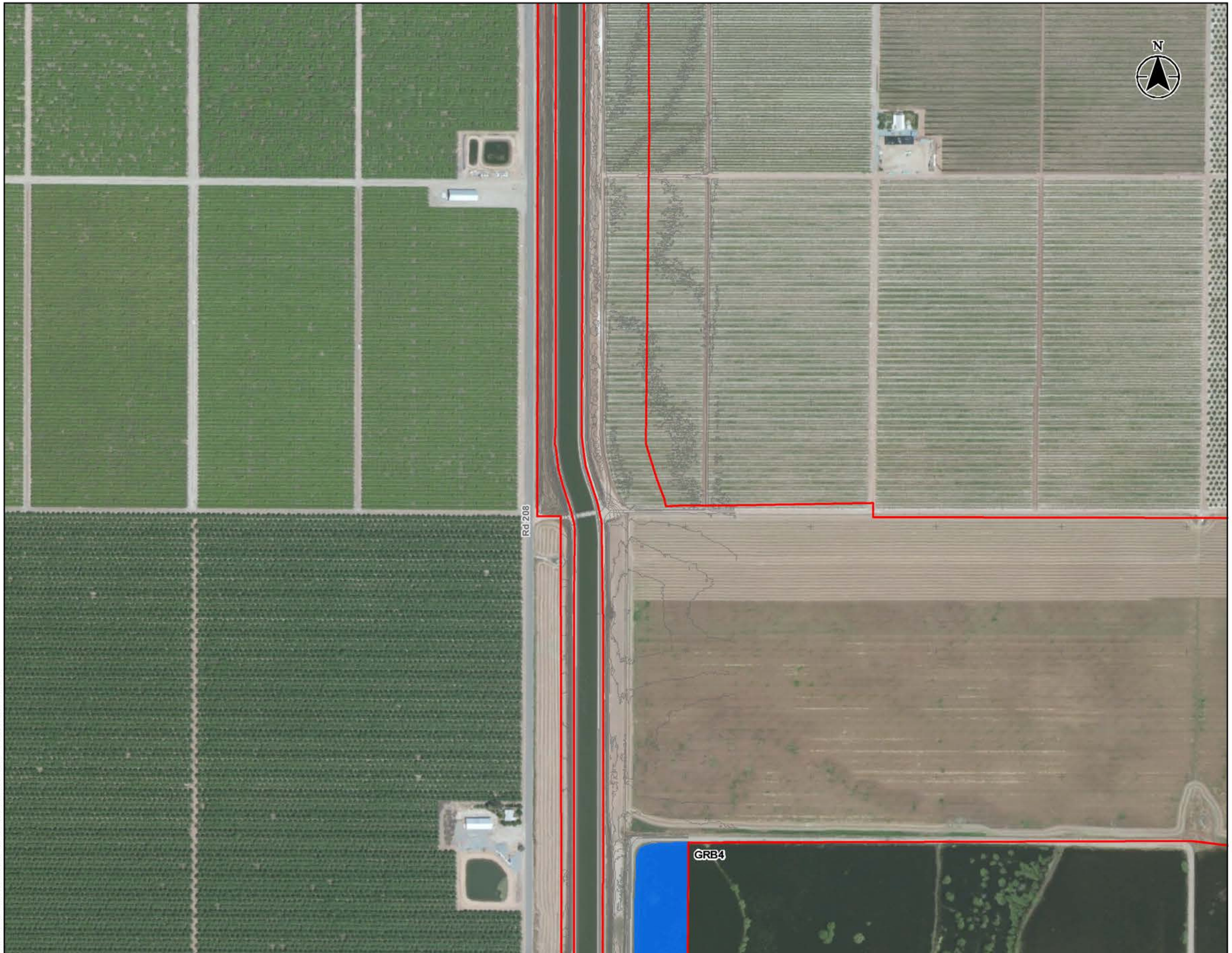

Figure No.
3r

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
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1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

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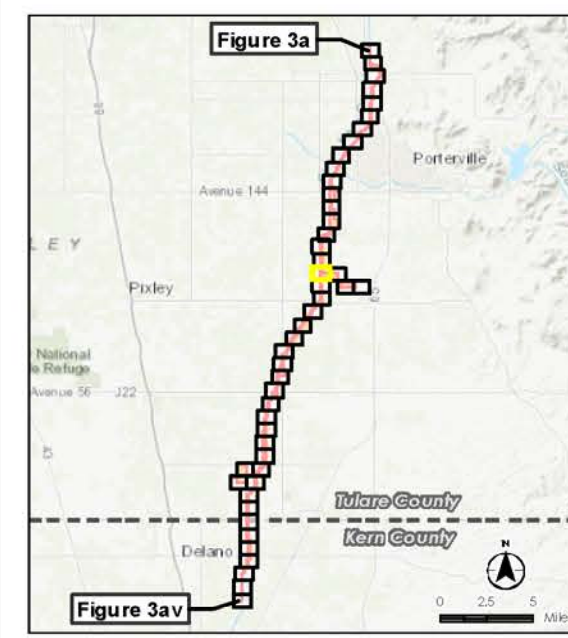

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3s

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet

0 400 800 Feet

1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

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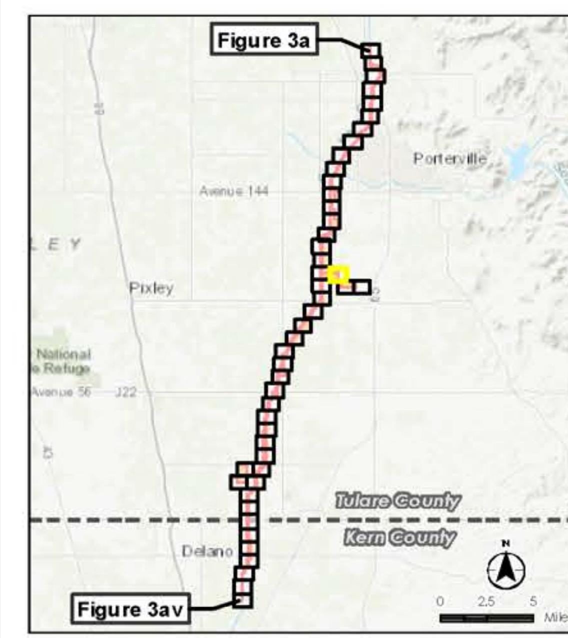

Notes

1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec Friant WATER AUTHORITY

Figure No.
3t

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

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- Culvert
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- Map Reference Point

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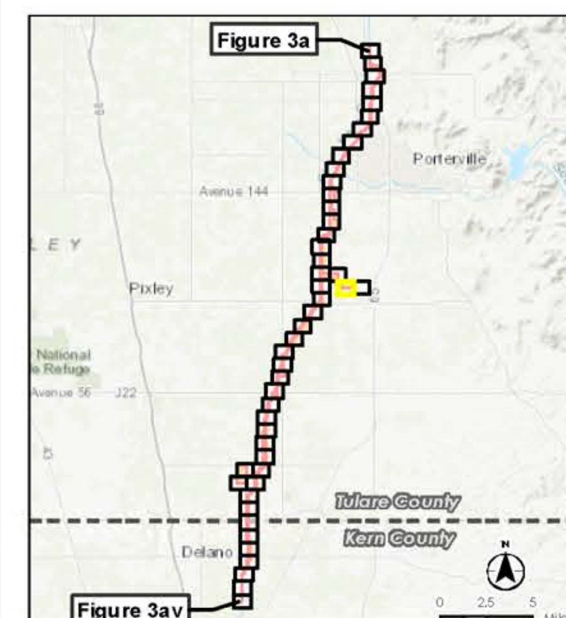

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec

Friant WATER AUTHORITY

Figure No.
3u

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Contour
Ordinary High Water Mark
Culvert
Data Point
Map Reference Point

Excluded Features

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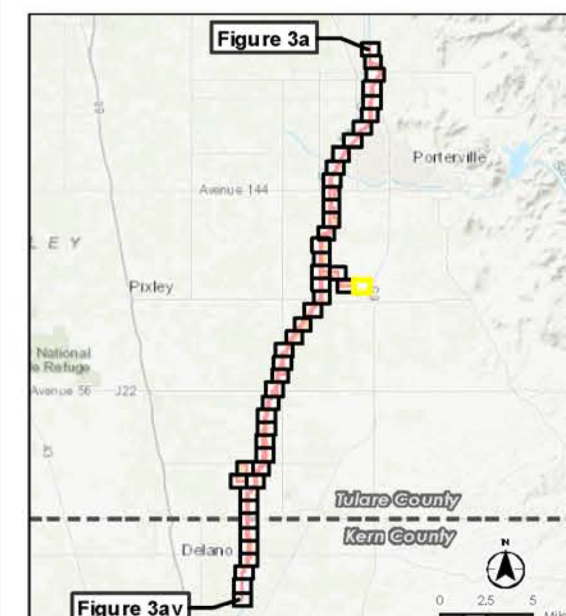

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

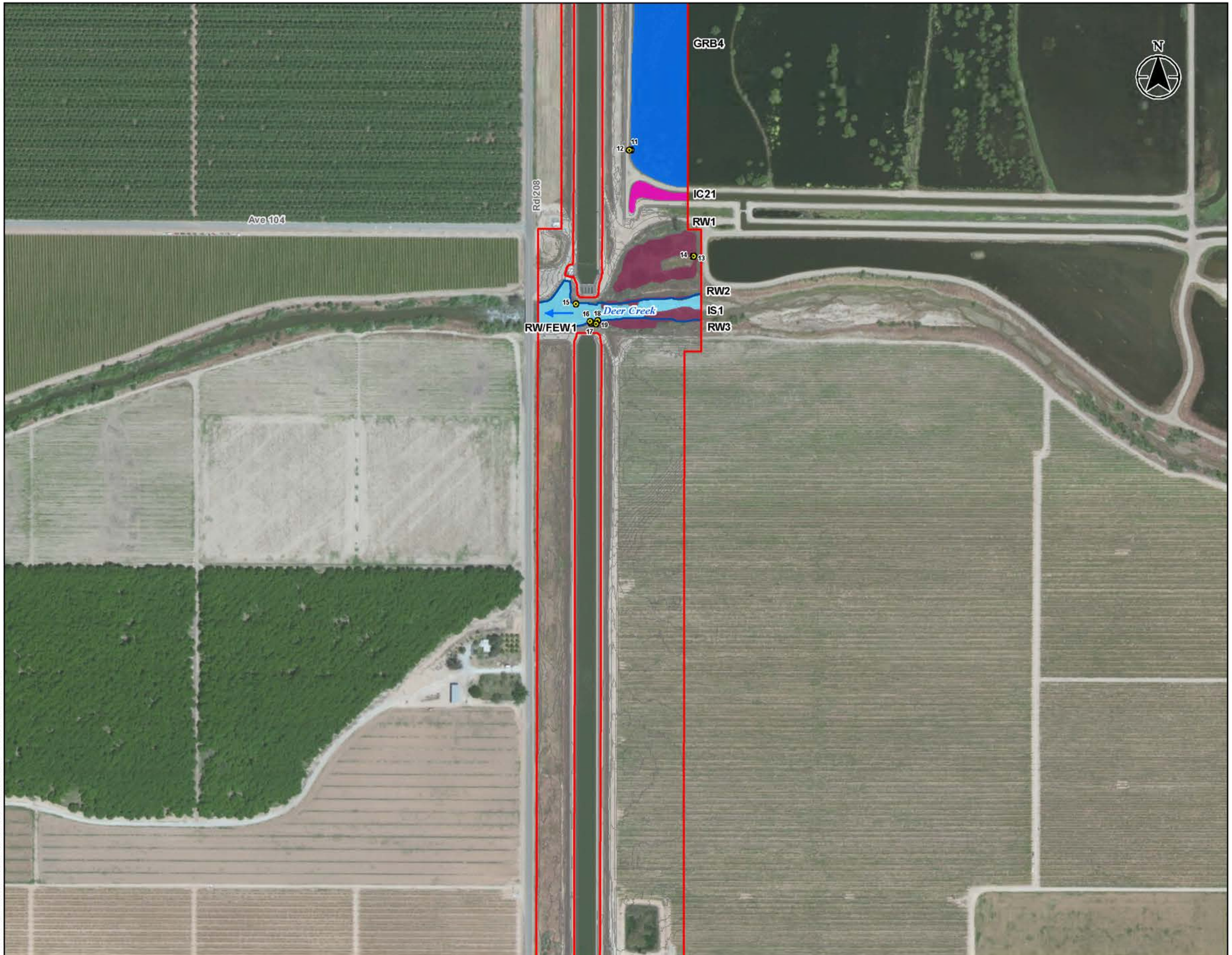

Figure No.
3v

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
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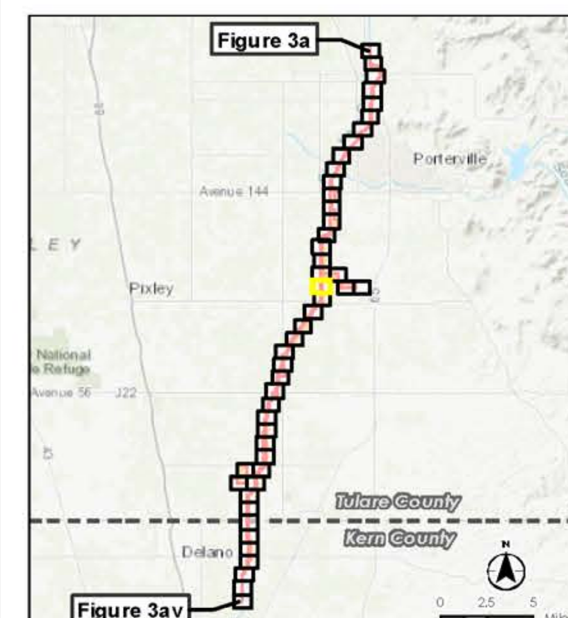

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec Friant WATER AUTHORITY

Figure No.
3w

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Contour
Ordinary High Water Mark
Culvert
Data Point
Map Reference Point

Excluded Features
Groundwater Recharge Basin (20.460 acres)
Intermittent Stream (2.114 acres, 2,294 linear feet)
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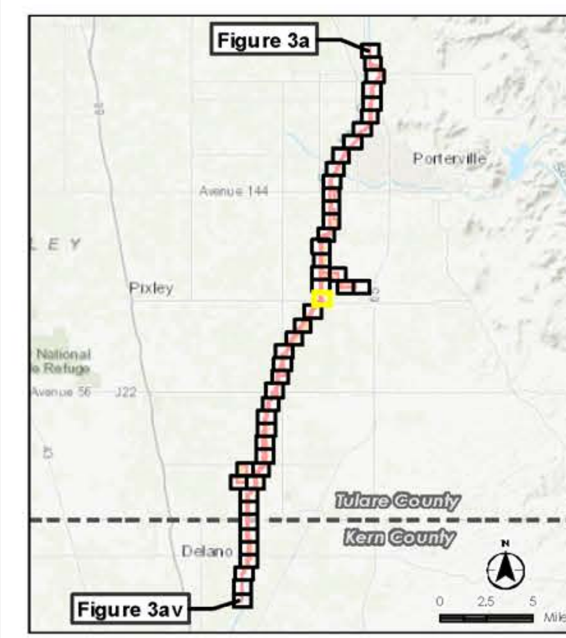

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3x

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Contour
Ordinary High Water Mark
Culvert
Data Point
Map Reference Point

Excluded Features

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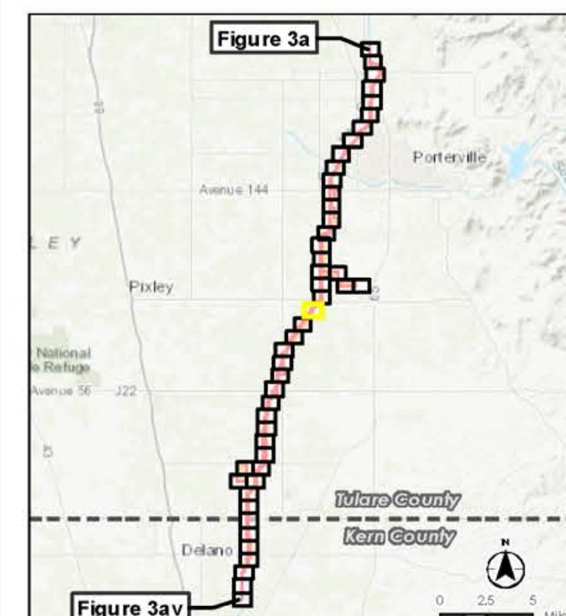

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3y

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
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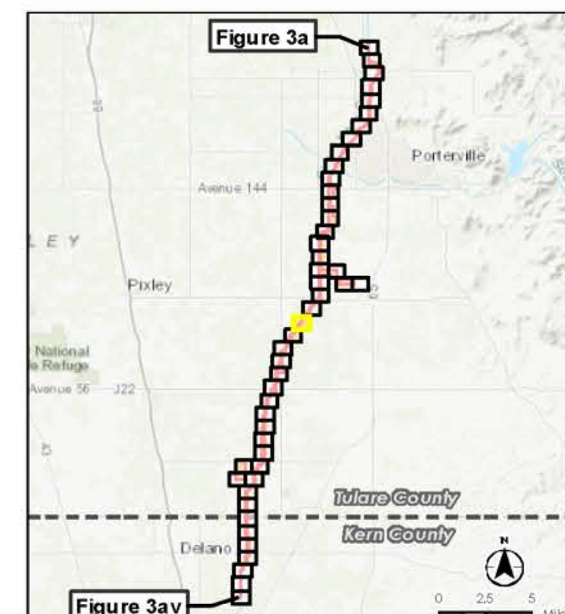

Notes

1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec

Friant WATER AUTHORITY

Figure No.
3z

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

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- Study Area (2,249.49 acres)
- Contour
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- Culvert
- Data Point
- Map Reference Point

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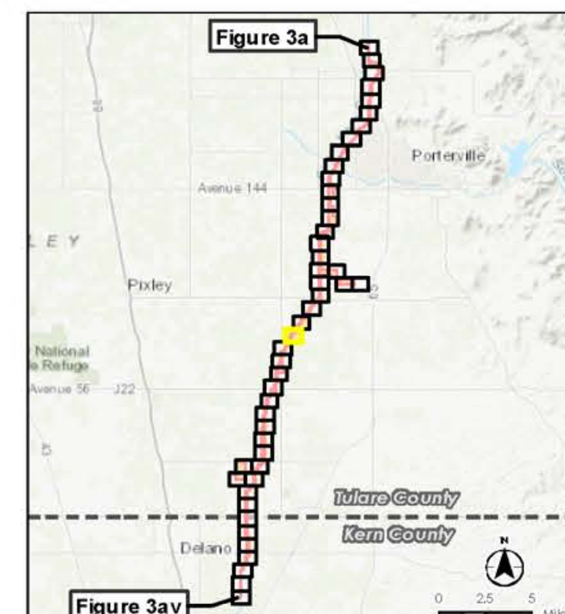

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.

3aa

Title

Excluded Features

Client/Project

Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location 184031016

Tulare and Kern Counties, California

Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet

0 400 800 Feet

1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
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Excluded Features

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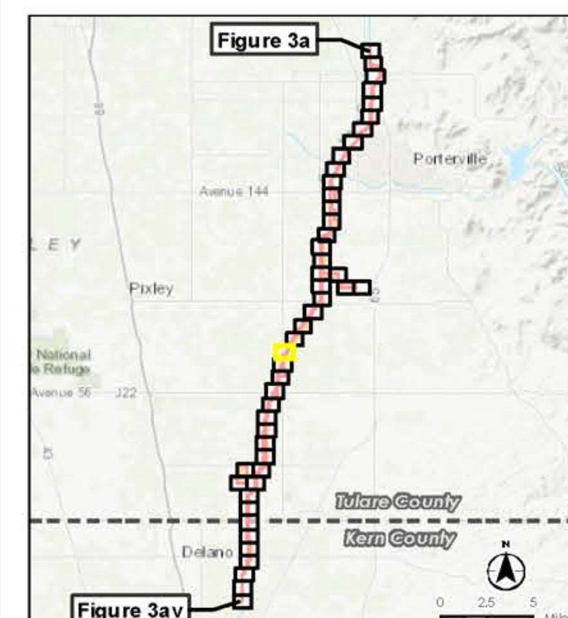

Notes

1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec

Friant WATER AUTHORITY

Figure No.
3ab

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
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1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Contour
Ordinary High Water Mark
Culvert
Data Point
Map Reference Point

Excluded Features

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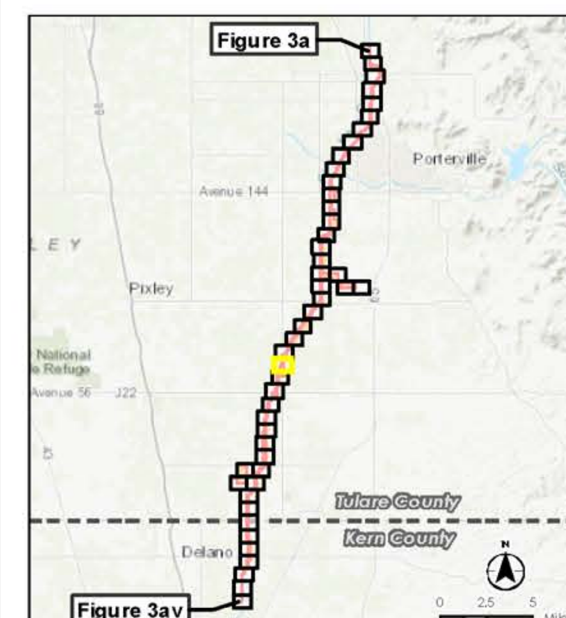

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

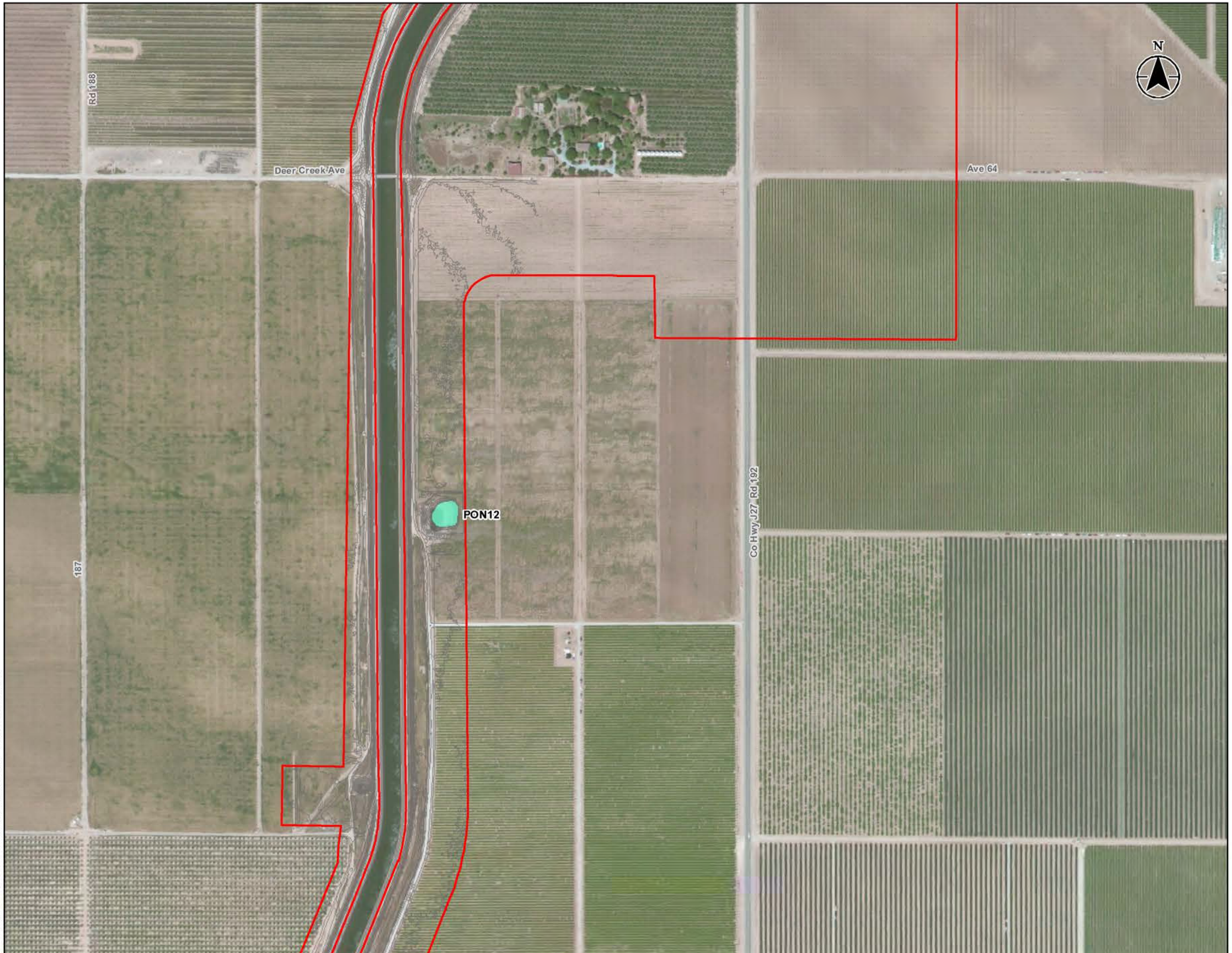

Figure No.
3ac

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016

Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

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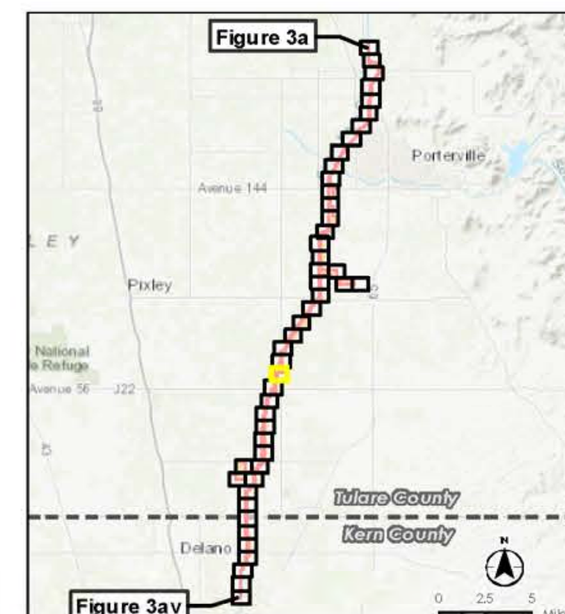

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec

Friant WATER AUTHORITY

Figure No.
3ad

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
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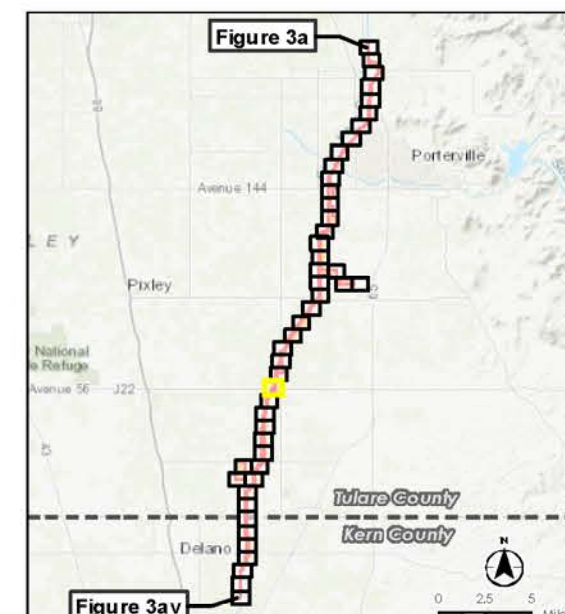

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3ae

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016

Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet

0 400 800 Feet

1:4,800 (At original document size of 11x17)

- Study Area (2,249.49 acres)
- Contour
- Ordinary High Water Mark
- Culvert
- Data Point
- Map Reference Point

Excluded Features

- Groundwater Recharge Basin (20.460 acres)
- Intermittent Stream (2.114 acres, 2,294 linear feet)
- Irrigation Canal (4.650 acres, 12,229 linear feet)
- Non-Vegetated Ditch (0.601 acre, 4,816 linear feet)
- Pond (5.799 acres)
- Riparian/Fresh Emergent Wetland Complex (0.011 acre)
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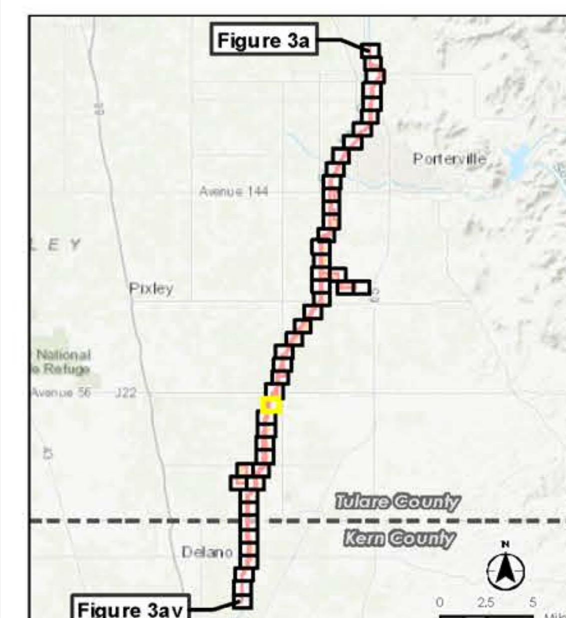

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec

Friant WATER AUTHORITY

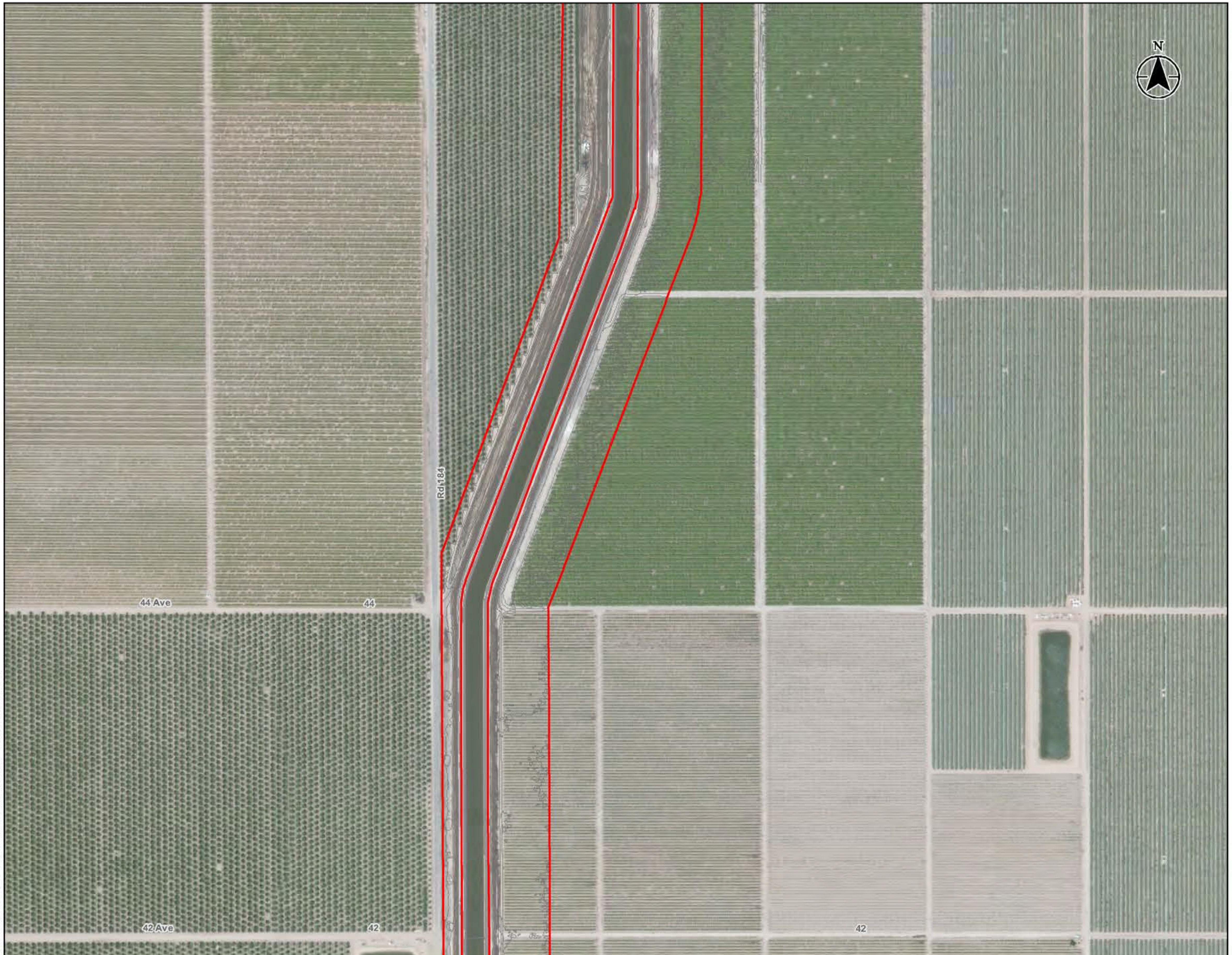

Figure No.
3af

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
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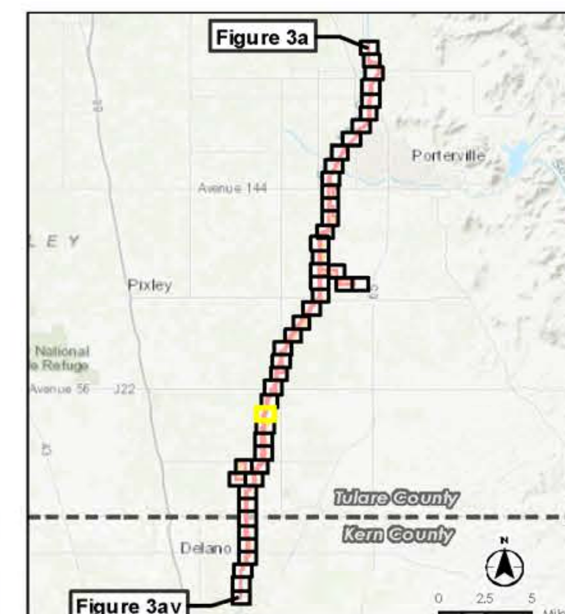

Notes
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Stantec
Friant WATER AUTHORITY

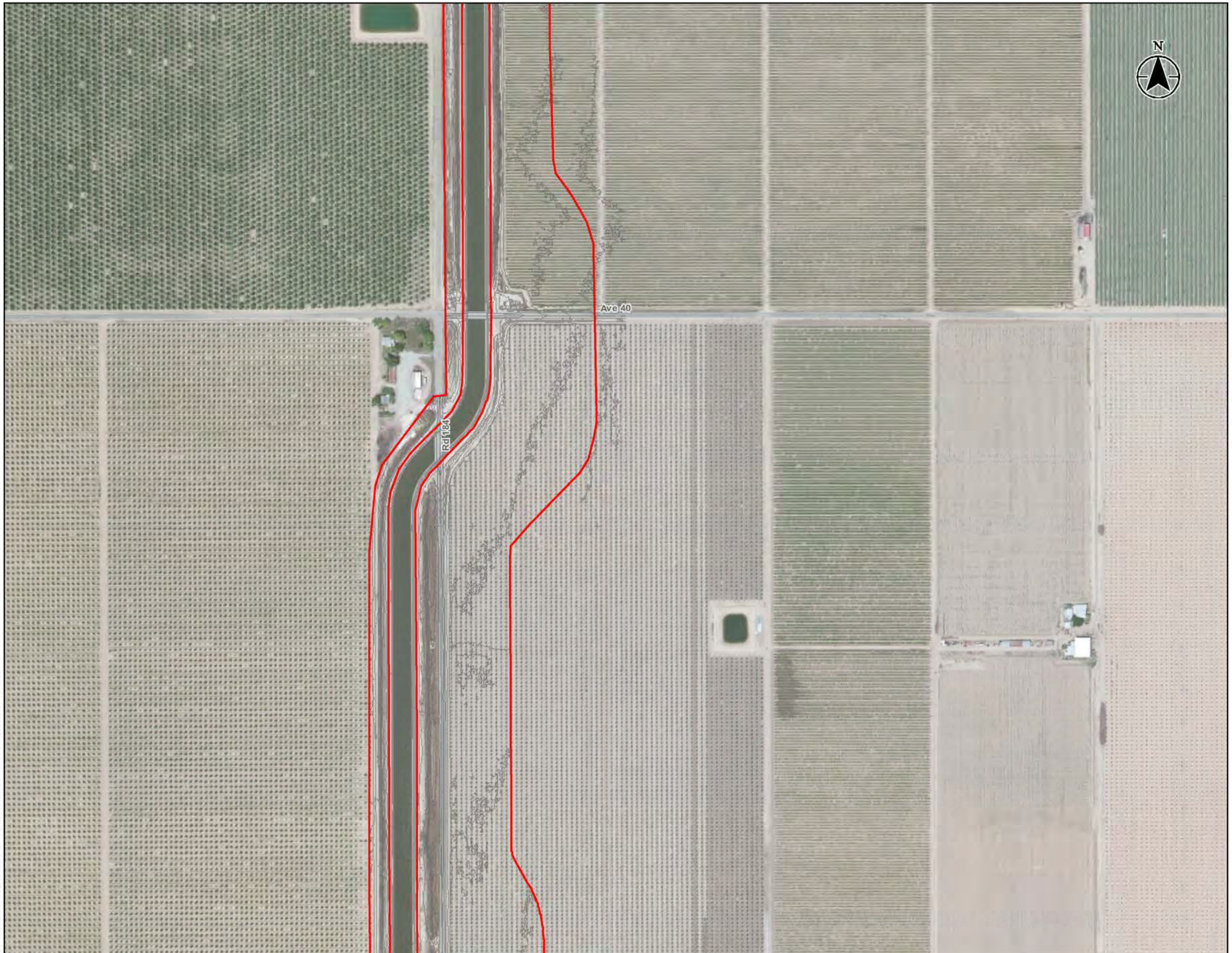

Figure No.

3ag

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Excluded Features

Client/Project

Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location

Tulare and Kern Counties, California

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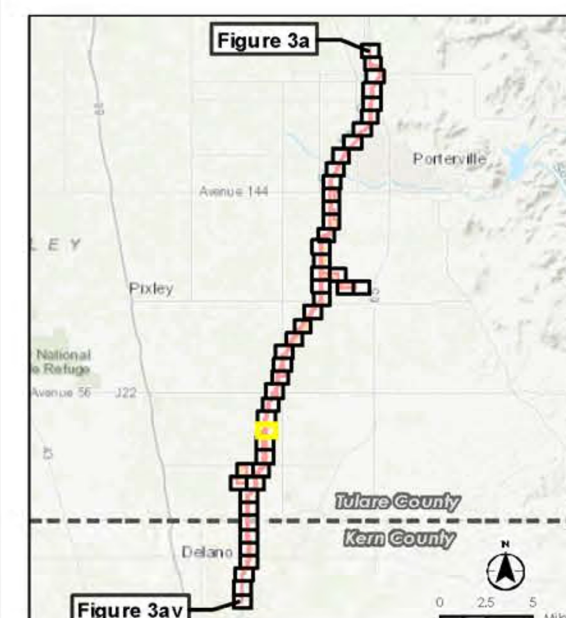

Notes

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Stantec

Friant WATER AUTHORITY

Figure No.
3ah

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Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

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Tulare and Kern Counties, California

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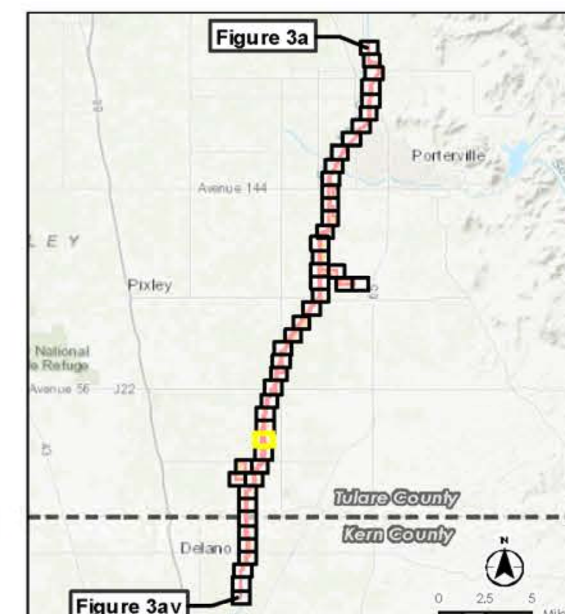

Notes
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Stantec

Friant WATER AUTHORITY

Figure No.
3ai

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Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
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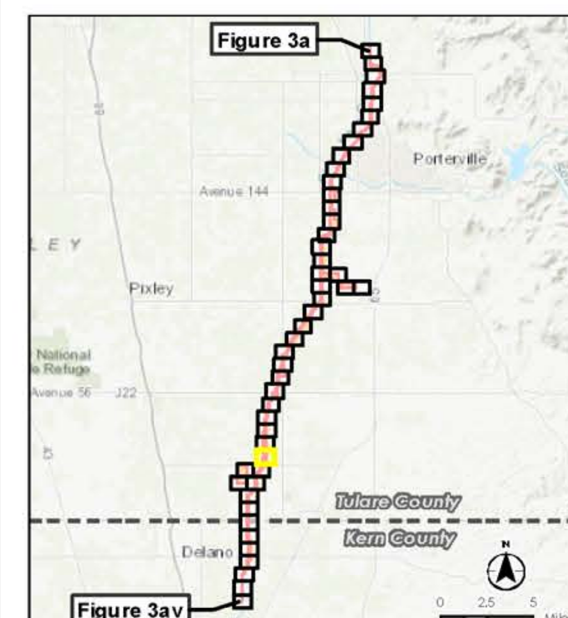

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Stantec
Friant WATER AUTHORITY

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3aj

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Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

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Tulare and Kern Counties, California

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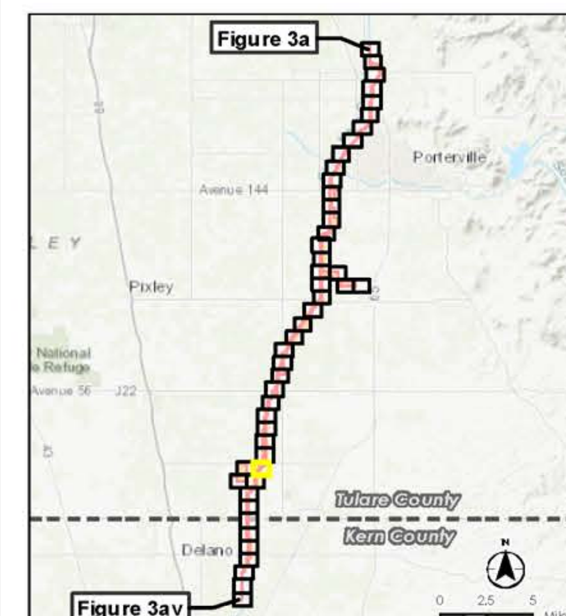

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Stantec
Friant WATER AUTHORITY

Figure No.
3ak

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
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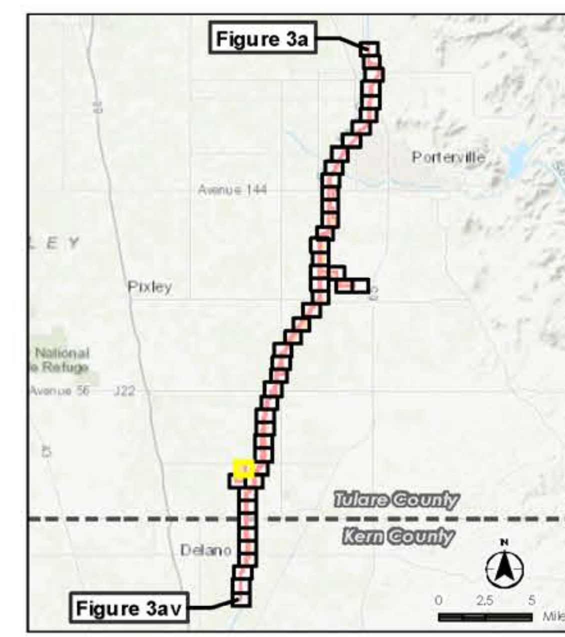

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
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Stantec
Friant WATER AUTHORITY

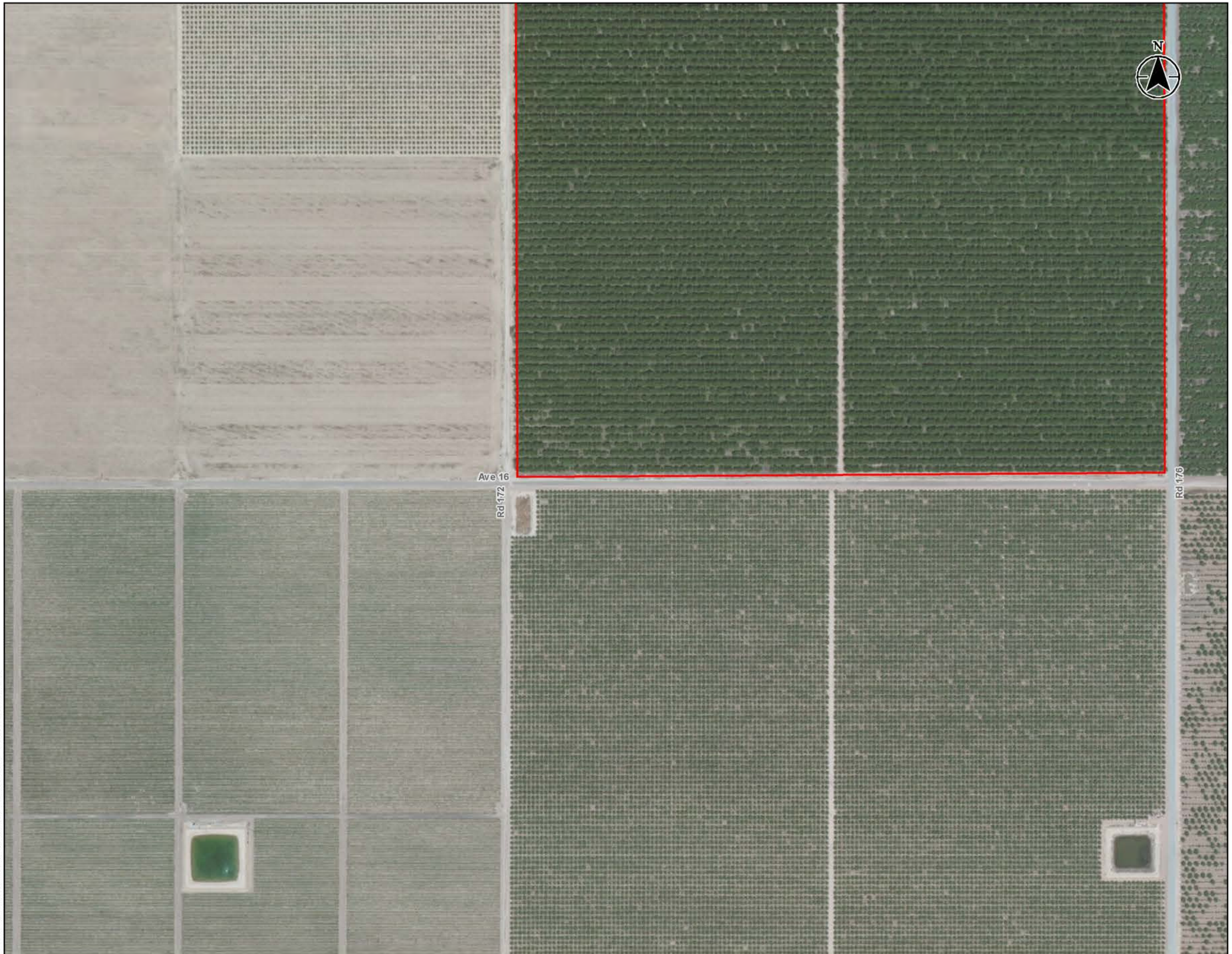

Figure No.
3al

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
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Study Area (2,249.49 acres)
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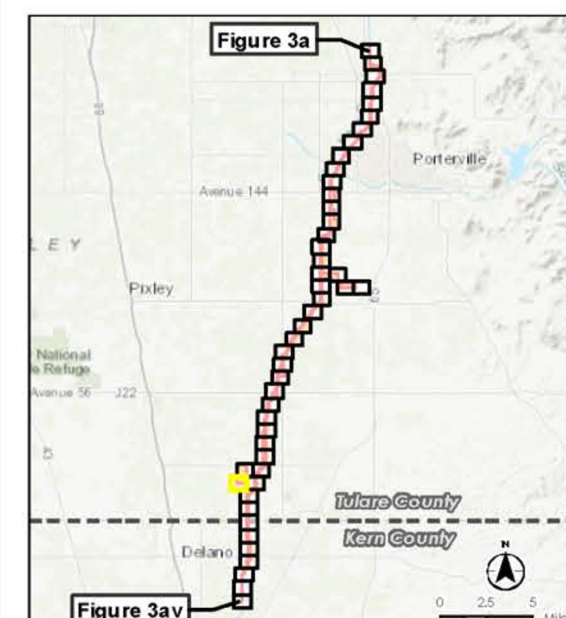

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Figure No.
3am

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
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Study Area (2,249.49 acres)
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Map Reference Point

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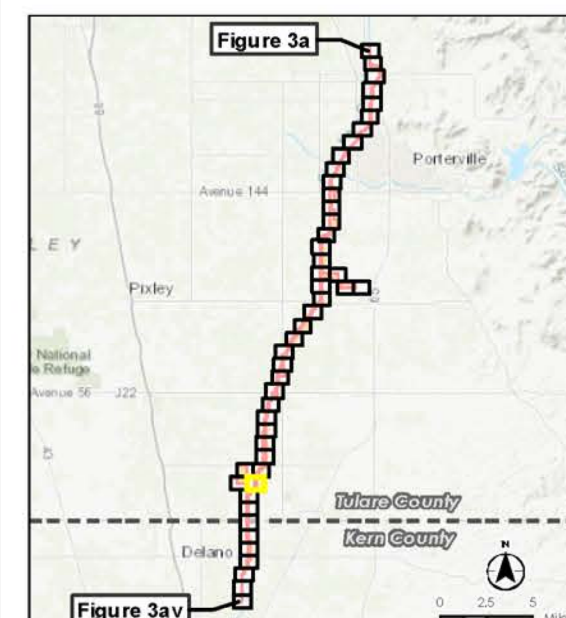

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec

Friant WATER AUTHORITY

Figure No.
3an

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
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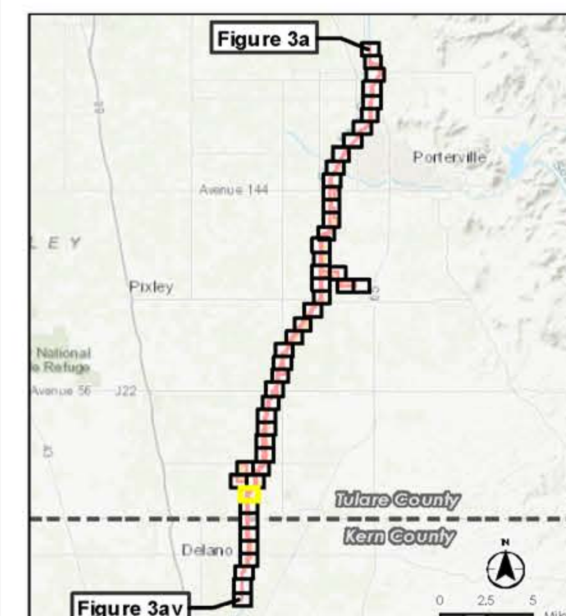

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

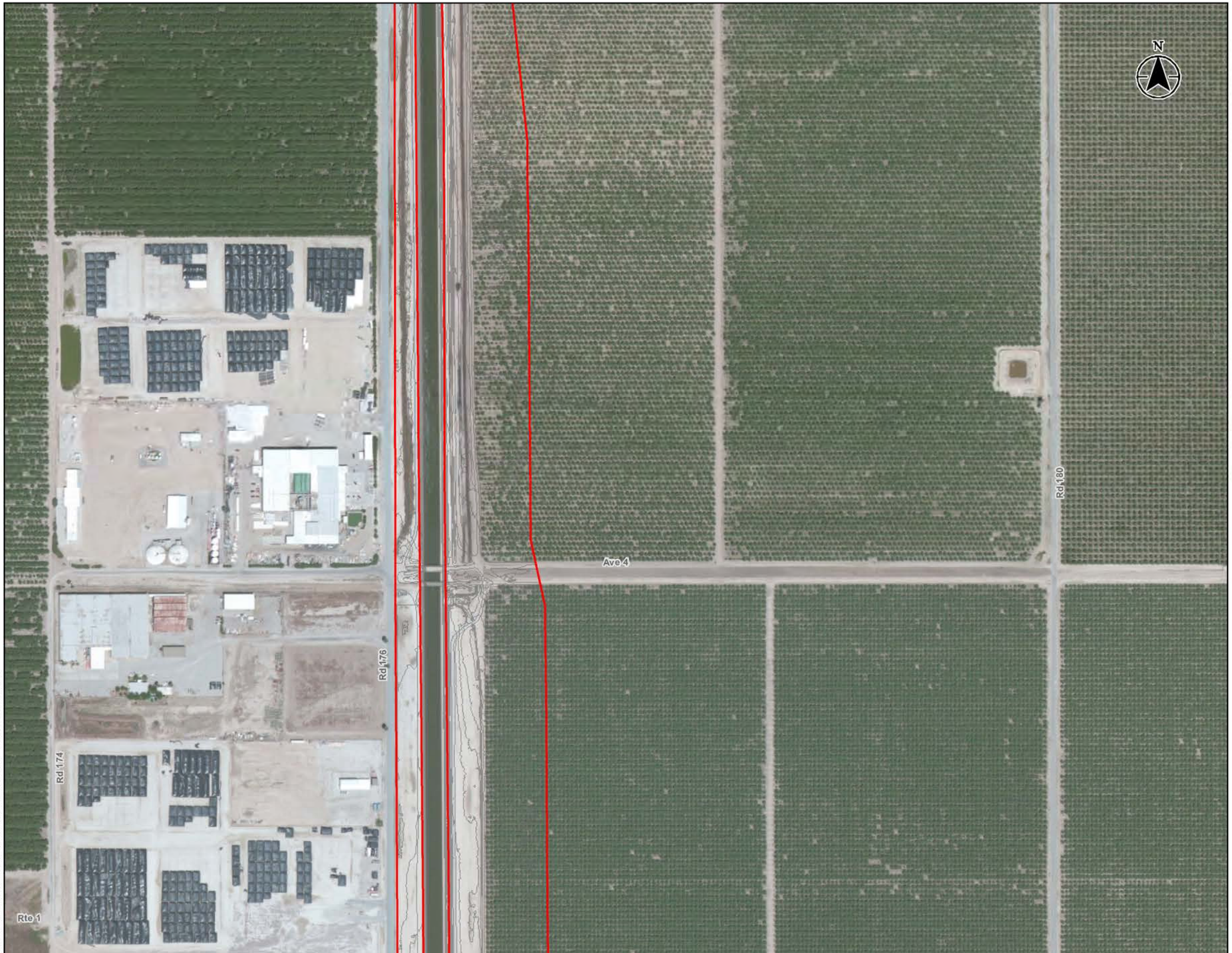

Figure No.
3ao

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
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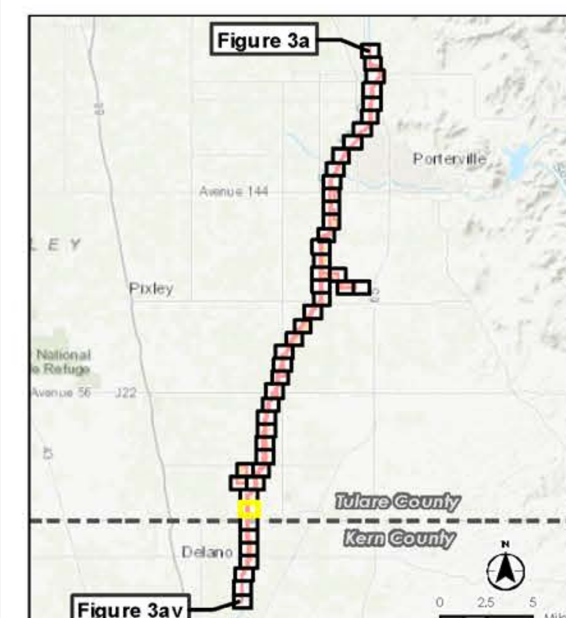

Notes
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Stantec
Friant WATER AUTHORITY

Figure No.
3ap

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location 184031016
Tulare and Kern Counties, California
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

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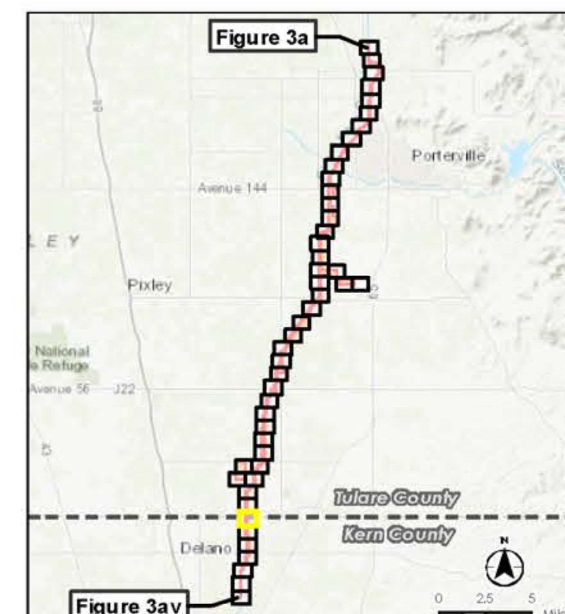

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Stantec

Friant WATER AUTHORITY

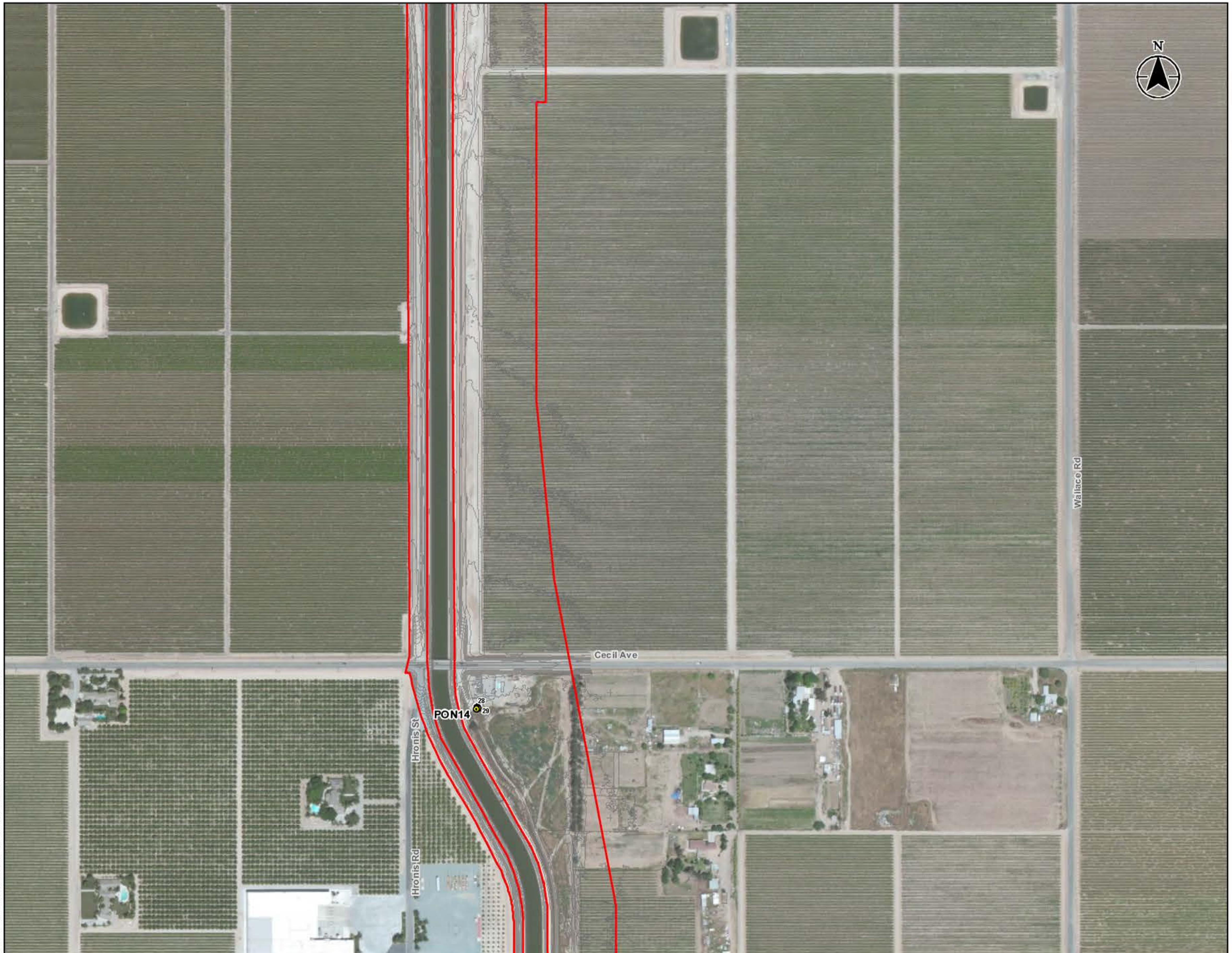

Figure No.
3aq

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
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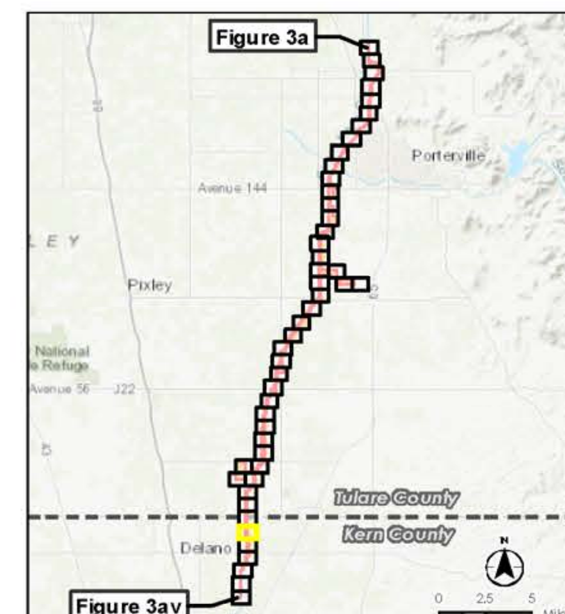

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
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Stantec Friant WATER AUTHORITY

Figure No.
3ar

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Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

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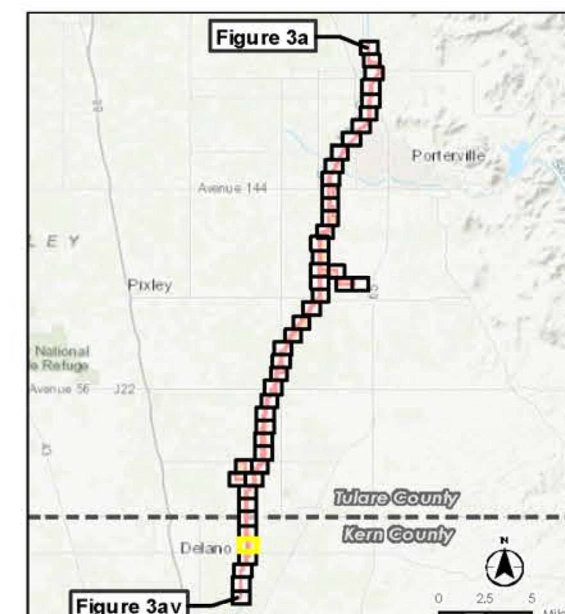

Notes
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Stantec
Friant WATER AUTHORITY

Figure No.
3as

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Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
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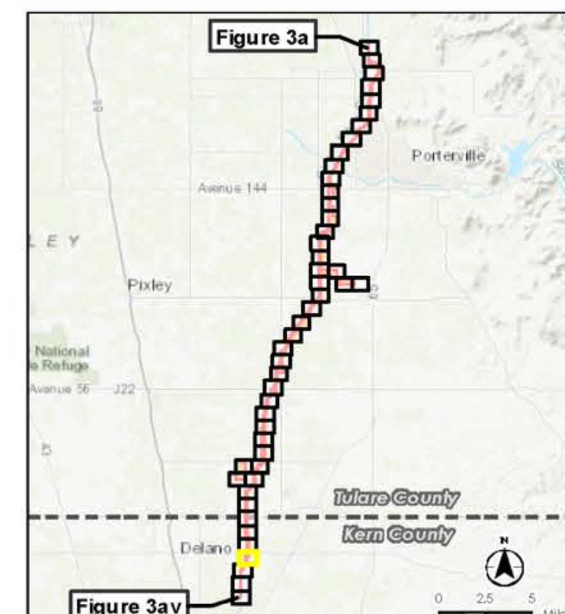

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Figure No.
3at

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Excluded Features

Client/Project
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Friant-Kern Canal Middle Reach Capacity Correction Project

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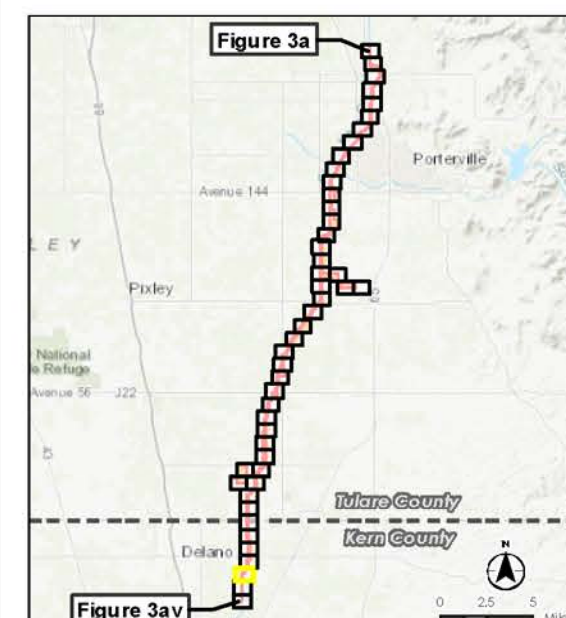

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Stantec
Friant WATER AUTHORITY

Figure No.
3au

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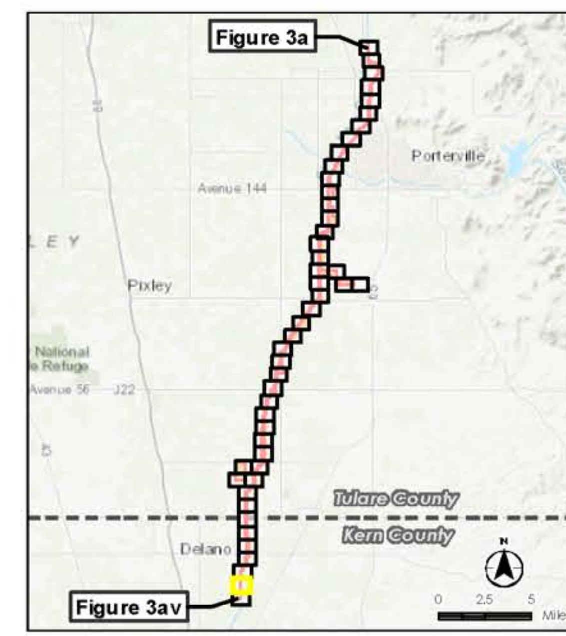
Excluded Features

Groundwater Recharge Basin (20.460 acres)
Intermittent Stream (2.114 acres, 2,294 linear feet)
Irrigation Canal (4.650 acres, 12,229 linear feet)
Non-Vegetated Ditch (0.601 acre, 4,816 linear feet)
Pond (5.799 acres)
Riparian/Fresh Emergent Wetland Complex (0.011 acre)
Riparian Wetland (1.874 acres)
Seasonal Wetland (0.355 acre)



Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

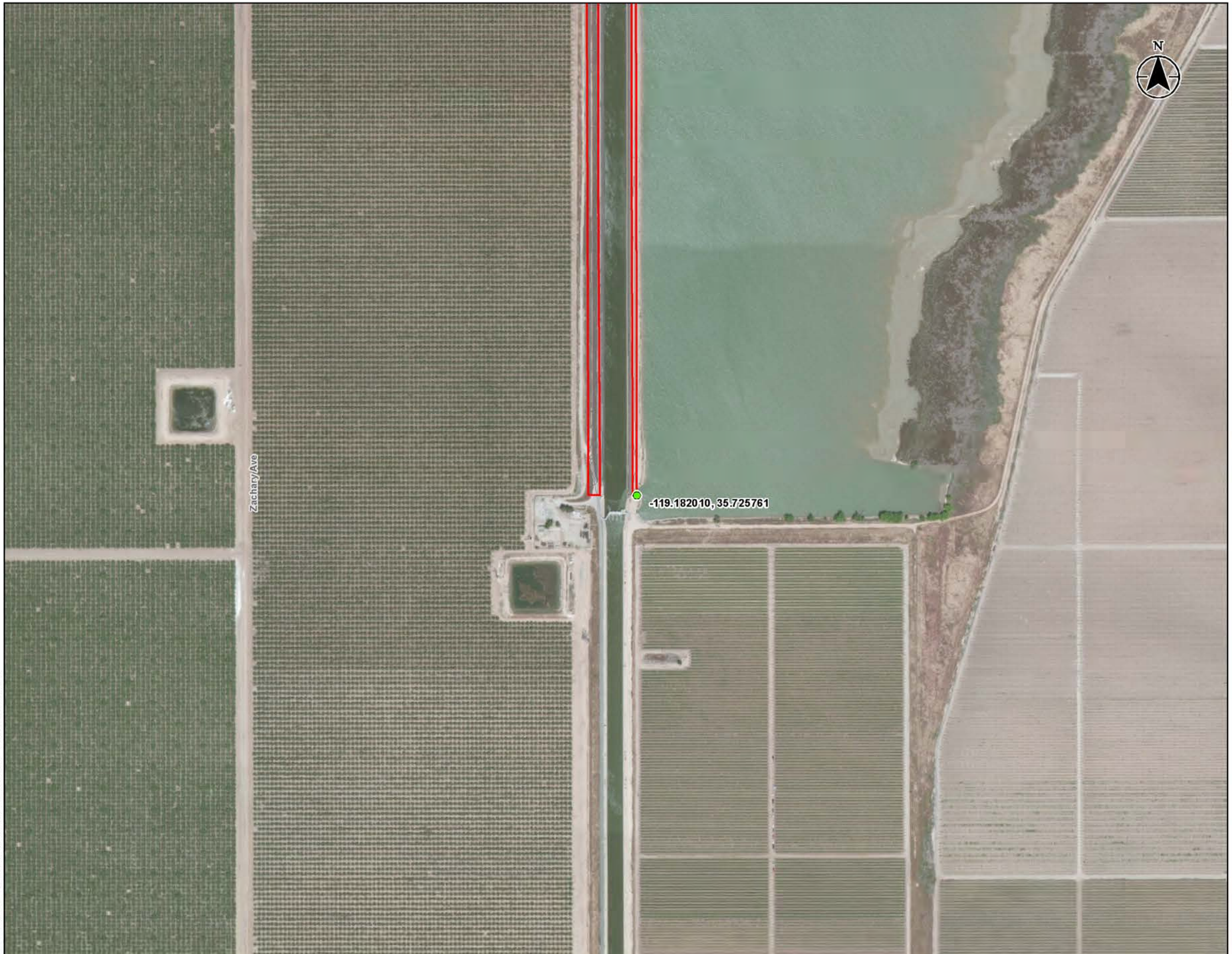


Figure No.
3av

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

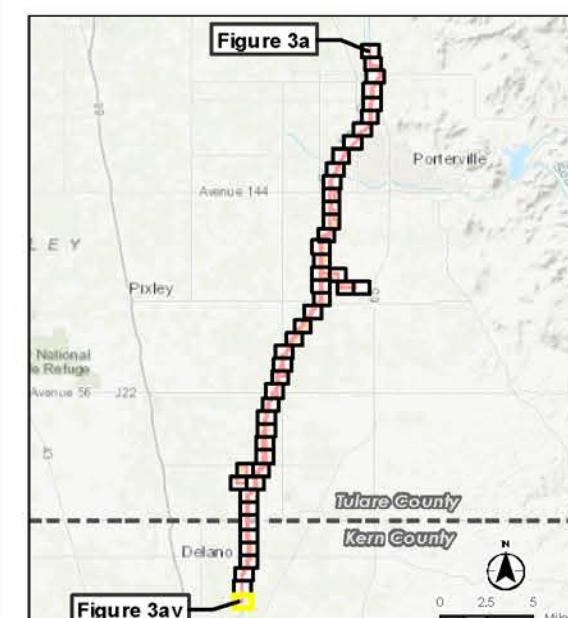
184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-15

1 inch = 400 feet
0 400 800 Feet
1:4,800 (At original document size of 11x17)

Study Area (2,249.49 acres)
Contour
Ordinary High Water Mark
Culvert
Data Point
Map Reference Point

Excluded Features

Groundwater Recharge Basin (20.460 acres)
Intermittent Stream (2.114 acres, 2,294 linear feet)
Irrigation Canal (4.650 acres, 12,229 linear feet)
Non-Vegetated Ditch (0.601 acre, 4,816 linear feet)
Pond (5.799 acres)
Riparian/Fresh Emergent Wetland Complex (0.011 acre)
Riparian Wetland (1.874 acres)
Seasonal Wetland (0.355 acre)



Notes

1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant Water Authority

Excluded Features							
ID	Type	Cowardin	Longitude (DD)	Latitude (DD)	Area (ac)	Length (ft)	Width (ft)
GRB1	Groundwater Recharge Basin	L2US	-119.089545	36.070467	2.080	--	--
GRB2	Groundwater Recharge Basin	L2US	-119.091220	36.067747	4.128	--	--
GRB3	Groundwater Recharge Basin	PUB	-119.096421	36.027676	8.461	--	--
GRB4	Groundwater Recharge Basin	RP2EM	-119.105666	35.980841	5.791	--	--
	Subtotal				20.460		
IS1	Intermittent Stream	R4SB	-119.106475	35.977875	1.079	653	20-186
IS2	Intermittent Stream	R4SB	-119.162894	35.843730	0.059	251	9-15
IS3	Intermittent Stream	R4SB	-119.162532	35.843767	0.172	449	9-38
IS4	Intermittent Stream	R4SB	-119.161395	35.843614	0.804	941	18-103
	Subtotal				2.114	2,294	
IC1	Irrigation Canal	R4SB	-119.058672	36.116219	0.185	271	23-33
IC2	Irrigation Canal	R4SB	-119.075284	36.089404	0.005	37	6
IC3	Irrigation Canal	R4SB	-119.075263	36.089301	0.009	39	2
IC4	Irrigation Canal	R4SB	-119.074994	36.088712	0.076	219	15
IC5	Irrigation Canal	R4SB	-119.087104	36.075461	0.060	215	8-19
IC6	Irrigation Canal	R4SB	-119.087915	36.075644	0.016	77	7-11
IC7	Irrigation Canal	R4SB	-119.089616	36.072460	0.039	92	18
IC8	Irrigation Canal	R4SB	-119.093973	36.064357	0.037	77	9-26
IC9	Irrigation Canal	R4SB	-119.093195	36.063987	0.083	142	9-31
IC10	Irrigation Canal	R4SB	-119.097563	36.058508	0.029	84	7-29
IC11	Irrigation Canal	R4SB	-119.097539	36.054893	1.573	2,403	27
IC12	Irrigation Canal	R4SB	-119.097511	36.051396	0.080	87	29-71
IC13	Irrigation Canal	R4SB	-119.093346	36.051364	0.818	1,641	21
IC14	Irrigation Canal	R4SB	-119.093223	36.050617	0.078	315	13
IC15	Irrigation Canal	R4SB	-119.093358	36.047138	0.572	2,205	13
IC16	Irrigation Canal	R4SB	-119.095308	36.043991	0.215	1,030	6-46
IC17	Irrigation Canal	R4SB	-119.097711	36.042380	0.288	1,327	8
IC18	Irrigation Canal	R4SB	-119.097795	36.039739	0.091	522	2-16
IC19	Irrigation Canal	R4SB	-119.097933	36.035011	0.171	1,188	6
IC20	Irrigation Canal	R4SB	-119.097942	36.033068	0.010	25	18
IC21	Irrigation Canal	R4SB	119.105778	35.979141	0.215	233	21-8
	Subtotal				4.650	12,229	
NVD1	Non-Vegetated Ditch	R4SB	-119.057909	36.166778	0.016	352	2
NVD2	Non-Vegetated Ditch	R4SB	-119.057870	36.165629	0.027	585	2
NVD3	Non-Vegetated Ditch	R4SB	119.095491	36.026562	0.481	2,542	6-12
NVD4	Non-Vegetated Ditch	R4SB	-119.096906	36.024931	0.023	404	2.5
NVD5	Non-Vegetated Ditch	R4SB	-119.097185	36.023401	0.054	933	2.5
	Subtotal				0.601	4,816	
PON1	Pond	PUB	-119.054041	36.150310	0.011	--	--
PON2	Pond	PUB	-119.049006	36.144792	0.018	--	--
PON3	Pond	PUB	-119.056430	36.127339	0.005	--	--
PON4	Pond	PUB	-119.092367	36.054466	0.429	--	--
PON5	Pond	PEM	-119.096677	36.055603	0.087	--	--
PON6	Pond	PEM	-119.096752	36.031350	0.315	--	--
PON7	Pond	PUB	-119.097080	36.025109	0.287	--	--
PON8	Pond	PEM	-119.112790	35.960401	0.011	--	--
PON9	Pond	PUB	-119.143141	35.922130	1.829	--	--
PON10	Pond	PUB	-119.142931	35.920996	0.091	--	--
PON11	Pond	PUB	119.144047	35.920088	0.006	--	--
PON12	Pond	PUB	-119.147799	35.902662	0.210	--	--
PON13	Pond	PUB	-119.158117	35.877180	0.098	--	--
PON14	Pond	PEM	-119.177603	35.775491	0.004	--	--
PON15	Pond	PUB	-119.094463	36.064002	0.007	--	--
PON16	Pond	PEM	119.184055	35.827421	2.391		
	Subtotal				5.799		
RW/FEW1	Riparian/Fresh Emergent Wetland Complex	RP1SS	-119.106638	35.977735	0.011	--	--
	Subtotal				0.011		
RW1	Riparian Wetland	RP2SS	-119.105686	35.978399	1.113		
RW2	Riparian Wetland	RP1FO	-119.105898	35.977978	0.141	--	--
RW3	Riparian Wetland	RP1FO	-119.105728	35.977773	0.442	--	--
RW4	Riparian Wetland	RP1EM	-119.162525	35.843800	0.046	--	--
RW5	Riparian Wetland	RP1EM	-119.162530	35.843721	0.088	--	--
RW6	Riparian Wetland	RP1FO	-119.162140	35.843688	0.015	--	--
RW7	Riparian Wetland	RP1SS	-119.160365	35.843545	0.028	--	--
	Subtotal				1.874		
SW1	Seasonal Wetland	PEM	-119.048196	36.144235	0.355	--	--
	Subtotal				0.355		
	Total of Excluded Features				35.864	19,339	

Figure No.
3-Table

Title
Excluded Features

Client/Project
Friant Water Authority
Friant-Kern Canal Middle Reach Capacity Correction Project

Project Location
Tulare and Kern Counties, California

184031016
Prepared by TM on 2020-01-02
Revised by SP on 2020-01-16

Notes
1. Coordinate System: NAD 1983 StatePlane California IV FIPS 0404 Feet
2. Orthoimagery: ESRI World Imagery (Clarity), 2019

Stantec
Friant WATER AUTHORITY

Appendix B ROUTINE WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Friant-Kern Canal   City/County: Tulare County   Sampling Date: 9/30/2019

Applicant/Owner: Friant   State: California   Sampling Point 1   Feature ID: Upland

Investigator(s): G. Youngblood, C. Femino   Section, Township, Range: Sec. 28, T20S, R27E

Local relief (hillside, terrace, etc.): shallow depression   Local Relief (concave, convex, none): Concave   Slope (%): 1

Subregion (LRR): Mediterranean California (I   Lat: 36.162844   Long: -119.058072   Datum: NAD83

Soil Map Unit Name: San Joaquin loam, 0 to 2 percent slopes (154)   NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed?   Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N , Soil N , or Hydrology N naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		x
Hydric Soil Present?		
Wetland Hydrology Present?	x	

Is the Sampled Area within a Wetland? Yes ___ No x

Evaluation of features designated "Other Waters"

Characteristics: Type: ___ Width: ___ Substrate: ___

Indicators: Defined bed and bank: ___ Scour ___ OHWM Mapped ___

Feature Designation: Perennial ___ Intermittent ___ Ephemeral ___

Natural Drainage ___ Artificial Drainage ___ Navigable Water ___

Remarks: Depression which receives outflow from canal and dissipates to ground. May also pond from rainfall, but does not support vegetation.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1				
2				
3				
4				
		0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1				
2				
3				
4				
5				
		0	= Total Cover	
Herb Stratum (Plot size:)				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
		0	= Total Cover	
Woody Vine Stratum (Plot size:)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb 25   % Cover of Biotic 75

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: #DIV/0! (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	0	(A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
No 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes ___ **No** X

Remarks: No vegetation present

SOIL Sampling Point 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (**LRR C**)
- 1 cm Muck (A9) (**LRR D**)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- 1 cm Muck (A9) (**LRR C**)
- 2 cm Muck (A10) (**LRR B**)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? Yes ___ No ___

Remarks: No soils pit potential utilities

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1) (**Nonriverine**)
- Sediment Deposits (B2) (**Nonriverine**)
- Drift Deposits (B3) (**Nonriverine**)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- X Biotic Crust (B12)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water Marks (B1) (**Riverine**)
- Sediment Deposits (B2) (**Riverine**)
- Drift Deposits (B3) (**Riverine**)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?			
Saturation Present? (includes capillary fringe)			

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Biotic crust indicates long duration ponding.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Friant-Kern Canal   City/County: Tulare County   Sampling Date: 9/30/2019

Applicant/Owner: Friant   State: California   Sampling Point 2   Feature ID: NVD1

Investigator(s): G. Youngblood, C. Femino   Section, Township, Range: Sec. 28, T20S, R27E

Local relief (hillside, terrace, etc.): Ditch   Local Relief (concave, convex, none): Concave   Slope (%): 1

Subregion (LRR): Mediterranean California (I   Lat: 36.166423   Long: -119.058088   Datum: NAD83

Soil Map Unit Name: San Joaquin loam, 0 to 2 percent slopes (154)   NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed?   Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N , Soil N , or Hydrology N naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		x
Hydric Soil Present?		
Wetland Hydrology Present?	x	

Is the Sampled Area within a Wetland? Yes ___ No x

Evaluation of features designated "Other Waters"

Characteristics: Type: non-vegeted ditch   Width: 2   Substrate: Soil

Indicators: Defined bed and bank: x   Scour x   OHWM Mapped x

Feature Designation: Perennial ___   Intermittent ___   Ephemeral x

Natural Drainage ___   Artificial Drainage x   Navigable Water ___

Remarks: Data point documents OHWM of a non-vegetated ditch.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1				
2				
3				
4				
		0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1				
2				
3				
4				
5				
		0	= Total Cover	
Herb Stratum (Plot size:)				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
		0	= Total Cover	
Woody Vine Stratum (Plot size:)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb 25   % Cover of Biotic 75

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ###### (A/B)

Prevalence Index worksheet:

Total % Cover of:			Multiply by:
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
No 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: No vegetation present

SOIL Sampling Point 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? **Yes** ___ **No** ___

Remarks: No soils pit potential utilities

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	
Water Table Present?	Yes ___	No ___	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ___	No ___	Depth (inches):	

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Biotic crust indicates long duration ponding.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Friant Kern Canal | City/County: Porterville | Sampling Date: 9/30/2019

Applicant/Owner: Friant | State: California | Sampling Point 3 | Feature ID: Upland

Investigator(s): Chariss, Gabe, Jacqueline | Section, Township, Range: Sec. 33, T20S, R27E

Local relief (hillside, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope (%): 1

Subregion (LRR): Mediterranean California (L | Lat: 36.150322 | Long: -119.051061 | Datum: NAD83

Soil Map Unit Name: San Joaquin loam, 0 to 2 percent slopes (154) | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N , Soil N , or Hydrology N naturally problematic? N (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	x	
Hydric Soil Present?		x
Wetland Hydrology Present?	x	
Is the Sampled Area within a Wetland?		x

Evaluation of features designated "Other Waters"

Characteristics: Type: ___ Width: ___ Substrate: ___

Indicators: Defined bed and bank: ___ Scour ___ OHWM Mapped ___

Feature Designation: Perennial ___ Intermittent ___ Ephemeral ___ Natural Drainage ___ Artificial Drainage ___ Navigable Water ___

Remarks: Depression which receives outflow from canal and dissipates to ground. May also pond from rainfall, but does not support hydric soils.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)					
1					
2					
3					
4					
			0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)					
1					
2					
3					
4					
5					
			0	= Total Cover	
Herb Stratum (Plot size:)					
1	Lepfus	Leptochloa fusca	30	YES	FACW
2	Triter	Tribulus terrestris	5	NO	UPL
3					
4					
5					
6					
7					
8					
9					
10					
11					
			35	= Total Cover	
Woody Vine Stratum (Plot size:)					
1					
2					
			0	= Total Cover	

% Bare Ground in Herb 65 | % Cover of Biotic 65

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	35 (A)		85 (B)

Prevalence Index = B/A = 2.4286

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- Yes 2 - Dominance Test is >50%
- Yes 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes X **No** ___

Remarks: Hydrophytic vegetation is dominant.

SOIL Sampling Point 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5 YR 3/4	100					Loamy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? **Yes** ___ **No** X

Remarks: No indicators of hydric soils were observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
X Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
X Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Surface soil cracks and biotic crust indicate long duration ponding.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Friant-Kern Canal | City/County: Strathmore | Sampling Date: 10/1/2019

Applicant/Owner: Friant | State: California | Sampling Point 4 | Feature ID: PON1

Investigator(s): G. Youngblood, J. Phipps | Section, Township, Range: Sec. 33, T20S, R27E

Local relief (hillside, terrace, etc.): Depression | Local Relief (concave, convex, none): Cocave | Slope (%): 10

Subregion (LRR): Mediterranean California (l | Lat: 36.150353 | Long: -119.054053 | Datum: NAD83

Soil Map Unit Name: San Joaquin loam, 0 to 2 percent slopes (154) | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation Y , Soil Y , or Hydrology Y significantly disturbed? ___ Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation N , Soil N , or Hydrology N naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No
Hydric Soil Present?	Yes	No x
Wetland Hydrology Present?	Yes x	No

Is the Sampled Area within a Wetland? Yes ___ No x

Evaluation of features designated "Other Waters"

Characteristics: Type: Pond | Width: Variable | Substrate: Soil

Indicators: Defined bed and bank: X | Scour ___ | OHWM Mapped X

Feature Designation: Perennial ___ | Intermittent ___ | Ephemeral ___ | Natural Drainage ___ | Artificial Drainage ___ | Navigable Water ___

Remarks: Pond with surface water and wetland vegetation along the edge. The feature appears to be from a leak (water bubbling up from soil) and has been fairly recently excavated/ disturbed.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1				
2				
3				
4				
		0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1				
2				
3				
4				
5				
		0	= Total Cover	
Herb Stratum (Plot size: 5-foot radius)				
1 Lepfus	Leptochloa fusca	18	YES	FACW
2 Cypesc	Cyperus esculentus	1	NO	FACW
3 Epicil	Epilobium ciliatum	1	NO	FACW
4				
5				
6				
7				
8				
9				
10				
11				
		20	= Total Cover	
Woody Vine Stratum (Plot size:)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb 80 | % Cover of Biotic ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	20	x 2 = 40
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	20 (A)	40 (B)

Prevalence Index = B/A = 2

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- Yes 2 - Dominance Test is >50%
- Yes 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: Dominant hydrophytic vegetation is present.

SOIL

Sampling Point 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10 yr 4/3	95	10 yr 2/1	5	C	M	Clay sand	
6-12	10 yr 4/3	80	5yr 3/4	10	C	M	Clay sand	
			10 yr 2/1	10	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ___ No X

Remarks: Concentrations occurr as hard masses. No hydric soil indicators were observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 1
Water Table Present?	Yes ___	No ___	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ___	Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Surface water provides wetland hydrology but appears to be from some sort of underground leak.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Friant-Kern Canal | City/County: Tulare County | Sampling Date: 10/1/2019

Applicant/Owner: Friant | State: California | Sampling Point 5 | Feature ID: SW1

Investigator(s): G. Youngblood, J. Phipps | Section, Township, Range: Sec. 33, T20S, R27E

Local relief (hillside, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope (%): 1

Subregion (LRR): Mediterranean California (l | Lat: 36.145285 | Long: -119.048417 | Datum: NAD83

Soil Map Unit Name: Wyman loam, 0 to 2 percent slopes (174) | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N , Soil N , or Hydrology N naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No
Hydric Soil Present?	Yes x	No
Wetland Hydrology Present?	Yes x	No

Is the Sampled Area within a Wetland? Yes x No

Evaluation of features designated "Other Waters"

Characteristics: Type: ___ Width: ___ Substrate: ___

Indicators: Defined bed and bank: ___ Scour ___ OHWM Mapped ___

Feature Designation: Perennial ___ Intermittent ___ Ephemeral ___ Natural Drainage ___ Artificial Drainage ___ Navigable Water ___

Remarks: Data point documents a depression that ponds water and supports hydrophytic vegetation but has problematic seasonaly ponded hydric soils. Hydrology likley influenced by the adjacent canal as two large pumps are sitiuated above the feature.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1				
2				
3				
4				
		0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1				
2				
3				
4				
5				
		0	= Total Cover	
Herb Stratum (Plot size:)				
1 Elemac	Eleocharis macrostachy	70	YES	OBL
2 Rumcri	Rumex crispus	10	NO	FAC
3 Conarv	Convolvulus arvensis	5	NO	UPL
4 Xanstr	Xanthium strumarium	2	NO	FAC
5				
6				
7				
8				
9				
10				
11				
		87	= Total Cover	
Woody Vine Stratum (Plot size:)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb ___ % Cover of Biotic 13

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:			Multiply by:
OBL species	70	x 1 =	70
FACW species	0	x 2 =	0
FAC species	12	x 3 =	36
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	87 (A)		131 (B)

Prevalence Index = B/A = 1.5057

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
Yes 2 - Dominance Test is >50%
Yes 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes X **No** ___

Remarks: Dominant hydrophytic vegetation is present.

SOIL

Sampling Point 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
1-3	7.5yr 3/1	100					Clay	
3-12	7.5yr 3/2	100					Sandy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? **Yes** X **No** ___

Remarks: The presence of dominant obligate vegetation and wetland hydrology suggest hydric soils however no hydric soil indicators were observed. Soils are considered a problematic hydric soil as vegetation and hydrology are present, the area is a depression, and the soils are seasonally ponded with a clay layer at the surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No	X	Depth (inches):	
Water Table Present?	Yes ___	No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Biotic crust provides evidence of long duration ponding.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Friant-Kern Canal | City/County: Strathmore | Sampling Date: 10/1/2019

Applicant/Owner: Friant | State: California | Sampling Point 6 | Feature ID: PON2

Investigator(s): G. Youngblood, J. Phipps | Section, Township, Range: Sec. 33, T20S, R27E

Local relief (hillside, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope (%): 5

Subregion (LRR): Mediterranean California (l | Lat: 36.144771 | Long: -119.049004 | Datum: NAD83

Soil Map Unit Name: Wyman loam, 0 to 2 percent slopes (172) | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N , Soil N , or Hydrology N naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No
Hydric Soil Present?	Yes x	No
Wetland Hydrology Present?	Yes x	No

Is the Sampled Area within a Wetland? Yes x No

Evaluation of features designated "Other Waters"

Characteristics: Type: Pond | Width: ___ | Substrate: Vegetated

Indicators: Defined bed and bank: x | Scour ___ | OHWM Mapped x

Feature Designation: Perennial ___ | Intermittent ___ | Ephemeral ___ | Natural Drainage ___ | Artificial Drainage ___ | Navigable Water ___

Remarks: Data point documents wetland fringe around OHWM of a pond.

VEGETATION – Use scientific plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)				
1				
2				
3				
4				
		0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ___)				
1				
2				
3				
4				
5				
		0	= Total Cover	
Herb Stratum (Plot size: ___)				
1 Perlap	Persicaria lapathifolia	30	YES	FACW
2 Cypesc	Cyperus esculentus	2	NO	FACW
3 Cypery	Cyperus erythrorhizos	30	YES	OBL
4 Lepfus	Leptochloa fusca	2	NO	FACW
5 Unk	Unknown	5	NO	0
6				
7				
8				
9				
10				
11				
		69	= Total Cover	
Woody Vine Stratum (Plot size: ___)				
1				
2				
		0	= Total Cover	

% Bare Ground in Hert 31 | % Cover of Biotic ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	30	x 1 = 30
FACW species	34	x 2 = 68
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	64 (A)	98 (B)

Prevalence Index = B/A = 1.5313

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
Yes 2 - Dominance Test is >50%
Yes 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes X **No** ___

Remarks: Dominant hydrophytic vegetation is present.

SOIL Sampling Point 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10yr 4/1	95	7.5yr 4/6	5	C	PL	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? Yes X No ___

Remarks: Soil meets the requirements for depleted matrix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	
Water Table Present?	Yes X	No ___	Depth (inches):	3
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	1

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: High water table provides wetland hydrology. Water marks found on concrete culvert opening.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Frian-Kern Canal City/County: Strathmore Sampling Date: 10/1/2019

Applicant/Owner: Friant State: California Sampling Point 7 Feature ID: Upland

Investigator(s): G. Youngblood, J. Phipps Section, Township, Range: Sec. 33, T20S, R27E

Local relief (hillside, terrace, etc.): Depression Local Relief (concave, convex, none): Concave Slope (%): 15

Subregion (LRR): Mediterranean California (Lat: 36.144766 Long: -119.049 Datum: NAD83

Soil Map Unit Name: Wyman loam, 0 to 2 percent slopes (172) NWI classification None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		x
Hydric Soil Present?	x	
Wetland Hydrology Present?		x
Is the Sampled Area within a Wetland?		x

Evaluation of features designated "Other Waters"

Characteristics: Type: ___ Width: ___ Substrate: ___

Indicators: Defined bed and bank: ___ Scour ___ OHWM Mapped ___

Feature Designation: Perennial ___ Intermittent ___ Ephemeral ___ Natural Drainage ___ Artificial Drainage ___ Navigable Water ___

Remarks: Upland pair to data point 6

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)					
1					
2					
3					
4					
			0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)					
1					
2					
3					
4					
5					
			0	= Total Cover	
Herb Stratum (Plot size:)					
1	Croset	Croton setiger	5	YES	UPL
2	Xanstr	Xanthium strumarium	2	YES	FAC
3	Helann	Helianthus annuus	1	NO	FACU
4					
5					
6					
7					
8					
9					
10					
11					
			8	= Total Cover	
Woody Vine Stratum (Plot size:)					
1					
2					
			0	= Total Cover	

% Bare Ground in Herb 92 % Cover of Biotic ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.5 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	2	x 3 =	6
FACU species	1	x 4 =	4
UPL species	5	x 5 =	25
Column Totals:	8 (A)		35 (B)

Prevalence Index = B/A = 4.375

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
No 2 - Dominance Test is >50%
No 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes ___ **No** X

Remarks: Hydrophytic vegetation is not dominant.

SOIL Sampling Point 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10yr 4/2	80	5yr 4/6	20	C	PL	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? Yes X No ___

Remarks: Soils meet requirements for depleted matrix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No indicators of wetland hydrology were observed.

WETLAND DETERMINATION DATA FORM - Arid West Region

v.110918

Project/Site: Friant-Kern Canal | City/County: Porterville | Sampling Date: 10/1/2019

Applicant/Owner: Friant | State: California | Sampling Point 8 | Feature ID: IC3

Investigator(s): G. Youngblood, J. Phipps | Section, Township, Range: Sec. 20, T21S, R27E

Local relief (hillside, terrace, etc.): Ditch | Local Relief (concave, convex, none): Concave | Slope (%): 1

Subregion (LRR): Mediterranean California (I | Lat: 36.089325 | Long: -119.075296 | Datum: NAD83

Soil Map Unit Name: Tagus loam, 0 to 2 percent slopes (137) | NWI classification: R5UBFx

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No
Hydric Soil Present?	Yes	No x
Wetland Hydrology Present?	Yes x	No

Is the Sampled Area within a Wetland? Yes ___ No x

Evaluation of features designated "Other Waters"

Characteristics: Type: Irrigation canal | Width: Variable | Substrate: Soil/Vegetated

Indicators: Defined bed and bank: X | Scour X | OHWM Mapped X

Feature Designation: Perennial ___ | Intermittent X | Ephemeral ___ | Natural Drainage ___ | Artificial Drainage X | Navigable Water ___

Remarks: Data point documents a irrigation canal which lacks hydric soils, but supports hydrophytic vegetation. The irrigation canal is carried under the Friant Kern Canal by a syphon.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)					
1					
2					
3					
4					
			0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)					
1					
2					
3					
4					
5					
			0	= Total Cover	
Herb Stratum (Plot size: 5-foot radius)					
1	Leeory	Leersia oryzoides	40	YES	OBL
2	Rorcur	Rorippa curvipes	20	YES	FACW
3	Unk	Unknown	10	NO	0
4	Rumcri	Rumex crispus	10	NO	FAC
5	Echcol	Echinochloa colona	10	NO	FAC
6	Unk	Unknown	2	NO	0
7	Perlap	Persicaria lapathifolia	1	NO	FACW
8	Lepfus	Leptochloa fusca	1	NO	FACW
9	Cypesc	Cyperus esculentus	1	NO	FACW
10					
11					
			95	= Total Cover	
Woody Vine Stratum (Plot size:)					
1					
2					
			0	= Total Cover	

% Bare Ground in Herb 5 | % Cover of Biotic ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	40	x 1 = 40
FACW species	23	x 2 = 46
FAC species	20	x 3 = 60
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	83 (A)	146 (B)

Prevalence Index = B/A = 1.759

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
Yes 2 - Dominance Test is >50%
Yes 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Hydrophytic vegetation is dominant.

SOIL Sampling Point 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10yr 4/2	100					Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Histosol (A1)
Histic Epipedon (A2)
Black Histic (A3)
Hydrogen Sulfide (A4)
Stratified Layers (A5) (**LRR C**)
1 cm Muck (A9) (**LRR D**)
Depleted Below Dark Surface (A11)
Thick Dark Surface (A12)
Sandy Mucky Mineral (S1)
Sandy Gleyed Matrix (S4)

Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)
Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

1 cm Muck (A9) (**LRR C**)
2 cm Muck (A10) (**LRR B**)
Reduced Vertic (F18)
Red Parent Material (TF2)
Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? **Yes** ☐ **No** X

Remarks: No indicators of hydric soils were observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Surface Water (A1)
High Water Table (A2)
Saturation (A3)
Water Marks (B1) (**Nonriverine**)
Sediment Deposits (B2) (**Nonriverine**)
Drift Deposits (B3) (**Nonriverine**)
Surface Soil Cracks (B6)
Inundation Visible on Aerial Imagery (B7)
Water-Stained Leaves (B9)

Salt Crust (B11)
Biotic Crust (B12)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Thin Muck Surface (C7)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

X Water Marks (B1) (**Riverine**)
X Sediment Deposits (B2) (**Riverine**)
Drift Deposits (B3) (**Riverine**)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C
Shallow Aquitard (D3)
FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** X **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Sediemnt and drift deposits indicate frequent flooding.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Friant-Kern Canal | City/County: Tulare County | Sampling Date: 12/10/2019

Applicant/Owner: Friant | State: California | Sampling Point 9 | Feature ID: GRB2

Investigator(s): Gabe Youngblood, Chariss Femino | Section, Township, Range: Sec. 30, T21S, R27E

Local relief (hillside, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope (%): 5

Subregion (LRR): Mediterranean California (I | Lat: 36.069651 | Long: -119.090259 | Datum: NAD83

Soil Map Unit Name: Nord fine sandy loam, 0-2% slopes (130) | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology N significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N, Soil N, or Hydrology N naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	x	
Hydric Soil Present?		x
Wetland Hydrology Present?	x	

Is the Sampled Area within a Wetland? Yes ___ No x

Evaluation of features designated "Other Waters"

Characteristics: Type: Detention basin | Width: N/A | Substrate: Soil

Indicators: Defined bed and bank: X | Scour ___ | OHWM Mapped X

Feature Designation: Perennial ___ | Intermittent X | Ephemeral ___ | Natural Drainage ___ | Artificial Drainage X | Navigable Water ___

Remarks: Data point documents a groundwater recharge basin.OHWM indicated by drift deposits and wave formed shelving . Feature lacks hydric soils, supports dominant hydrophytic vegetation along banks but the rest of the feature had been recently disked.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)				
1				
2				
3				
4				
		0 = Total Cover		
Sapling/Shrub Stratum (Plot size: ___)				
1 Sallae	Salix laevigata	5	YES	FACW
2 Tamchi	Tamarix chinensis	1	NO	FAC
3				
4				
5				
		6 = Total Cover		
Herb Stratum (Plot size: ___)				
1 Echcol	Echinochloa colona	25	YES	FAC
2 Amapal	Amaranthus palmeri	3	NO	FACU
3 Triter	Tribulus terrestris	2	NO	UPL
4				
5				
6				
7				
8				
9				
10				
11				
		30 = Total Cover		
Woody Vine Stratum (Plot size: ___)				
1				
2				
		0 = Total Cover		

% Bare Ground in Herb 70 | % Cover of Biotic ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	26	x 3 =	78
FACU species	3	x 4 =	12
UPL species	2	x 5 =	10
Column Totals:	36 (A)		110 (B)

Prevalence Index = B/A = 3.0556

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

Yes 2 - Dominance Test is >50%

No 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes X **No** ___

Remarks: Hydrophytic vegetation is dominant.

SOIL Sampling Point 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	100					Sandy Loam	
4-16	10YR 4/2	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? Yes ___ No X

Remarks: No indicators of hydric soil were observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- X Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	
Water Table Present?	Yes ___	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Drift deposits indicate wetland hydrology.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Friant-Kern Canal | City/County: Tulare County | Sampling Date: 12/10/2019

Applicant/Owner: Friant | State: California | Sampling Point 10 | Feature ID: PON6

Investigator(s): Gabe Youngblood, Chariss Femino | Section, Township, Range: Sec. 7, T22S, R27E

Local relief (hillside, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope (%): 5

Subregion (LRR): Mediterranean California (I | Lat: 36.031467 | Long: -119.096964 | Datum: NAD83

Soil Map Unit Name: Exeter loam, 0-2% slopes (114) | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ___ (If no, explain in Remarks.)

Are Vegetation x, Soil x, or Hydrology x significantly disturbed? ___ Are "Normal Circumstances" present? Yes x No ___

Are Vegetation x, Soil x, or Hydrology x naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No
Hydric Soil Present?	Yes	No x
Wetland Hydrology Present?	Yes x	No

Is the Sampled Area within a Wetland? Yes ___ No x

Evaluation of features designated "Other Waters"

Characteristics: Type: Irrigation pond | Width: N/A | Substrate: Soil

Indicators: Defined bed and bank: X | Scour ___ | OHWM Mapped X

Feature Designation: Perennial ___ | Intermittent X | Ephemeral ___

Natural Drainage ___ | Artificial Drainage X | Navigable Water ___

Remarks: Data point documents an irrigation pond which supports facultative species along its banks and obligate plants in the bottom of the feature. The feature lacks hydric soils but supports dominant hydrophytic vegetation and wetland hydrology.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1				
2				
3				
4				
		0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1				
2				
3				
4				
5				
		0	= Total Cover	
Herb Stratum (Plot size:)				
1 Lepfus	Leptochloa fusca	40	YES	FACW
2 Rumcri	Rumex crispus	10	NO	FAC
3 Cypera	Cyperus eragrostis	5	NO	FACW
4				
5				
6				
7				
8				
9				
10				
11				
		55	= Total Cover	
Woody Vine Stratum (Plot size:)				
1				
2				
		0	= Total Cover	

% Bare Ground in Hert 0 | % Cover of Biotic 45

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	45	x 2 =	90
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	55 (A)		120 (B)

Prevalence Index = B/A = 2.1818

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

Yes 2 - Dominance Test is >50%

Yes 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes X **No** ___

Remarks: Hydrophytic vegetation is dominant. Cattails (Typha sp.) dominante in the bottom of the feature.

SOIL Sampling Point 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 4/6	95	5YR 4/6	5	C	PL	Sandy Loam	
3-8	10YR 5/3	90	5YR 4/6	10	C	PL	Sandy Loam	
8	Compacted layer							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: Compacted soil
Depth (inches): 8

Hydric Soil Present? Yes ___ No X

Remarks: No indicators of hydric soil were observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Biotic crust indicates wetland hydrology. Surface water was present in the bottom of the feature.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Friant-Kern Canal | City/County: Tulare County | Sampling Date: 12/11/2019

Applicant/Owner: Friant | State: California | Sampling Point 11 | Feature ID: GRB4

Investigator(s): Gabe Youngblood, Chariss Femino | Section, Township, Range: Sec. 30, T22S, R27E

Local relief (hillside, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope (%): 5

Subregion (LRR): Mediterranean California (l | Lat: 35.979627 | Long: -119.106077 | Datum: NAD83

Soil Map Unit Name: Nord fine sandy loam, 0-2% slopes (130) | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes Y No ___

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No
Hydric Soil Present?	Yes x	No
Wetland Hydrology Present?	Yes x	No

Is the Sampled Area within a Wetland? Yes x No

Evaluation of features designated "Other Waters"

Characteristics: Type: Detention basin | Width: N/A | Substrate: Soil

Indicators: Defined bed and bank: X | Scour ___ | OHWM Mapped X

Feature Designation: Perennial ___ | Intermittent X | Ephemeral ___

Natural Drainage ___ | Artificial Drainage X | Navigable Water ___

Remarks: Data point documents a groundwater recharge basin which supports all three wetland parameters.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)					
1					
2					
3					
4					
			0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)					
1					
2					
3					
4					
5					
			0	= Total Cover	
Herb Stratum (Plot size:)					
1	Xanstr	Xanthium strumarium	80	YES	FAC
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
			80	= Total Cover	
Woody Vine Stratum (Plot size:)					
1					
2					
			0	= Total Cover	

% Bare Ground in Hert 0 | % Cover of Biotic 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:			Multiply by:
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	80	x 3 =	240
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80	(A)	240 (B)

Prevalence Index = B/A = 3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

Yes 2 - Dominance Test is >50%

Yes 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes X **No** ___

Remarks: Hydrophytic vegetation is dominant.

SOIL Sampling Point 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
1-16	7.5YR3/1	95	5YR4/6	5	C	PL	Loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? Yes X No ___

Remarks: Soil meets the requirments for indicator F6 Redox Dark Surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	
Water Table Present?	Yes ___	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Biotic Crust and Oxidized Rhizosphers indicate wetland hydrology. Inundation is visible on some aerial images.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Friant-Kern Canal | City/County: Tulare County | Sampling Date: 12/11/2019

Applicant/Owner: Friant | State: California | Sampling Point 12 | Feature ID: Upland

Investigator(s): Gabe Youngblood, Chariss Femino | Section, Township, Range: Sec. 30, T22S, R27E

Local relief (hillside, terrace, etc.): Terrace | Local Relief (concave, convex, none): None | Slope (%): 0

Subregion (LRR): Mediterranean California (l | Lat: 35.979623 | Long: 119.106096 | Datum: NAD83

Soil Map Unit Name: Nord fine sandy loam, 0-2% slopes (130) | NWI classification None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N , Soil N , or Hydrology N naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No x	
Hydric Soil Present?	Yes ___ No x	Is the Sampled Area within a Wetland? Yes No x
Wetland Hydrology Present?	Yes No x	

Evaluation of features designated "Other Waters"

Characteristics: Type: ___ Width: ___ Substrate: ___

Indicators: Defined bed and bank: ___ Scour ___ OHWM Mapped ___

Feature Designation: Perennial ___ Intermittent ___ Ephemeral ___

Natural Drainage ___ Artificial Drainage ___ Navigable Water ___

Remarks: Data point documents uplands adjacent to a groundwater recharge basin.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)				
1				
2				
3				
4				
		0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ___)				
1				
2				
3				
4				
5				
		0	= Total Cover	
Herb Stratum (Plot size: ___)				
1 Amaalb	Amaranthus albus	70	YES	FACU
2 Erican	Erigeron canadensis	5	NO	FACU
3 Leptus	Leptochloa fusca	5	NO	FACW
4				
5				
6				
7				
8				
9				
10				
11				
		80	= Total Cover	
Woody Vine Stratum (Plot size: ___)				
1				
2				
		0	= Total Cover	

% Bare Ground in Herb 20 | % Cover of Biotic 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	75	x 4 =	300
UPL species	0	x 5 =	0
Column Totals:	80 (A)		310 (B)

Prevalence Index = B/A = 3.875

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

No 2 - Dominance Test is >50%

No 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

5 - Wetland Non-Vascular Plants[1]

___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes ___ **No** X

Remarks: Hydrophytic vegetation is not dominant.

SOIL Sampling Point 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
1-16	10YR	100					Loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (**LRR C**)
- 1 cm Muck (A9) (**LRR D**)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- 1 cm Muck (A9) (**LRR C**)
- 2 cm Muck (A10) (**LRR B**)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? Yes ___ No X

Remarks: No indicators of hydric soil were observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1) (**Nonriverine**)
- Sediment Deposits (B2) (**Nonriverine**)
- Drift Deposits (B3) (**Nonriverine**)
- Surface Soil Cracks (B6)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Biotic Crust (B12)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres along Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- Water Marks (B1) (**Riverine**)
- Sediment Deposits (B2) (**Riverine**)
- Drift Deposits (B3) (**Riverine**)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):
Water Table Present?	Yes ___	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No indicators of wetland hydrology were observed.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Friant-Kern Canal City/County: Tulare County Sampling Date: 12/11/2019

Applicant/Owner: Friant State: California Sampling Point 13 Feature ID: Upland

Investigator(s): Gabe Youngblood, Chariss Femino Section, Township, Range: Sec. 31, T22S, R27E

Local relief (hillside, terrace, etc.): Depression Local Relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR): Mediterranean California (I Lat: 35.978463 Long: -119.105244 Datum: NAD83

Soil Map Unit Name: Nord fine sandy loam, 0-2% slopes (130) NWI classification None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are “Normal Circumstances” present? Yes X No ___

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		x
Hydric Soil Present?	x	
Wetland Hydrology Present?		x

Is the Sampled Area within a Wetland? Yes ___ No x

Evaluation of features designated “Other Waters”

Characteristics: Type: ___ Width: ___ Substrate: ___

Indicators: Defined bed and bank: ___ Scour ___ OHWM Mapped ___

Feature Designation: Perennial ___ Intermittent ___ Ephemeral ___

Natural Drainage ___ Artificial Drainage ___ Navigable Water ___

Remarks: Data point documents an elevated portion of a presumed old borrow site adjacent to Deer Creek which lacks indicators of hydrology and hydrophytic vegetation.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)					
1					
2					
3					
4					
			0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)					
1					
2					
3					
4					
5					
			0	= Total Cover	
Herb Stratum (Plot size: 5-foot radius)					
1	Helann	Helianthus annuus	35	YES	FACU
2	Lacser	Lactuca serriola	20	YES	FACU
3	Unk	Unknown	10	NO	0
4	Erican	Erigeron canadensis	8	NO	FACU
5	Brohor	Bromus hordeaceus	5	NO	FACU
6	Hormur	Hordeum murinum	5	NO	FACU
7	Cypera	Cyperus eragrostis	5	NO	FACW
8	Epibar	Epilobium brachycarpum	5	NO	UPL
9	Unk	Unknown	5	NO	0
10	Perlap	Persicaria lapathifolia	2	NO	FACW
11					
			100	= Total Cover	
Woody Vine Stratum (Plot size:)					
1					
2					
			0	= Total Cover	

% Bare Ground in Herb 0 % Cover of Biotic ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:			Multiply by:
OBL species	0	x 1 =	0
FACW species	7	x 2 =	14
FAC species	0	x 3 =	0
FACU species	73	x 4 =	292
UPL species	5	x 5 =	25
Column Totals:	85 (A)		331 (B)

Prevalence Index = B/A = 3.8941

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

No 2 - Dominance Test is >50%

No 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes ___ **No** X

Remarks: Hydrophytic vegetation is not dominant.

SOIL Sampling Point 13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
1-14	7.5YR 4/2	95	5YR4/6	5	C	PL	Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? **Yes** X **No** ___

Remarks: Soil meets the requirments for indicator F3 depleted matrix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	___
Water Table Present?	Yes ___	No X	Depth (inches):	___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No indicators of wetland hydrology were observed.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.110918

Project/Site: Friant-Kern Canal | City/County: Tulare County | Sampling Date: 12/11/2019

Applicant/Owner: Friant | State: California | Sampling Point 14 | Feature ID: RW1

Investigator(s): Gabe Youngblood, Chariss Femino | Section, Township, Range: Sec. 31, T22S, R27E

Local relief (hillside, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope (%): 0

Subregion (LRR): Mediterranean California (I | Lat: 35.978458 | Long: -119.10523 | Datum: NAD83

Soil Map Unit Name: Nord fine sandy loam, 0-2% slopes (130) | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N , Soil N , or Hydrology N naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x No ___	Is the Sampled Area within a Wetland? Yes x No
Hydric Soil Present?	Yes x No ___	
Wetland Hydrology Present?	Yes x No	

Evaluation of features designated "Other Waters"

Characteristics: Type: ___ Width: ___ Substrate: ___

Indicators: Defined bed and bank: ___ Scour ___ OHWM Mapped ___

Feature Designation: Perennial ___ Intermittent ___ Ephemeral ___

Natural Drainage ___ Artificial Drainage ___ Navigable Water ___

Remarks: Data point documents wetland conditions in an presumed old borrow site adjacent to Deer Creek.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)					
1					
2					
3					
4					
			0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ___)					
1					
2					
3					
4					
5					
			0	= Total Cover	
Herb Stratum (Plot size: 5-foot radius)					
1	Elemac	Eleocharis macrostachya	50	YES	OBL
2	Cypera	Cyperus eragrostis	10	NO	FACW
3	Polmon	Polypogon monspeliensis	5	NO	FACW
4	Helann	Helianthus annuus	5	NO	FACU
5					
6					
7					
8					
9					
10					
11					
			70	= Total Cover	
Woody Vine Stratum (Plot size: ___)					
1					
2					
			0	= Total Cover	

% Bare Ground in Herb 0 % Cover of Biotic 30

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	15	x 2 =	30
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	70 (A)		100 (B)

Prevalence Index = B/A = 1.4286

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

Yes 2 - Dominance Test is >50%

Yes 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes X **No** ___

Remarks: Hydrophytic vegetation is dominant.

SOIL Sampling Point 14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
1-14	7.5YR 4/2	95	5YR4/6	5	C	PL	Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? Yes X No ___

Remarks: Soil meets the requirments for indicator F3 depleted matrix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Biotic crust and water stained leaves indicate wetland hydrology.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.111618

Sampling Point: 16 | Feature ID: RW/FEW1

Project/Site: Friant Kern Canal | City/County: Tulare County | Sampling Date: 10/3/2019

Applicant/Owner: Friant | State: CA

Investigator(s): BC | Section, Township, Range: Sec. 31, T23S, R27E

Local relief (hillside, terrace, etc.): Channel | Local Relief (concave, convex, none): Concave | Slope (%): 1

Subregion (LRR): Mediterranean California (I | Lat: 35.977744 | Long: -119.106625 | Datum: NAD 83

Soil Map Unit Name: Riverwash (134) | NWI classification: PFOA

Are climatic / hydrologic conditions on the site typical for this time of year Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil Yes , or Hydrology No naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x No ___	
Hydric Soil Present?	Yes x No ___	Is the Sampled Area within a Wetland? Yes x No ___
Wetland Hydrology Present?	Yes x No ___	

Remarks: Data point documents presence of primary hydrology and a dominance of obligate hydrophytic vegetation. Soils are naturaly problematic and assumed hydric, see soil remarks for more details.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)					
1					
2					
3					
4					
			0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)					
1					
2					
3					
4					
5					
			0	= Total Cover	
Herb Stratum (Plot size:)					
1	Typlat	Typha latifolia	35	YES	OBL
2	Alitri	Alisma triviale	7	NO	OBL
3					
4					
5					
6					
7					
8					
9					
10					
11					
			42	= Total Cover	
Woody Vine Stratum (Plot size:)					
1					
2					
			0	= Total Cover	

%Bare Ground in Herb Stratum: 64 | % Cover of Biotic Crust: ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	42	x 1 =	42
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	42 (A)		42 (B)

Prevalence Index = B/A = 1

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
Yes 2 - Dominance Test is >50%
Yes 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Area dominated by hydrophytic vegetation.

SOIL Sampling Point 16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/1	100					Loamy sand	Some pure sand pockets in soil

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- x Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks: Soil is assumed hydric and problematic due to a dominance of obligate plant species, primary hydrology, and location of sample within stream channel with sandy soils that may have hydric soil indicators washed out.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 6
Water Table Present?	Yes X	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology evidenced by saturation, water table within 12 inches and the presence of surface water from Deer Creek.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.111618

Sampling Point 17 | Feature ID: Upland

Project/Site: Friant Kern Canal | City/County: Tulare County | Sampling Date: 10/3/2019

Applicant/Owner: Friant | State: CA

Investigator(s): BC | Section, Township, Range: Sec. 31, T23S, R27E

Local relief (hillside, terrace, etc.): Stream bank slope | Local Relief (concave, convex, none): Convex | Slope (%): 7

Subregion (LRR): Mediterranean California (l | Lat: 35.977731 | Long: -119.106617 | Datum: NAD 83

Soil Map Unit Name: Riverwash (134) | NWI classification PFOA

Are climatic / hydrologic conditions on the site typical for this time of yeai Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil No , or Hydrology No naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No x	
Hydric Soil Present?	Yes x No ___	Is the Sampled Area within a Wetland? Yes ___ No x
Wetland Hydrology Present?	Yes x No ___	

Remarks: Sample showed hydric soil and hydrology indicators but is dominated by upland vegetation.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)					
1					
2					
3					
4					
			0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ___)					
1					
2					
3					
4					
5					
			0	= Total Cover	
Herb Stratum (Plot size: 5-foot radius)					
1	Citcol	Citrullus colocynthis	30	YES	UPL
2	Fesbro	Festuca bromoides	18	YES	FACU
3	Conmac	Conium maculatum	12	NO	FACW
4	Erican	Erigeron canadensis	10	NO	FACU
5	Lacser	Lactuca serriola	5	NO	FACU
6					
7					
8					
9					
10					
11					
			75	= Total Cover	
Woody Vine Stratum (Plot size: ___)					
1					
2					
			0	= Total Cover	

%Bare Ground in Herb Stratum: 25 | % Cover of Biotic Crust: ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	12	x 2 = 24
FAC species	0	x 3 = 0
FACU species	33	x 4 = 132
UPL species	30	x 5 = 150
Column Totals:	75 (A)	306 (B)

Prevalence Index = B/A = 4.08

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
No 2 - Dominance Test is >50%
No 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: Area not dominated by hydrophytic vegetation.

SOIL Sampling Point 17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	10 YR 3/2	100					Loamy sand	
5-9	10 YR 3/1	80	2.5YR 4/8	20	C	M	Loamy sand	
9-16	10 YR 3/1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks: Indicator S5 met by a 4 inch thick layer starting within 6 inches of the soil surface that has a matrix chroma of less than 2 and more than 2 percent prominent redox concentrations in the matrix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water Table Present?	Yes	X	No		Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology evidenced by saturation and water table within 12 inches of the soil surface.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.111618

Sampling Point: 18 | Feature ID: RW3

Project/Site: Friant Kern Canal | City/County: Tulare County | Sampling Date: 10/3/2019

Applicant/Owner: Friant | State: CA

Investigator(s): BC, YS | Section, Township, Range: Sec. 31, T23S, R27E

Local relief (hillside, terrace, etc.): Stream bank slope | Local Relief (concave, convex, none): Convex | Slope (%): 7

Subregion (LRR): Mediterranean California (l | Lat: 35.977754 | Long: -119.106524 | Datum: NAD 83

Soil Map Unit Name: Riverwash (134) | NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of yeai Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil No , or Hydrology Yes naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes x No ___

Hydric Soil Present? Yes x No ___

Wetland Hydrology Present? Yes x No ___

Is the Sampled Area within a Wetland? Yes x No ___

Remarks: Sample area is dominated by hydrophytic vegetation (Salix) and shows hydric soil indicators. Hydrology is problematic as the survey was conducted during the dry season.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)					
1	Sallae	Salix laevigata	80	YES	FACW
2					
3					
4					
			80 = Total Cover		
Sapling/Shrub Stratum (Plot size:)					
1					
2					
3					
4					
5					
			0 = Total Cover		
Herb Stratum (Plot size:)					
1	Conmac	Conium maculatum	5	YES	FACW
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
			5 = Total Cover		
Woody Vine Stratum (Plot size:)					
1					
2					
			0 = Total Cover		

%Bare Ground in Herb Stratum: ___ % Cover of Biotic Crust: ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	85	x 2 = 170
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	85 (A)	170 (B)

Prevalence Index = B/A = 2

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

Yes 2 - Dominance Test is >50%

Yes 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Area dominated by hydrophytic vegetation.

SOIL Sampling Point 18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 2/2	100					Loamy sand	
6-11	10 YR 2/2	97	2.5YR 4/8	3	C	M	Loamy sand	Prominent redox
11-16	10 YR 4/1	80	2.5 YR 3/6	20	C	Pl/M	Loamy sand	Prominent redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks: Indicator S5 met by a 4 inch thick layer starting within 6 inches of the soil surface that has a matrix chroma of less than 2 and more than 2 percent prominent redox concentrations in the matrix and pore linings. Soil also meets indicator A11.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Sample area is adjacent to Deer Creek and soil is damp but not saturated. Hydrology is problematic due to delineation being done during the dry season. Area is dominated by hydrophytic vegetation and contains hydric soil indicators.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.111618

Sampling Point: 19 | Feature ID: Upland

Project/Site: Friant-Kern Canal | City/County: Tulare county | Sampling Date: 10/3/2019

Applicant/Owner: Friant | State: CA

Investigator(s): BC, YS | Section, Township, Range: Sec. 31, T23S, R27E

Local relief (hillside, terrace, etc.): Floodplain | Local Relief (concave, convex, none): Convex | Slope (%): 4

Subregion (LRR): Mediterranean California (I | Lat: 35.977715 | Long: -119.10655 | Datum: NAD 83

Soil Map Unit Name: Riverwash (134) | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil No , or Hydrology No naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		x
Hydric Soil Present?		x
Wetland Hydrology Present?		x

Is the Sampled Area within a Wetland? Yes ___ No x

Remarks: Wetland indicators not observed.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1				
2				
3				
4				
		0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)				
1				
2				
3				
4				
5				
		0 = Total Cover		
Herb Stratum (Plot size:)				
1 Citcol	Citrullus colocynthis	80	YES	UPL
2 Conmac	Conium maculatum	5	NO	FACW
3				
4				
5				
6				
7				
8				
9				
10				
11				
		85 = Total Cover		
Woody Vine Stratum (Plot size:)				
1				
2				
		0 = Total Cover		

%Bare Ground in Herb Stratum: ___ % Cover of Biotic Crust: ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	5	x 2 = 10
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	80	x 5 = 400
Column Totals:	85 (A)	410 (B)

Prevalence Index = B/A = 4.8235

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
No 2 - Dominance Test is >50%
No 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: Area not dominated by hydrophytic vegetation.

SOIL Sampling Point 19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-9	10 YR 2/2	100					Loamy sand	
9-16	10 YR 2/2	95	5 YR 5/8	5	C	M	Loamy sand	Prominent redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ___
Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks: Does not meet indicator S5 because redox is not present until 9 inches below soil surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology indicators not observed.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.111618

Sampling Point: 23 | Feature ID: RW5

Project/Site: Friant-Kern Canal | City/County: Tulare County | Sampling Date: 10/2/2019

Applicant/Owner: Friant | State: CA

Investigator(s): BC, YS | Section, Township, Range: Sec. 16, T24S, R26E

Local relief (hillside, terrace, etc.): Floodplain | Local Relief (concave, convex, none): Concave | Slope (%): 2

Subregion (LRR): Mediterranean California (I | Lat: 35.843818 | Long: -119.162217 | Datum: NAD 83

Soil Map Unit Name: Nord fine sandy loam, 0 to 2 percent slopes (130) | NWI classification: R4SBCx

Are climatic / hydrologic conditions on the site typical for this time of year Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil Yes , or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x No ___	Is the Sampled Area within a Wetland? Yes x No ___
Hydric Soil Present?	Yes x No ___	
Wetland Hydrology Present?	Yes x No ___	

Remarks: Area dominated by Stachys. Sample is dominated by hydrophytic vegetation and contains problematic hydric soils, see soil remarks for more details. Riparian herbaceous wetland contains Xanthium strumarium and Cyperus sp. farther west.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)					
1					
2					
3					
4					
			0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ___)					
1					
2					
3					
4					
5					
			0	= Total Cover	
Herb Stratum (Plot size: ___)					
1	Staalb	Stachys albens	75	YES	OBL
2	Urtdio	Urtica dioica	25	YES	FAC
3					
4					
5					
6					
7					
8					
9					
10					
11					
			100	= Total Cover	
Woody Vine Stratum (Plot size: ___)					
1					
2					
			0	= Total Cover	

%Bare Ground in Herb Stratum: ___ % Cover of Biotic Crust: ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	75	x 1 =	75
FACW species	0	x 2 =	0
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		150 (B)

Prevalence Index = B/A = 1.5

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
Yes 2 - Dominance Test is >50%
Yes 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Area dominated by hdrophytic vegetation.

SOIL Sampling Point 23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5 YR 3/2	100					Loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- x Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks: Soil is problematic and assumed hydric due to presence of hydrology and a dominance of hydrophytic vegetation. The soil is composed of sand directly below the OHWM of an intermittent stream. Indicators may not be present due to seasonal or annual deposition of new soil material, low iron or manganese content, and low organic matter content.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)	X		0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology evidenced by saturation within 12 inches of the soil surface.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.111618

Sampling Point: 24 | Feature ID: Upland

Project/Site: Friant-Kern Canal | City/County: Tulare County | Sampling Date: 10/2/2019

Applicant/Owner: Friant | State: CA

Investigator(s): BC, YS | Section, Township, Range: Sec. 16, T24S, R26E

Local relief (hillside, terrace, etc.): Floodplain | Local Relief (concave, convex, none): Concave | Slope (%): 2

Subregion (LRR): Mediterranean California (I | Lat: 35.843799 | Long: -119.16222 | Datum: NAD 83

Soil Map Unit Name: Nord fine sandy loam, 0 to 2 percent slopes (130) | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil No , or Hydrology No naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		x
Hydric Soil Present?		x
Wetland Hydrology Present?		x
Is the Sampled Area within a Wetland?		x

Remarks: Upland pair point to riparian wetland documented by data point 23. No wetland indicators observed.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1				
2				
3				
4				
		0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)				
1				
2				
3				
4				
5				
		0 = Total Cover		
Herb Stratum (Plot size:)				
1 Hirinc	Hirschfeldia incana	80	YES	UPL
2 Urtdio	Urtica dioica	3	NO	FAC
3				
4				
5				
6				
7				
8				
9				
10				
11				
		83 = Total Cover		
Woody Vine Stratum (Plot size:)				
1				
2				
		0 = Total Cover		

%Bare Ground in Herb Stratum: 17 | % Cover of Biotic Crust: ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	3	x 3 =	9
FACU species	0	x 4 =	0
UPL species	80	x 5 =	400
Column Totals:	83 (A)		409 (B)

Prevalence Index = B/A = 4.9277

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
No 2 - Dominance Test is >50%
No 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: Area not dominated by hydrophytic vegetation.

SOIL Sampling Point 24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5 YR 3/2	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ___
Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Hydric soil indicators not observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology indicators not observed.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.111618

Sampling Point: 25 | Feature ID: RW6

Project/Site: Friant-Kern Canal | City/County: Tulare County | Sampling Date: 10/1/2019

Applicant/Owner: Friant | State: CA

Investigator(s): BC, YS | Section, Township, Range: Sec. 16, T24S, R26E

Local relief (hillside, terrace, etc.): Stream | Local Relief (concave, convex, none): Concave | Slope (%): 1

Subregion (LRR): Mediterranean California (l | Lat: 35.843697 | Long: -119.162232 | Datum: NAD 83

Soil Map Unit Name: Nord fine sandy loam, 0 to 2 percent slopes (130) | NWI classification: R4SBCx

Are climatic / hydrologic conditions on the site typical for this time of yeaı Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil No , or Hydrology No naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ___
Hydric Soil Present?	Yes x	No ___
Wetland Hydrology Present?	Yes x	No ___

Is the Sampled Area within a Wetland? Yes x No ___

Remarks: Area has all 3 wetland indicators present. It is within an intermittent channel.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 foot radius)					
1	Popfre	Populus fremontii	40	YES	FAC
2	Sallae	Salix laevigata	35	YES	FACW
3					
4					
			75 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 foot radius)					
1	Sallae	Salix laevigata	10	YES	FACW
2					
3					
4					
5					
			10 = Total Cover		
Herb Stratum (Plot size: 5 foot radius)					
1	Cypery	Cyperus erythrorhizos	25	YES	OBL
2	Staalb	Stachys albens	15	YES	OBL
3	Urtdio	Urtica dioica	7	NO	FAC
4					
5					
6					
7					
8					
9					
10					
11					
			47 = Total Cover		
Woody Vine Stratum (Plot size: ___)					
1					
2					
			0 = Total Cover		

%Bare Ground in Herb Stratum: 53 | % Cover of Biotic Crust: ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	40	x 1 = 40
FACW species	45	x 2 = 90
FAC species	47	x 3 = 141
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	132 (A)	271 (B)

Prevalence Index = B/A = 2.053

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- Yes 2 - Dominance Test is >50%
- Yes 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Area dominated by hydrophytic vegetation.

SOIL Sampling Point 25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5Y 4/2	93	5 YR 5/8	7	C	PL	Sand	Prominent redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: Rock
Depth (inches): 6

Hydric Soil Present? **Yes** X **No** ___

Remarks: Indicator S5 evidenced by sandy layer at least 4 inches thick starting within 6 inches of the soil surface with a matrix chroma less than 2 and more than 2 percent prominent redox concentrations occurring as soft masss.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- X Drift Deposits (B3) (**Riverine**)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)	X		4

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology evidenced by saturation within 12 inches of soil surface and riverine drift deposits.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.111618

Sampling Point: 26 Feature ID: RW6

Project/Site: Friant-Kern Canal City/County: Tulare County Sampling Date: 10/1/2019

Applicant/Owner: Friant State: CA

Investigator(s): BC, YS Section, Township, Range: Sec. 16, T24S, R26E

Local relief (hillside, terrace, etc.): Stream Local Relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): Mediterranean California (l Lat: 35.843697 Long: -119.162232 Datum: NAD 83

Soil Map Unit Name: Nord fine sandy loam, 0 to 2 percent slopes (130) NWI classification: R4SBCx

Are climatic / hydrologic conditions on the site typical for this time of year Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil No , or Hydrology No naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x	No ___
Hydric Soil Present?	Yes x	No ___
Wetland Hydrology Present?	Yes x	No ___
Is the Sampled Area within a Wetland?	Yes x	No ___

Remarks: Area has all 3 wetland indicators present. It is within an intermittent channel.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 foot radius)					
1	Popfre	Populus fremontii	40	YES	FAC
2	Sallae	Salix laevigata	35	YES	FACW
3					
4					
			75 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 foot radius)					
1	Sallae	Salix laevigata	10	YES	FACW
2					
3					
4					
5					
			10 = Total Cover		
Herb Stratum (Plot size: 5 foot radius)					
1	Cypery	Cyperus erythrorhizos	25	YES	OBL
2	Staalb	Stachys albens	15	YES	OBL
3	Urtdio	Urtica dioica	7	NO	FAC
4					
5					
6					
7					
8					
9					
10					
11					
			47 = Total Cover		
Woody Vine Stratum (Plot size: ___)					
1					
2					
			0 = Total Cover		

%Bare Ground in Herb Stratum: 53 % Cover of Biotic Crust: ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	45	x 2 =	90
FAC species	47	x 3 =	141
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	132 (A)		271 (B)

Prevalence Index = B/A = 2.053

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
Yes 2 - Dominance Test is >50%
Yes 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Area dominated by hydrophytic vegetation.

SOIL Sampling Point 26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5Y 4/2	93	5 YR 5/8	7	C	PL	Sand	Prominent redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: Rock
Depth (inches): 6

Hydric Soil Present? **Yes** X **No** ___

Remarks: Indicator S5 evidenced by sandy layer at least 4 inches thick starting within 6 inches of the soil surface with a matrix chroma less than 2 and more than 2 percent prominent redox concentrations occurring as soft masss.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
X Drift Deposits (B3) (**Riverine**)
X Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
X FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)	X		4

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology evidenced by saturation within 12 inches of soil surface and riverine drift deposits.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.111618

Sampling Point 28 | Feature ID: PON14

Project/Site: Friant Kern Canal | City/County: Kern County | Sampling Date: 9/30/2019

Applicant/Owner: Friant | State: CA

Investigator(s): YS, BC | Section, Township, Range: Sec. 9, T25S, R26E

Local relief (hillside, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope (%): 2

Subregion (LRR): Mediterranean California (I | Lat: 35.775502 | Long: -119.177624 | Datum: NAD 83

Soil Map Unit Name: Exeter sandy loam, 0 to 2 percent slopes (154) | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil No , or Hydrology No naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes x No ___	Is the Sampled Area within a Wetland? Yes x No ___
Hydric Soil Present?	Yes x No ___	
Wetland Hydrology Present?	Yes x No ___	

Remarks: Data point documents seasonal pond in a man made depression.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

	3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)					
1					
2					
3					
4					
			0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)					
1					
2					
3					
4					
5					
			0	= Total Cover	
Herb Stratum (Plot size:)					
1	ammrob	Ammannia robusta	70	YES	OBL
2	cypdif	Cyperus difformis	15	NO	OBL
3					
4					
5					
6					
7					
8					
9					
10					
11					
			85	= Total Cover	
Woody Vine Stratum (Plot size:)					
1					
2					
			0	= Total Cover	

%Bare Ground in Herb Stratum: ___ % Cover of Biotic Crust: ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	85	x 1 =	85
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	85 (A)		85 (B)

Prevalence Index = B/A = 1

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
Yes 2 - Dominance Test is >50%
Yes 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Area dominated by hydrophytic vegetation.

SOIL Sampling Point 28

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	2.5y 4/1	70	5yr 4/6	30	C	PL	Sandy clay loam	Prominent redox
3-16	10yr 4/2	85	5yr 4/6	15	C	PL	Loamy Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

X Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? **Yes** X **No** ___

Remarks: F3 is met by a layer with 60% or more chroma of 2 or less, and value of 4 or more that is 2inches thick starting within the upper 4 inches of the soil surface, And contains redox concentrations occurring as pore linings.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
X Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

___ Salt Crust (B11)
X Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology evidenced by saturation, surface soil cracks, and biotic crust.

WETLAND DETERMINATION DATA FORM -Arid West Region

v.111618

Sampling Point: 29 | Feature ID: Upland

Project/Site: Friant-Kern Canal | City/County: Kern County | Sampling Date: 9/30/2019

Applicant/Owner: Friant | State: CA

Investigator(s): YS, BC | Section, Township, Range: Sec. 9, T25S, R26E

Local relief (hillside, terrace, etc.): Slope | Local Relief (concave, convex, none): Concave | Slope (%): 15

Subregion (LRR): Mediterranean California (l | Lat: 35.775497 | Long: -119.177646 | Datum: NAD 83

Soil Map Unit Name: Exeter sandy loam, 0 to 2 percent slopes (154) | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of yea Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? ___ Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil No , or Hydrology No naturally problematic? ___ (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		x
Hydric Soil Present?		x
Wetland Hydrology Present?		x
Is the Sampled Area within a Wetland?		X

Remarks: Upland pair point to pond documented by data point 28.

VEGETATION – Use scientific names of plants. List all species in the plot. MUST LIST COVER IN DESECENDING ORDER

3/3 Abbrev.	Species Name	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1				
2				
3				
4				
		0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)				
1				
2				
3				
4				
5				
		0 = Total Cover		
Herb Stratum (Plot size:)				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
		0 = Total Cover		
Woody Vine Stratum (Plot size:)				
1				
2				
		0 = Total Cover		

%Bare Ground in Herb Stratum: 100 | % Cover of Biotic Crust: ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ###### (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

No 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ 6 - Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: Barren no vegetation present.

SOIL Sampling Point 29

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/3	100					Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ___
Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Hydric soil indicators not observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology indicators not observed.

Appendix C ORDINARY HIGH WATER MARK DATA FORMS

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Sampling Point: 15 **Feature ID:** IS1 **Date:** 10/3/2019

Project: Friant-Kern Canal Middle Reach Capacity Correction Project

Location: Tulare County, CA **Photo begin/end file#:** See Field Photos

Investigator(s): BC, YS

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: Deer Creek at Friant Kern Canal syphon

Projection: Lambert **Datum:** NAD83

Coordinates:

Potential anthropogenic influences on the channel system:

Road crossings and water routinely released into stream from Friant Kern Canal. The stream banks were also fortified with rip-rap in the vacinity of the canal.

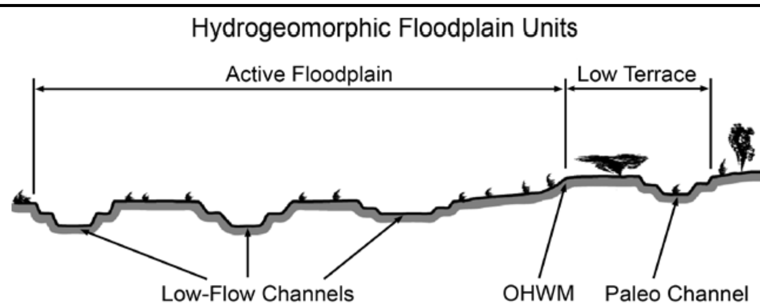
Brief site description:

Surface water present in western portion of the study area due to water released from canal the channel is dry east of the canal.

Checklist of resources (if available):

- [ ] Aerial photography
  - **Dates:**
- [ ] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [ ] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies:

- [ ] Stream gage data
  - **Gage number:**
  - Period of record:
- [ ] History of recent effective discharges
- [ ] Results of flood frequency analysis
- [ ] Most recent shift-adjusted rating
- [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event



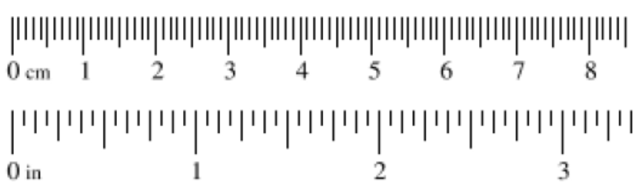
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

- [ ] Mapping on aerial photograph
- [ ] Digitized on computer
- [X] GPS
- [ ] Other:

Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
			Boulder	Gravel
	10.08	256		
			Cobble	
	2.56	64		
			Pebble	
	0.157	4		
			Granule	
	0.079	2.00		
			Very coarse sand	Sand
	0.039	1.00		
			Coarse sand	
	0.020	0.50		
			Medium sand	
1/2	0.0098	0.25		
			Fine sand	
1/4	0.005	0.125		
			Very fine sand	
1/8	0.0025	0.0625		
			Coarse silt	Silt
1/16	0.0012	0.031		
			Medium silt	
1/32	0.00061	0.0156		
			Fine silt	
1/64	0.00031	0.0078		
			Very fine silt	
1/128	0.00015	0.0039		
			Clay	Mud



Feature ID: **Cross section ID:** **Date:** **Time:**

Cross section drawing:

OHWM

GPS point: ____________________

Indicators:

- [X] Change in average sediment texture
- [X] Change in vegetation species
- [X] Change in vegetation cover
- [X] Break in bank slope
- [X] Other: Drift deposits
- [ ] Other: ____________________

Comments:

Some diff species in channel or below OHWM such as cocklebur.

Floodplain unit: [ ] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ____________________

Total veg cover: ______ % Tree: ______ % Shrub: ______ % Herb: ______ %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________________
- [ ] Other: ____________________
- [ ] Other: ____________________

Comments:

Feature ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: Sandy loam

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

☐ NA ☐ Mid (herbaceous, shrubs, saplings)
☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks ☐ Soil development
☐ Ripples ☐ Surface relief
☐ Drift and/or debris ☐ Other: ____________________
☐ Presence of bed and bank ☐ Other: ____________________
☐ Benches ☐ Other: ____________________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ____________________

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

☐ NA ☐ Mid (herbaceous, shrubs, saplings)
☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks ☐ Soil development
☐ Ripples ☐ Surface relief
☐ Drift and/or debris ☐ Other: ____________________
☐ Presence of bed and bank ☐ Other: ____________________
☐ Benches ☐ Other: ____________________

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Sampling Point: 20 **Feature ID:** PON4 **Date:** 10/2/2019

Project: Friant Kern Canal

Location: Tulare County, CA **Photo begin/end file#:** See Field Photos

Investigator(s): BC, YS

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details:

Projection: Lambert **Datum:** NAD83

Coordinates:

Potential anthropogenic influences on the channel system:

Detention basin. Water is managed by agriculture

Brief site description:

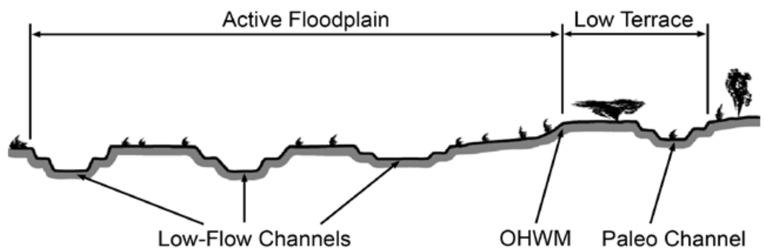
Large pond between canal and ag land

Checklist of resources (if available):

- [ ] Aerial photography
  - **Dates:**
- [ ] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [ ] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies:

- [ ] Stream gage data
  - **Gage number:**
  - Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

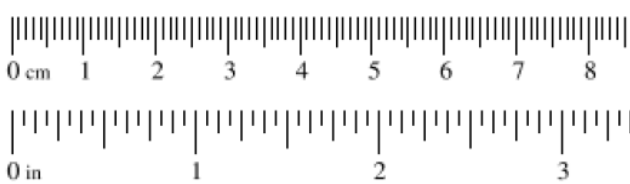
1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

[ ] Mapping on aerial photograph [X] GPS

[ ] Digitized on computer [ ] Other:

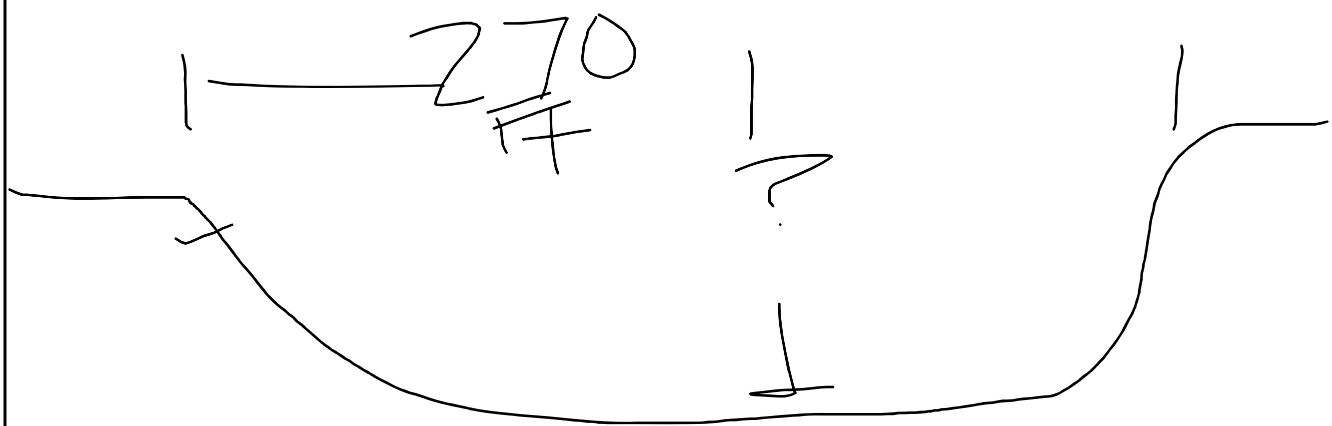
Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
			Boulder	Gravel
	10.08	256		
			Cobble	Gravel
	2.56	64		
			Pebble	Gravel
	0.157	4		
			Granule	Gravel
	0.079	2.00		
			Very coarse sand	Sand
	0.039	1.00		
			Coarse sand	Sand
	0.020	0.50		
			Medium sand	Sand
1/2	0.0098	0.25		
			Fine sand	Sand
1/4	0.005	0.125		
			Very fine sand	Sand
1/8	0.0025	0.0625		
			Coarse silt	Silt
1/16	0.0012	0.031		
			Medium silt	Silt
1/32	0.00061	0.0156		
			Fine silt	Silt
1/64	0.00031	0.0078		
			Very fine silt	Silt
1/128	0.00015	0.0039		
			Clay	Mud



Feature ID: **Cross section ID:** **Date:** **Time:**

Cross section drawing:



OHWM

GPS point: ____________________

Indicators:

- [ ] Change in average sediment texture
- [X] Change in vegetation species
- [X] Change in vegetation cover
- [X] Break in bank slope
- [ ] Other: Drift deposits
- [ ] Other: ____________________

Comments:

Water is currently being pumped into the pond.

Floodplain unit: [ ] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ____________________

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________________
- [ ] Other: ____________________
- [ ] Other: ____________________

Comments:

Feature ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: Sandy loam

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ____________________

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________________
- ☐ Other: ____________________
- ☐ Other: ____________________

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Sampling Point: 21 **Feature ID:** PON10 **Date:** 10/2/2019

Project: Friant kern canal

Location: Tulare County, CA **Photo begin/end file#:** See Field Photos

Investigator(s): BC, YS

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details:

Projection: Lambert **Datum:** NAD83

Coordinates:

Potential anthropogenic influences on the channel system:

Detention basin. Water is managed by agriculture

Brief site description:

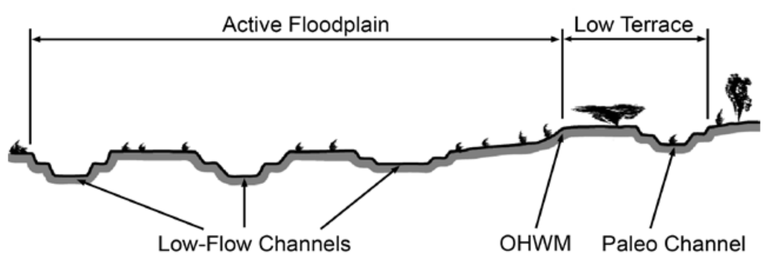
pond between canal and ag land

Checklist of resources (if available):

- [ ] Aerial photography
  Dates:
- [ ] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [ ] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies:

- [ ] Stream gage data
  Gage number:
  Period of record:
- [ ] History of recent effective discharges
- [ ] Results of flood frequency analysis
- [ ] Most recent shift-adjusted rating
- [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



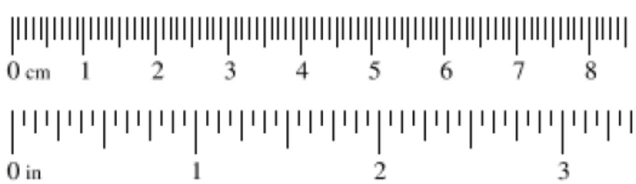
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

- [ ] Mapping on aerial photograph
- [ ] Digitized on computer
- [X] GPS
- [ ] Other:

Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
			Boulder	Gravel
	10.08	256		
			Cobble	
	2.56	64		
			Pebble	
	0.157	4		
			Granule	
	0.079	2.00		
			Very coarse sand	Sand
	0.039	1.00		
			Coarse sand	
	0.020	0.50		
			Medium sand	
1/2	0.0098	0.25		
			Fine sand	
1/4	0.005	0.125		
			Very fine sand	
1/8	0.0025	0.0625		
			Coarse silt	Silt
1/16	0.0012	0.031		
			Medium silt	
1/32	0.00061	0.0156		
			Fine silt	
1/64	0.00031	0.0078		
			Very fine silt	
1/128	0.00015	0.0039		
			Clay	Mud



Feature ID: **Cross section ID:** **Date:** **Time:**

Cross section drawing:

OHWM

GPS point: ______________________

Indicators:

- [ ] Change in average sediment texture
- [X] Change in vegetation species
- [X] Change in vegetation cover
- [X] Break in bank slope
- [X] Other: Drift deposits
- [ ] Other: ______________________

Comments:

Water is managed by ag.

Floodplain unit: [ ] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:

Average sediment texture: ______________________

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ______________________
- [ ] Other: ______________________
- [ ] Other: ______________________

Comments:

Feature ID: **Cross section ID:** **Date:** **Time:**

<u>Floodplain unit:</u> ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: Sandy loam

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

☐ NA ☐ Mid (herbaceous, shrubs, saplings)

☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks ☐ Soil development

☐ Ripples ☐ Surface relief

☐ Drift and/or debris ☐ Other: ____________________

☐ Presence of bed and bank ☐ Other: ____________________

☐ Benches ☐ Other: ____________________

Comments:

<u>Floodplain unit:</u> ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ____________________

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

☐ NA ☐ Mid (herbaceous, shrubs, saplings)

☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks ☐ Soil development

☐ Ripples ☐ Surface relief

☐ Drift and/or debris ☐ Other: ____________________

☐ Presence of bed and bank ☐ Other: ____________________

☐ Benches ☐ Other: ____________________

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Sampling Point: 22 **Feature ID:** IS2 **Date:** 10/1/2019

Project: Friant-Kern Canal Middle Reach Capacity Correction Project

Location: Tulare County, CA **Photo begin/end file#:** See Field Photos

Investigator(s): BC, YS

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: White River at Friant Kern Canal downstream

Projection: Lambert **Datum:** NAD83

Coordinates: 35.843901°, -119.162143°

Potential anthropogenic influences on the channel system:

Water is released from Friant-Kern Canal into the White River an intermittent stream.

Brief site description:

Intermittent stream flowing west.

Checklist of resources (if available):

[X] Aerial photography
Dates:

[X] Topographic maps

[ ] Geologic maps

[ ] Vegetation maps

[ ] Soils maps

[ ] Rainfall/precipitation maps

[ ] Existing delineation(s) for site

[X] Global positioning system (GPS)

[ ] Other studies:

[ ] Stream gage data
Gage number:

Period of record:

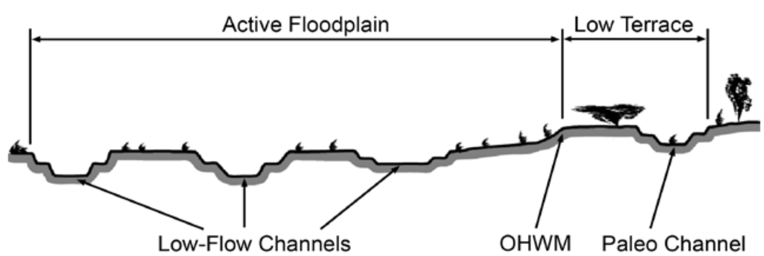
[ ] History of recent effective discharges

[ ] Results of flood frequency analysis

[ ] Most recent shift-adjusted rating

[ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

[ ] Mapping on aerial photograph [X] GPS

[ ] Digitized on computer [ ] Other:

Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
			Boulder	Gravel
	10.08	256		
			Cobble	
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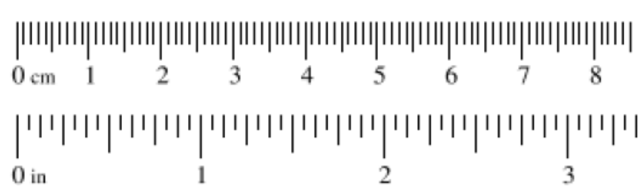
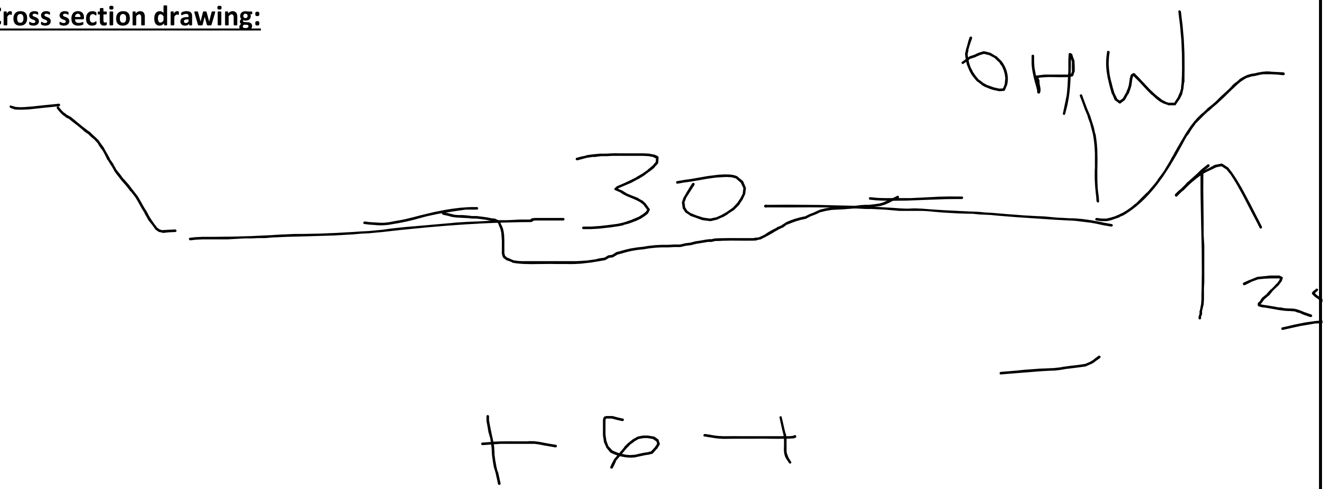
			Granule	
	0.079	2.00		
			Very coarse sand	Sand
	0.039	1.00		
			Coarse sand	
	0.020	0.50		
			Medium sand	
1/2	0.0098	0.25		
			Fine sand	
1/4	0.005	0.125		
			Very fine sand	
1/8	0.0025	0.0625		
			Coarse silt	Silt
1/16	0.0012	0.031		
			Medium silt	
1/32	0.00061	0.0156		
			Fine silt	
1/64	0.00031	0.0078		
			Very fine silt	
1/128	0.00015	0.0039		
			Clay	Mud



Feature ID: **Cross section ID:** **Date:** **Time:**

Cross section drawing:



OHWM

GPS point: ____________________

Indicators:

- [X] Change in average sediment texture
- [X] Change in vegetation species
- [ ] Change in vegetation cover
- [X] Break in bank slope
- [ ] Other: ____________________
- [ ] Other: ____________________

Comments:

Floodplain unit: [X] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: Cobble, pebble, few boulders

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- [X] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [X] Other: Change in veg cover
- [X] Other: Deposition/sorting
- [X] Other: Change in sediment type

Comments:

Some sandy material remains but low flow contains water released from canal with larger rocks not in other portions of the floodplain below the ohwm

Feature ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: Sandy loam

Total veg cover: ____ % Tree: ____ % Shrub: 25 % Herb: 70 %

Community successional stage:

☐ NA ☒ Mid (herbaceous, shrubs, saplings)

☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks ☐ Soil development

☐ Ripples ☐ Surface relief

☐ Drift and/or debris ☒ Other: Change in sediment type

☐ Presence of bed and bank ☒ Other: Drift deposits

☐ Benches ☒ Other: Change in veg species

Comments:

Several indicators observed consistent with OHWM and at change in floodplain.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: ____________________

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

☐ NA ☐ Mid (herbaceous, shrubs, saplings)

☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks ☐ Soil development

☐ Ripples ☐ Surface relief

☐ Drift and/or debris ☐ Other: ____________________

☐ Presence of bed and bank ☐ Other: ____________________

☐ Benches ☐ Other: ____________________

Comments:

No low terrace as channel has been fortified with rip-rap

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Sampling Point: 27 **Feature ID:** IS4 **Date:** 10/1/2019

Project: Friant-Kern Canal Middle Reach Capacity Correction Project

Location: Tulare County, CA **Photo begin/end file#:** See Field Photos

Investigator(s): BC, YS

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: White River at Friant Kern Canal upstream

Projection: Lambert **Datum:** NAD83

Coordinates: 35.843741°, -119.161311°

Potential anthropogenic influences on the channel system:

Paved road through channel and fortified banks around canal.

Brief site description:

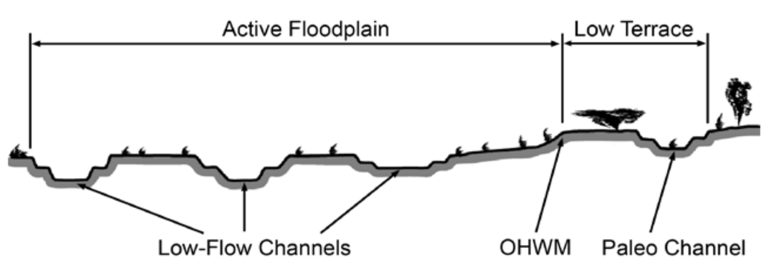
White River upstream of Friant-Kern Canal syphon.

Checklist of resources (if available):

- [X] Aerial photography
  - **Dates:**
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [ ] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies:

- [ ] Stream gage data
  - **Gage number:**
  - Period of record:
- [ ] History of recent effective discharges
- [ ] Results of flood frequency analysis
- [ ] Most recent shift-adjusted rating
- [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



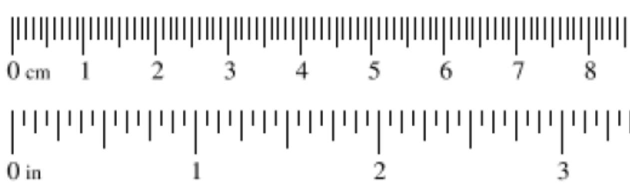
Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

- [ ] Mapping on aerial photograph
- [ ] Digitized on computer
- [X] GPS
- [ ] Other:

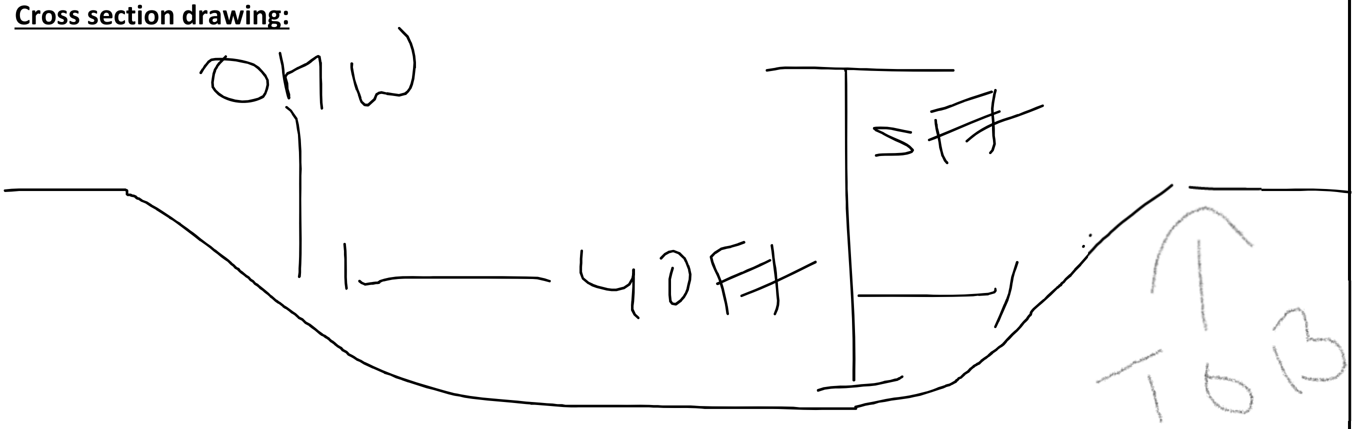
Wentworth Size Classes

Inches (in)		Millimeters (mm)	Wentworth size class	
			Boulder	Gravel
	10.08	256		
			Cobble	
	2.56	64		
			Pebble	
	0.157	4		
			Granule	
	0.079	2.00		
			Very coarse sand	Sand
	0.039	1.00		
			Coarse sand	
	0.020	0.50		
			Medium sand	
1/2	0.0098	0.25		
			Fine sand	
1/4	0.005	0.125		
			Very fine sand	
1/8	0.0025	0.0625		
			Coarse silt	Silt
1/16	0.0012	0.031		
			Medium silt	
1/32	0.00061	0.0156		
			Fine silt	
1/64	0.00031	0.0078		
			Very fine silt	
1/128	0.00015	0.0039		
			Clay	Mud



Feature ID: **Cross section ID:** **Date:** **Time:**

Cross section drawing:



OHWM

GPS point: ____________________

Indicators:

- [X] Change in average sediment texture
- [X] Change in vegetation species
- [X] Change in vegetation cover
- [X] Break in bank slope
- [X] Other: Drift deposits
- [ ] Other: ____________________

Comments:

Sandy composition in channel

Floodplain unit: [X] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: ____________________

Characteristics of the floodplain unit:

Average sediment texture: Mostly sand, few cobbles and boulders

Total veg cover: 1 % Tree: 0 % Shrub: 0 % Herb: 1 %

Community successional stage:

- [ ] NA
- [X] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [X] Other: Change in veg cover
- [ ] Other: ____________________
- [ ] Other: ____________________

Comments:

Feature ID: **Cross section ID:** **Date:** **Time:**

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:

Average sediment texture: Sand

Total veg cover: 15 % Tree: ____ % Shrub: 40 % Herb: 40 %

Community successional stage:

☐ NA ☒ Mid (herbaceous, shrubs, saplings)
☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks ☐ Soil development
☐ Ripples ☐ Surface relief
☒ Drift and/or debris ☒ Other: Break in slope
☐ Presence of bed and bank ☐ Other: ______________________
☐ Benches ☐ Other: ______________________

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ______________________

Characteristics of the floodplain unit:

Average sediment texture: ______________________

Total veg cover: ____ % Tree: ____ % Shrub: ____ % Herb: ____ %

Community successional stage:

☐ NA ☐ Mid (herbaceous, shrubs, saplings)
☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

☐ Mudcracks ☐ Soil development
☐ Ripples ☐ Surface relief
☐ Drift and/or debris ☐ Other: ______________________
☐ Presence of bed and bank ☐ Other: ______________________
☐ Benches ☐ Other: ______________________

Comments:

Appendix D PLANT LIST

Friant-Kern Canal Middle Reach Capacity Correction Project Wetland Delineation

Appendix D. Plant List

Scientific Name[1]	Common Name	Wetland Indicator Status[2]
Alisma triviale	northern water-plantain	Obligate
Amaranthus albus	tumbleweed	Facultative Upland
Amaranthus palmeri	Palmer's amaranth	Facultative Upland
Ammannia robusta	grand redstem	Obligate
Atriplex polycarpa	allscale saltbush	Facultative Upland
Avena barbata	slender oat	Upland
Baccharis salicifolia	mulefat	Facultative
Bromus diandrus	ripgut grass	Upland
Bromus hordeaceus	soft chess	Facultative Upland
Bromus madritensis	foxtail chess	Upland
Citrullus colocynthis	wild watermelon	Upland
Conium maculatum	poison hemlock	Facultative Wetland
Convolvulus arvensis	bindweed	Upland
Croton setiger	turkey-mullein	Upland
Cyperus difformis	variable flat sedge	Obligate
Cyperus eragrostis	tall flat sedge	Facultative Wetland
Cyperus erythrorhizos	red-root flat sedge	Obligate
Cyperus esculentus	chufa	Facultative Wetland
Echinochloa colona	jungle-rice	Facultative
Eleocharis macrostachya [3]	common spikerush	Obligate
Epilobium brachycarpum	annual fireweed	Upland
Epilobium ciliatum	fringed willowherb	Facultative Wetland
Erigeron canadensis	horseweed	Facultative Upland
Eriogonum fasciculatum	California buckwheat	Upland
Festuca bromoides[4]	brome fescue	Facultative Upland
Helianthus annuus	common sunflower	Facultative Upland
Hirschfeldia incana	short podded mustard	Upland
Hordeum murinum	wall barley	Facultative Upland
Lactuca serriola	prickly lettuce	Facultative Upland
Leersia oryzoides	rice cutgrass	Obligate
Leptochloa fusca[5]	sprangletop	Facultative Wetland
Malva parviflora	cheeseweed	Upland
Medicago sativa	alfalfa	Upland
Persicaria lapathifolia	willow weed	Facultative Wetland
Polypogon monspeliensis	rabbitfoot grass	Facultative Wetland

Scientific Name[1]	Common Name	Wetland Indicator Status[2]
Populus fremontii[6]	Fremont cottonwood	Facultative
Prunus dulcis	almond	Upland
Quercus lobata	valley oak	Facultative Upland
Rorippa curvipes	blunt-leaf yellowcress	Facultative Wetland
Rumex crispus	curly dock	Facultative
Salix laevigata	red willow	Facultative Wetland
Salsola tragus	Russian thistle	Facultative Upland
Stachys albens	white-stem hedge-nettle	Obligate
Tribulus terrestris	puncture vine	Upland
Typha latifolia	broad-leaved cattail	Obligate
Urtica dioica	stinging nettle	Facultative
Vitis vinifera	wine grape	Upland
Xanthium strumarium	cocklebur	Facultative

[1] Taxonomic nomenclature for plant species followed: Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. *The Jepson manual: vascular plants of California, second edition*. University of California Press, Berkeley, California.

[2] Wetland indicator status for plant species followed Lichvar, R. W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. *Phytoneuron* 2016-30: 1-17.

[3] *Eleocharis palustris* in Lichvar et al. 2016.

[4] *Vulpia bromoides* in Lichvar et al. 2016.

[5] *Diplachne fusca* in Lichvar et al. 2016.

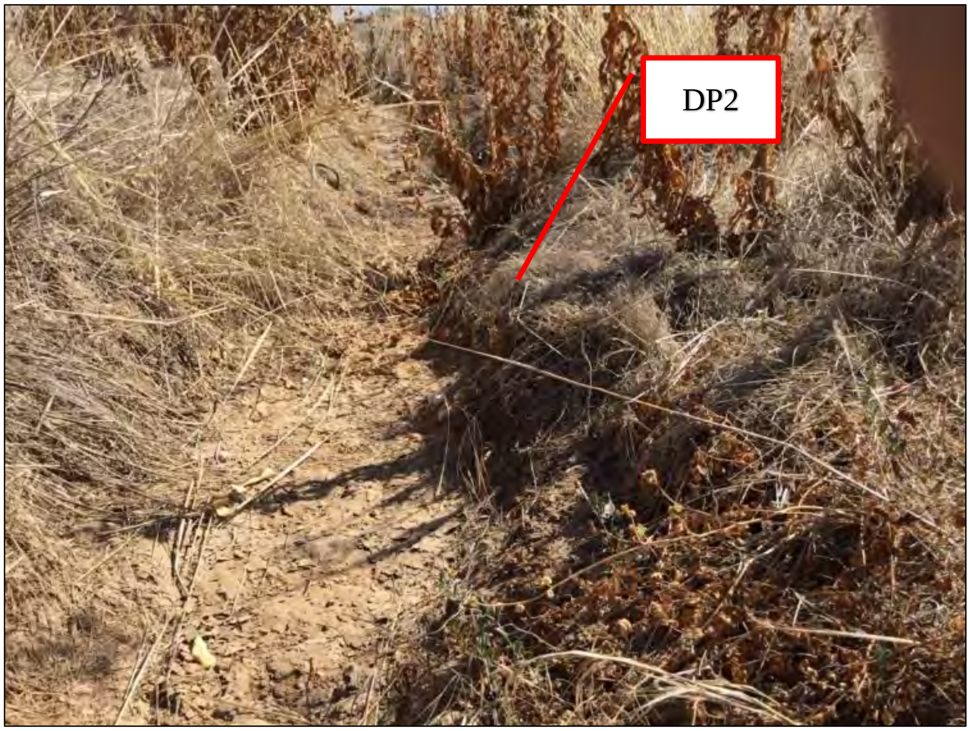
[6] Populus deltoides in Lichvar et al. 2016.

Appendix E REPRESENTATIVE PHOTOGRAPHS

Friant-Kern Canal Middle Reach Capacity Correction Project
Delineation of Waters of the United States
Appendix E. Photographs

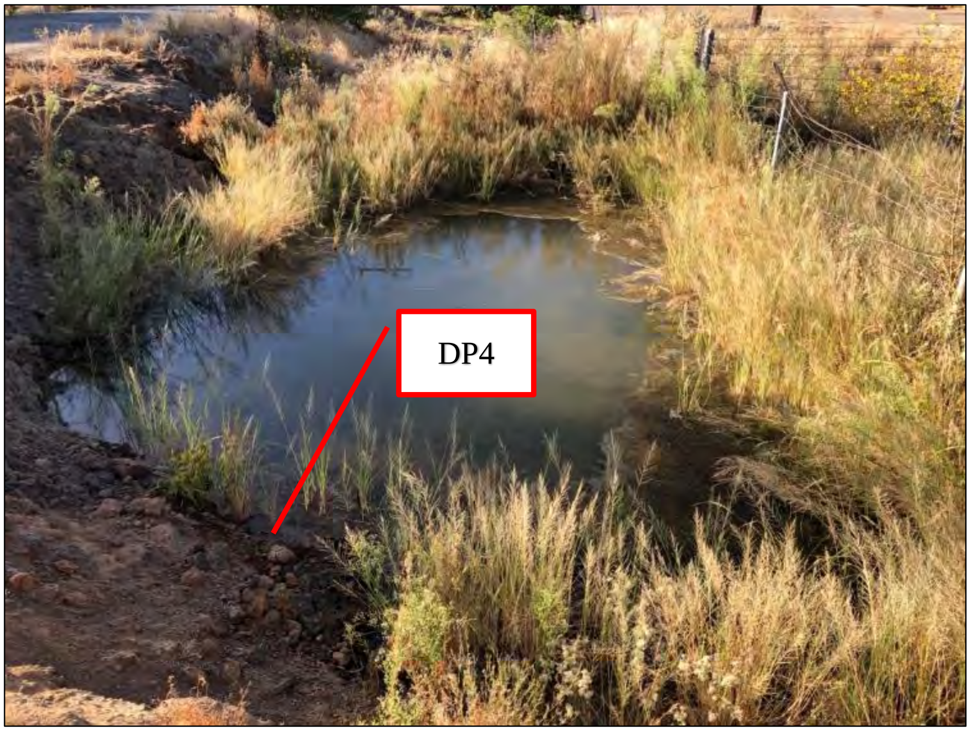
Photographs Taken September 30, October 1, 2 and 3, and December 10 and 11, 2019

Photograph 1. Upland. Data Point 1 (DP1) documents upland conditions in a suspect area. Orientation: east.

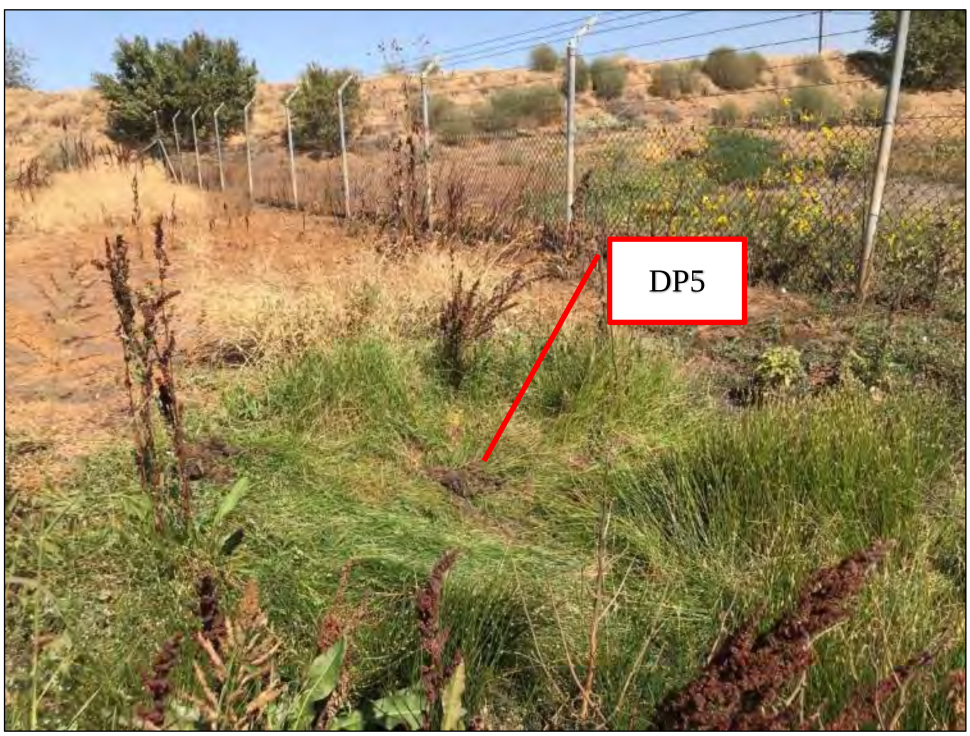


Photograph 2. Non-vegetated ditch (NVD1). DP2 documents the ordinary high water mark (OHWM) of a non-vegetated ditch. Orientation: east.

Photograph 3. Upland. DP3 documents upland conditions in a suspect area. Orientation: north.



Photograph 4. Pond (PON1). DP4 documents pond that appears to have formed from a leak from the canal, as water was observed coming up from the ground under the surface of the pond. Orientation: north.



Photograph 5. Seasonal Wetland (SW1). DP5 documents a seasonal wetland supporting dominant hydrophytic vegetation and wetland hydrology, with problematic seasonally ponded soils. Orientation: north.

Photograph 6. Pond (PON2). DP6 documents wetland vegetation around a pond in an excavation for a storm water siphon under the Friant-Kern Canal. Orientation: west.

Photograph 7. Upland. DP7 documents upland conditions adjacent to DP6. Orientation: southwest.

Photograph 8. Irrigation Canal (IC3). DP8 documents the OHWM and absence of hydric soil in an irrigation canal supporting dominant hydrophytic vegetation. Orientation: northwest.

Photograph 9. Groundwater Recharge Basin (GRB2). DP9 documents non-wetland conditions within a groundwater recharge basin. Orientation: east.

Photograph 10. Pond (PON6). DP10 documents non-wetland conditions within a pond supporting hydrophytic vegetation. Orientation: southeast.

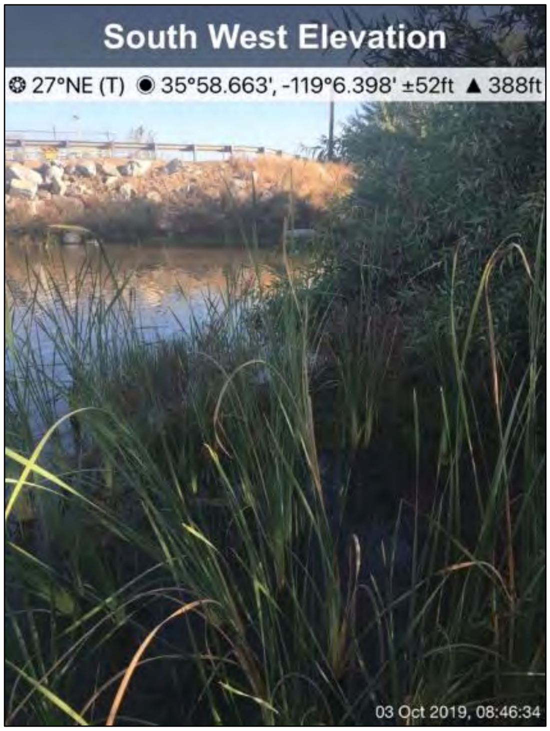
Photograph 11. Groundwater Recharge Basin (GRB4). DP11 documents wetland conditions within a groundwater recharge basin. Orientation: east.

Photograph 12. Upland. DP12 documents upland condition adjacent to wetlands within a groundwater recharge basin. Orientation: northeast.

Photograph 13. Upland. DP13 documents upland conditions associated with a slight rise within a depression adjacent to Deer Creek. Orientation: southwest.

Photograph 14. Riparian Wetland (RW1). DP14 documents wetland conditions within a depression adjacent to Deer Creek. Orientation: southwest.

Photograph 15. Intermittent Stream (IS3). DP15 documents the OHWM of Deer Creek. Orientation: southwest



Photograph 16. Riparian/fresh emergent wetland complex (RW/FEW1). DP16 documents a riparian/fresh emergent wetland complex along the margins of Deer Creek. Orientation: northeast.

Photograph 17. Upland. DP17 documents upland conditions adjacent to a riparian wetland/fresh emergent wetland documented by DP16. Orientation: south.

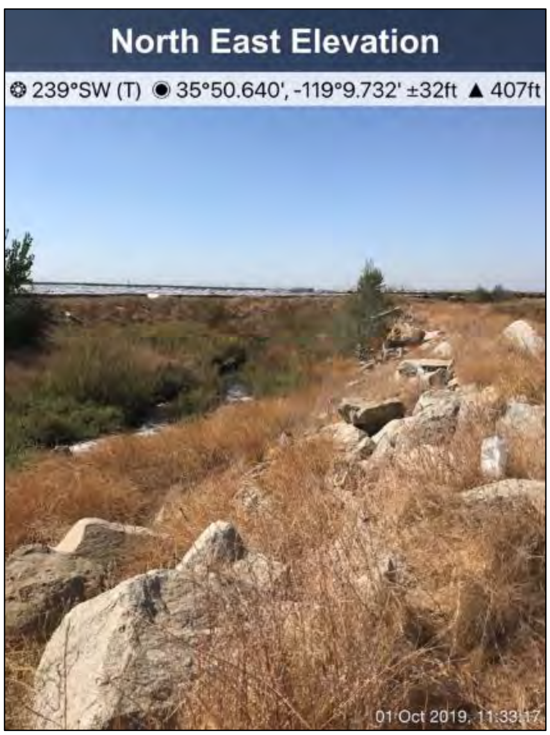
Photograph 18. Riparian wetland (RW3). DP18 documents riparian wetland adjacent to Deer Creek. Orientation: northeast.

Photograph 19. Upland. DP19 documents upland conditions adjacent to a riparian wetland documented by DP18. Orientation: south.

Photograph 20. Pond (PON9). DP20 documents the OHWM of an irrigation pond. Orientation: northeast.

Photograph 21. Pond (PON10). DP21 documents the OHWM of an irrigation pond. Orientation: south.

Photograph 22. Intermittent stream (IS2). DP22 documents the OHWM of the White River where water is released into the intermittent stream from the Friant-Kern Canal. Orientation: southeast.



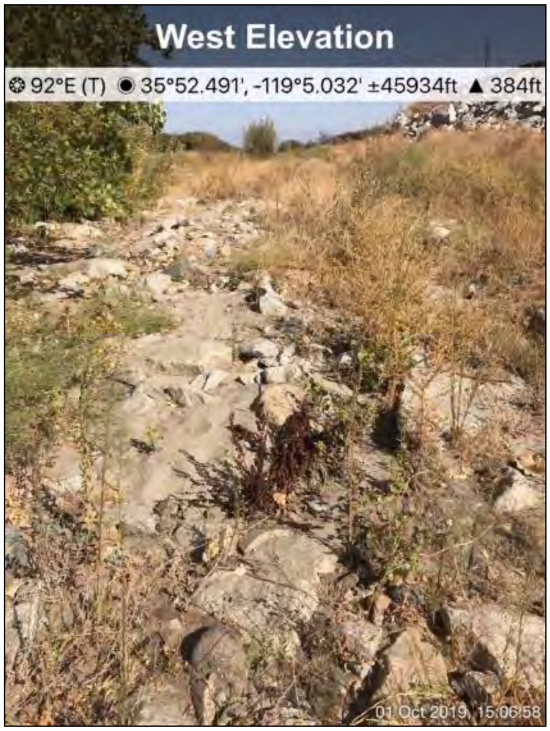
Photograph 23. Intermittent stream (IS2). Looking downstream at fortified banks of the White River downstream of the Friant-Kern Canal. Orientation: southwest.

Photograph 24. Riparian wetland (RW4). DP23 documents a riparian wetland associated with the White River downstream of the Friant-Kern Canal. Orientation: northeast.

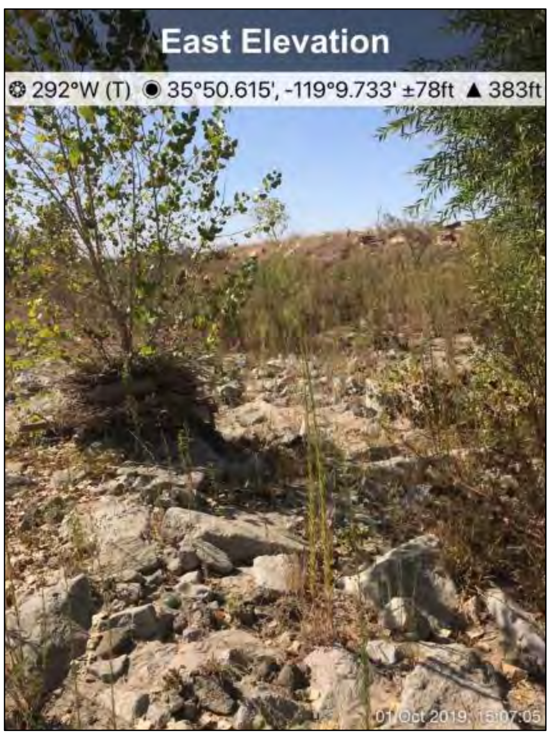
Photograph 25. Riparian wetland (RW4). DP23 documents a riparian wetland associated with the White River downstream of the Friant-Kern Canal. Orientation: west.

Photograph 26. Upland. DP24 documents upland conditions adjacent to riparian wetlands associated with the White River downstream of the Friant-Kern Canal documented by DP23. Orientation: northeast.

Photograph 27. Upland. DP24 documents upland conditions adjacent to riparian wetlands associated with the White River downstream of the Friant-Kern Canal documented by DP23. Orientation: east.

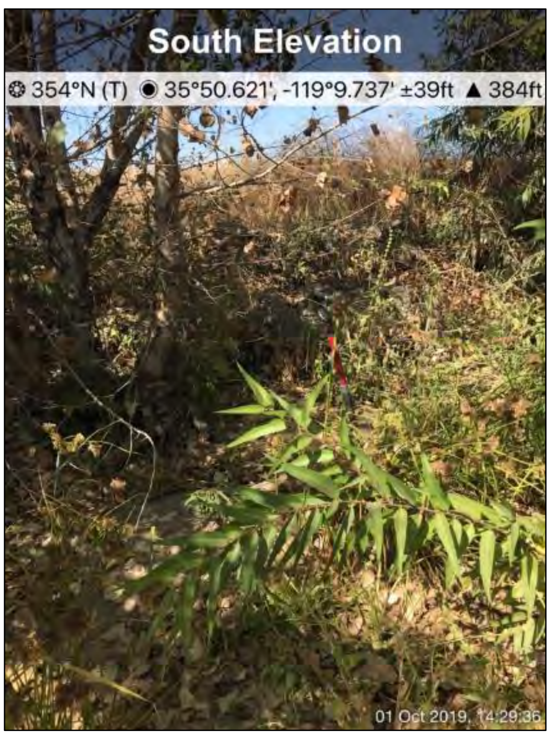


Photograph 28. Intermittent stream (IS4). DP25 documents non-wetland conditions in the White River adjacent to riparian wetlands documented by DP26. Orientation: east.



Photograph 29. Intermittent stream (IS4). DP25 documents non-wetland conditions in the White River adjacent to riparian wetlands documented by DP26. Orientation: west.

Photograph 30. Riparian wetland (RW6). DP26 documents a riparian wetland associated with the White River. Orientation: northwest.



Photograph 31. Riparian wetland (RW6). DP26 documents a riparian wetland associated with the White River. Orientation: north.

Photograph 32. Intermittent stream (IS4). DP27 documents OHWM of the White River upstream of the Friant-Kern Canal. Orientation: west.

Photograph 33. Intermittent Stream (IS4). White River upstream of DP27. Orientation: east.

Photograph 34. Pond (PON14). DP28 documents a seasonal pond that supports wetland vegetation and hydric soils. Orientation: northeast.

Photograph 35. Upland. DP29 documents upland conditions adjacent to the pond documented by DP28. Orientation: southwest.

Photograph 36. Pond (PON3). Photograph shows pond in excavation for a siphon underneath the Friant-Kern Canal. Orientation: west.

Photograph 37. Pond (PON6). Irrigation pond with hydrophytic vegetation. Orientation: east.

Photograph 38. Groundwater recharge Basin (GRB4). Groundwater recharge basin that supports dominant hydrophytic vegetation, mostly cocklebur (*Xanthium strumarium*). Orientation: east.

Photograph 39. Groundwater recharge Basin (GRB2). Groundwater recharge basin that does not support dominant hydrophytic vegetation. Orientation: north.

Photograph 40. Irrigation canal (IC10). Photograph shows water being delivered from Friant-Kern Canal into Tipton Ditch. Orientation: west.

Appendix F APPROVED JURISDICTIONAL DETERMINATION FORMS

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): October 17, 2014

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Sacramento District, Poso Creek Jurisdictional Determination, SPK-2003-00265

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State: **California** County/parish/borough: **Kern** City: **N/A**
Center coordinates of site (lat/long in degree decimal format): Lat. **35.63298°**, Long. **-119.33298°**
Universal Transverse Mercator: **11 288745.18 3945748.47**
Name of nearest waterbody: **Poso Creek**
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: **N/A**
Name of watershed or Hydrologic Unit Code (HUC): **Tulare-Buena Vista Lakes. California., 18030012**
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form:

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☒ Office (Desk) Determination. Date: **October 17, 2014**
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet, wide, and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
      Elevation of established OHWM (if known):

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **The review area consists of the 32.6 miles of Poso Creek from Highway 65 (Latitude 35.71770°, Longitude -119.57936°) to the terminus at the Kern National Wildlife Refuge (NWR) (Latitude 35.55135°, Longitude -119.08744°), as shown in the attached map. Poso Creek, within the review area, was determined to be an intrastate, non-navigable, isolated water on April 26, 2004. The creek was reviewed for a nexus with interstate commerce due to potential recreation along the waterway and at the Kern NWR. It was determined through coordination with USACE HQ in 2004, that the portion**

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

of Poso Creek west of Highway 65 is not jurisdictional under Section 404 of the Clean Water Act. Poso Creek originates in the Sequoia National Forest in Tulare and Kern Counties and terminates at the Kern NWR. At approximately Highway 65 Poso Creek leaves the undeveloped foothills and enters the agricultural lands of the Central Valley. The natural channel of Poso Creek terminates approximately 19.22 miles downstream of Highway 65, approximately 2.09 miles west of Highway 43. The creek historically ended at this point with any flood flows spreading out onto the surrounding valley floor. An approximately 13.38-mile artificial channel was constructed in the early 1960's to prevent flooding of county roads by redirecting flood flows to the Kern NWR. The NWR receives regular water deliveries from the California Aqueduct and does not use the Poso Creek flood waters as part of its waterfowl management. The Cawelo Water District provided flow data stating that the creek only contained enough flows to reach the NWR for 20 days in the 35 years between 1960 and 1995. Sixteen of the 20 days are from two flood years. Water within Poso Creek is lost through water diversions, eveporation, or percolation. Poso Creek does not have a hydrologic connection to a traditional navigable water of the U.S. and does not have a nexus to interstate commerce.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW

Identify TNW:

Summarize rationale supporting determination:

2. Wetland adjacent to TNW

Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:

Watershed size: **Pick List**
Drainage area: **Pick List**
Average annual rainfall: inches
Average annual snowfall: inches

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

(ii) Physical Characteristics:

(a) Relationship with TNW:

☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain:

Identify flow route to TNW[5]:
Tributary stream order, if known:

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain:
☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

☐ Silts ☐ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain:

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain:
Presence of run/riffle/pool complexes. Explain:
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime:
Other information on duration and volume:

Surface flow is: **Pick List.** Characteristics:

Subsurface flow: **Pick List**. Explain findings:
☐ Dye (or other) test performed:

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank ☐ the presence of litter and debris
☐ changes in the character of soil ☐ destruction of terrestrial vegetation
☐ shelving ☐ the presence of wrack line
☐ vegetation matted down, bent, or absent ☐ sediment sorting
☐ leaf litter disturbed or washed away ☐ scour
☐ sediment deposition ☐ multiple observed or predicted flow events
☐ water staining ☐ abrupt change in plant community
☐ other (list):
☐ Discontinuous OHWM.[7] Explain:

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:
- ☐ oil or scum line along shore objects
- ☐ fine shell or debris deposits (foreshore)
- ☐ physical markings/characteristics
- ☐ tidal gauges
- ☐ other (list):

☐ Mean High Water Mark indicated by:
- ☐ survey to available datum;
- ☐ physical markings;
- ☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.). Explain:
Identify specific pollutants, if known:

(iv) Biological Characteristics. Channel supports (check all that apply):
☐ Riparian corridor. Characteristics (type, average width):
☐ Wetland fringe. Characteristics:
☐ Habitat for:
- ☐ Federally Listed species. Explain findings:
- ☐ Fish/spawn areas. Explain findings:
- ☐ Other environmentally-sensitive species. Explain findings:
- ☐ Aquatic/wildlife diversity. Explain findings:

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:
Properties:
Wetland size: acres
Wetland type. Explain:
Wetland quality. Explain:
Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:
Flow is: **Pick List**. Explain:

Surface flow is**: Pick List**
Characteristics:

Subsurface flow: **Pick List**. Explain findings:
☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:
☐ Directly abutting
☐ Not directly abutting
- ☐ Discrete wetland hydrologic connection. Explain:
- ☐ Ecological connection. Explain:
- ☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW
Project wetlands are **Pick List** river miles from TNW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Flow is from: **Pick List.**
Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:
Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:
Identify specific pollutants, if known:

(iii) Biological Characteristics. Wetland supports (check all that apply):
☐ Riparian buffer. Characteristics (type, average width):
☐ Vegetation type/percent cover. Explain:
☐ Habitat for:
- ☐ Federally Listed species. Explain findings:

☐ Fish/spawn areas. Explain findings:
☐ Other environmentally-sensitive species. Explain findings:
☐ Aquatic/wildlife diversity. Explain findings:

3. Characteristics of all wetlands adjacent to the tributary (if any)
All wetland(s) being considered in the cumulative analysis: **Pick List**
Approximately acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
☐ TNWs: linear feet, wide, Or acres.
☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**

☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:

☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):

☐ Tributary waters: linear feet wide.

☐ Other non-wetland waters: acres.

Identify type(s) of waters:

3. Non-RPWs[8] that flow directly or indirectly into TNWs.

☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):

☐ Tributary waters: linear feet, wide.

☐ Other non-wetland waters: acres.

Identify type(s) of waters:

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.

☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.

☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.

☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.

☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. Impoundments of jurisdictional waters.[9]

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

☐ Demonstrate that impoundment was created from "waters of the U.S.," or

☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or

☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.

☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.

☐ which are or could be used for industrial purposes by industries in interstate commerce.

☐ Interstate isolated waters. Explain:

---

[8]See Footnote # 3.

[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ Other factors. Explain:

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet, wide.
☐ Other non-wetland waters: acres.
Identify type(s) of waters:
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☒ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☒ Non-wetland waters (i.e., rivers, streams): **32.60** linear miles, **ranging between 25 to 250 feet** wide.
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource:
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, wide.
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource:
☐ Wetlands: acres.

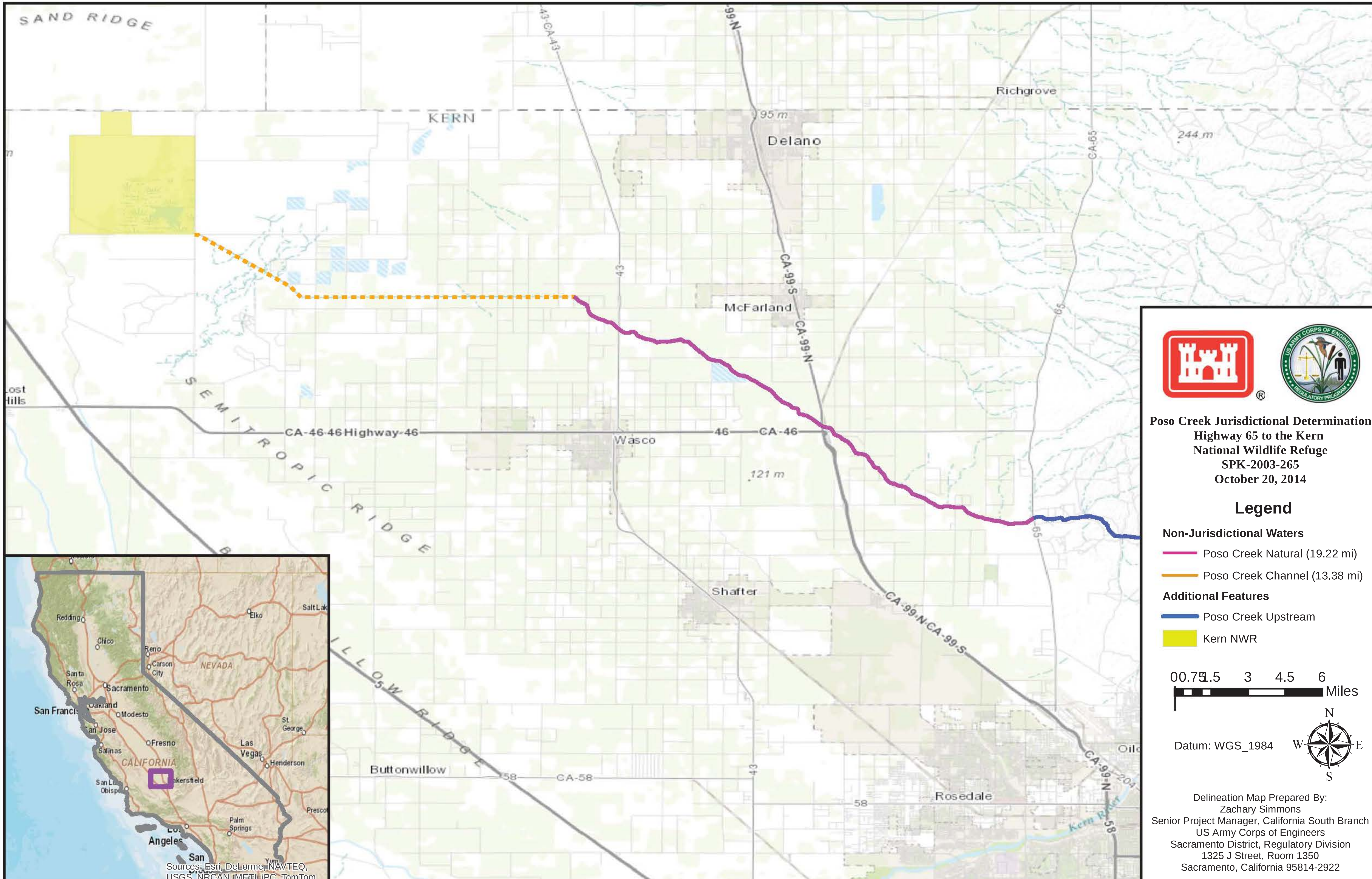
SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: **Poso Creek Jurisdictional Determination, Highway 65 to the Kern National Wildlife Refuge, SPK-2003-265, Dated October 20, 2014**
☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps:
☐ Corps navigable waters' study:
☐ U.S. Geological Survey Hydrologic Atlas:
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: **1:24K; CA-Lost Hills NE, Wasco NW, Pond, McFarland, Famoso, North of Oildale**
☐ USDA Natural Resources Conservation Service Soil Survey. Citation:
☐ National wetlands inventory map(s). Cite name:
☐ State/Local wetland inventory map(s):
☐ FEMA/FIRM maps:
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☐ Photographs: ☐ Aerial (Name & Date):
or ☐ Other (Name & Date):
☐ Previous determination(s). File no. and date of response letter:
☐ Applicable/supporting case law:
☐ Applicable/supporting scientific literature:
☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

The 32.6-mile portion of Poso Creek within the review area, was determined to be an intrastate, non-navigable, isolated water on April 26, 2004. The creek was reviewed for a nexus with interstate commerce due to potential recreation along the waterway and at the Kern NWR. It was determined through coordination with USACE HQ in 2004, that the portion of Poso Creek west of Highway 65 is not jurisdictional under Section 404 of the Clean Water Act. Poso Creek originates in the Sequoia National Forest in Tulare and Kern Counties and terminates at the Kern NWR. At approximately Highwy 65 Poso Creek leaves the undeveloped foothills and enters the agricultural lands of the Central Valley. The natural channel of Poso Creek terminates approximately 19.22 miles downstream of Highway 65, approximately 2.09 miles west of Highway 43. The creek historically ended at this point with any flood flows spreading out onto the surrounding valley floor. An approximately 13.38-mile artificial channel was constructed in the early 1960's to prevent flooding of county roads by redirecting flood flows to the Kern NWR. The NWR receives regular water deliveries from the California Aqueduct and does not use the Poso Creek flood waters as part of its waterfowl management. The Cawelo Water District provided flow data stating that the creek only contained enough flows to reach the NWR for 20 days in the 35 years between 1960 and 1995. Sixteen of the 20 days are from two flood years. Water within Poso Creek is lost through water diversions, eveporation, or percolation. Poso Creek does not have a hydrologic connection to a traditional navigable water of the U.S. and does not have a nexus to interstate commerce.


Poso Creek Jurisdictional Determination
Highway 65 to the Kern
National Wildlife Refuge
SPK-2003-265
October 20, 2014
Legend
Non-Jurisdictional Waters
Poso Creek Natural (19.22 mi)
Poso Creek Channel (13.38 mi)
Additional Features
Poso Creek Upstream
Kern NWR
0 0.75 1.5 3 4.5 6
Miles
Datum: WGS_1984
N
S
E
W
Delineation Map Prepared By:
Zachary Simmons
Senior Project Manager, California South Branch
US Army Corps of Engineers
Sacramento District, Regulatory Division
1325 J Street, Room 1350
Sacramento, California 95814-2922
SAND RIDGE
KERN
Delano
Richgrove
McFarland
Wasco
Shafter
Buttonwillow
Rosedale
Lost Hills
SEMITROPIC RIDGE
CA-46 46 Highway-46
CA-99-N
CA-99-S
CA-65
CA-58
95 m
244 m
121 m
Kern River
Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): May 1, 2015

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Sacramento District, Pixley Groundwater Bank, SPK-2015-00265

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State: **California** County/parish/borough: **Tulare** City:
Center coordinates of site (lat/long in degree decimal format): Lat. **35.934199°**, Long. **-119.195345°**
Universal Transverse Mercator: **11 301959.29 3978877.41**
Name of nearest waterbody: **Deer Creek**
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: **N/A**
Name of watershed or Hydrologic Unit Code (HUC): **Tulare-Buena Vista Lakes. California., 18030012**
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☒ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form: **Approved JD Form for Friant-Kern Canal within project boundary.**

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☒ Office (Desk) Determination. Date: **May 1, 2015**
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   ☐ TNWs, including territorial seas
   ☐ Wetlands adjacent to TNWs
   ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   ☐ Non-RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   ☐ Impoundments of jurisdictional waters
   ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: linear feet, wide, and/or acres.
   Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
   Elevation of established OHWM (if known):

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:
   The review area consists of 3.086 acres (approximately 0.55 miles) of Deer Creek, 9.568 acres of irrigation holding ponds, and a 1.122 acre tail water pond and ditch.

   Deer Creek originates in the Sequoia National Forest in the southern portion of Tulare County and terminates at the bank of Homeland Canal approximately 49 miles to the west, just north of the town of Alpaugh (Latitude 35.934784, Longitude -119.473127. Within the study area, the channel is bracketed by

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

levees and also contains a weir structure with wing walls. Water flows within Deer Creek at the project location during times of heavy rainfall or substantial runoff from within Sequoia National Forest. The width of Deer Creek within the project location ranges between approximately 10 and 100 feet. Deer creek does not have a hydrologic connection to a traditional navigable water of the U.S. and does not have a nexus to interstate commerce.

Within the review area, there are 14 irrigation holding ponds totaling 9.568 acres. Water is pumped into these irrigation holding ponds from water wells and then distributed into the farm fields encompassing the study area for the purpose of irrigation. There is also one tail water pond and small ditch totaling 1.122 acres. The approximately 0.25 mile ditch runs north and south adjacent to Road 160, on the western side of the study area. Some of the irrigation run-off flows into this ditch and pond, and is re-circulated back onto the fields. These irrigation features do not receive or discharge water into any drainage or channel that could be considered a Water of the United States. The preamble to the Corps of Engineers' regulations (33CFR Parts 320 through 330, Regulatory Programs of the Corps of Engineers; Final Rule, November 13, 1986) states that the Corps generally does not consider artificial ponds created by excavating or diking dry land to collect and retain water which is used exclusively for irrigation, waters of the United States.

<u>SECTION III: CWA ANALYSIS</u>

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW:

Summarize rationale supporting determination:

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: **Pick List**
Drainage area: **Pick List**

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics:

(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain:

Identify flow route to TNW[5]:
Tributary stream order, if known:

(b) General Tributary Characteristics (check all that apply):
Tributary is: ☐ Natural
☐ Artificial (man-made). Explain:
☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):
☐ Silts ☐ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain:

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain:
Presence of run/riffle/pool complexes. Explain:
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime:
Other information on duration and volume:

Surface flow is: **Pick List.** Characteristics:

Subsurface flow: **Pick List**. Explain findings:
☐ Dye (or other) test performed:

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank ☐ the presence of litter and debris
☐ changes in the character of soil ☐ destruction of terrestrial vegetation
☐ shelving ☐ the presence of wrack line
☐ vegetation matted down, bent, or absent ☐ sediment sorting
☐ leaf litter disturbed or washed away ☐ scour
☐ sediment deposition ☐ multiple observed or predicted flow events
☐ water staining ☐ abrupt change in plant community
☐ other (list):

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list):

☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.). Explain:
Identify specific pollutants, if known:

(iv) Biological Characteristics. Channel supports (check all that apply):
☐ Riparian corridor. Characteristics (type, average width):
☐ Wetland fringe. Characteristics:
☐ Habitat for:
☐ Federally Listed species. Explain findings:
☐ Fish/spawn areas. Explain findings:
☐ Other environmentally-sensitive species. Explain findings:
☐ Aquatic/wildlife diversity. Explain findings:

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:
(a) General Wetland Characteristics:
Properties:
Wetland size: acres
Wetland type. Explain:
Wetland quality. Explain:
Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:
Flow is: **Pick List**. Explain:

Surface flow is**: Pick List**
Characteristics:

Subsurface flow: **Pick List**. Explain findings:
☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:
☐ Directly abutting
☐ Not directly abutting
☐ Discrete wetland hydrologic connection. Explain:
☐ Ecological connection. Explain:
☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW
Project wetlands are **Pick List** river miles from TNW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Flow is from: **Pick List.**
Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:
Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:
Identify specific pollutants, if known:

(iii) Biological Characteristics. Wetland supports (check all that apply):
☐ Riparian buffer. Characteristics (type, average width):

[7] Ibid.

☐ Vegetation type/percent cover. Explain:
☐ Habitat for:
  ☐ Federally Listed species. Explain findings:
  ☐ Fish/spawn areas. Explain findings:
  ☐ Other environmentally-sensitive species. Explain findings:
  ☐ Aquatic/wildlife diversity. Explain findings:

3. Characteristics of all wetlands adjacent to the tributary (if any)
All wetland(s) being considered in the cumulative analysis: **Pick List**
Approximately acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   ☐ TNWs: linear feet, wide, Or acres.
   ☐ Wetlands adjacent to TNWs: acres.

2. RPWs that flow directly or indirectly into TNWs.

☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:

☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):

☐ Tributary waters: linear feet wide.
☐ Other non-wetland waters: acres.
Identify type(s) of waters:

3. Non-RPWs[8] that flow directly or indirectly into TNWs.

☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):

☐ Tributary waters: linear feet, wide.
☐ Other non-wetland waters: acres.
Identify type(s) of waters:

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.

☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.

☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.

☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.

☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. Impoundments of jurisdictional waters.[9]

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.

---

[8]See Footnote # 3.

[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain:
☐ Other factors. Explain:

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet, wide.
☐ Other non-wetland waters: acres.
Identify type(s) of waters:
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☒ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☒ Non-wetland waters (i.e., rivers, streams): **2,830** linear feet, **ranging between 10 and 100 feet** wide.
☒ Lakes/ponds: **10.690** acres.
☐ Other non-wetland waters: acres. List type of aquatic resource:
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, wide.
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource:
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: **Jurisdictional Delineation Pixley Groundwater Bank, Tulare County, California, February 2015, Revised April 2015, Prepared by M. Hirkala.**
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☒ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps:
☐ Corps navigable waters' study:
☐ U.S. Geological Survey Hydrologic Atlas:
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: **1:24K; CA-SAUSALITO SCHOOL**
☐ USDA Natural Resources Conservation Service Soil Survey. Citation:
☐ National wetlands inventory map(s). Cite name:
☐ State/Local wetland inventory map(s):
☐ FEMA/FIRM maps:
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): **Google Earth, Imagery Date: February 20, 2014**
or ☐ Other (Name & Date):
☐ Previous determination(s). File no. and date of response letter:
☐ Applicable/supporting case law:
☐ Applicable/supporting scientific literature:
☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

Deer Creek originates in the Sequoia National Forest in the southern portion of Tulare County and terminates at the bank of Homeland Canal approximately 49 miles to the west, just north of the town of Alpaugh (Latitude 35.934784, Longitude -119.473127). About 18 miles from its origin, Deer Creek passes under Deer Creek Drive and transitions into the Central Valley's developed agricultural lands. It meanders west until it runs through the project location, approximately 15 miles from its terminus, where it became a straightened channel prior to 1994. Deer Creek abruptly ends at the east bank of Homeland Canal. During storm events, the canal bank can be breached at Deer Creek's terminus to allow excess water to flow into Homeland Canal. Homeland Canal is an irrigation channel which flows to the southwest from its juncture and terminates at Gates-Jones Canal. Deer creek does not have a hydrologic connection to a traditional navigable water of the U.S. and does not have a nexus to interstate commerce.

The irrigation holding ponds and tail water return pond do not receive or discharge water into any drainage or channel that could be considered a Water of the United States. The preamble to the Corps of Engineers' regulations (33CFR Parts 320 through 330, Regulatory Programs of the Corps of Engineers; Final Rule, November 13, 1986) states that the Corps generally does not consider artificial ponds created by excavating or diking dry land to collect and retain water which is used exclusively for irrigation, waters of the United States.

ATTACHMENT D
BOTANTICAL SURVEY REPORT

Stantec

Friant-Kern Canal Middle Reach Capacity Correction Project

Botanical Survey Report

March 25, 2020

Prepared for:

Friant Water Authority
854 N. Harvard Ave.
Lindsay, CA 93247

Prepared by:

Stantec Consulting Services Inc.
5000 Bechelli Lane, Suite 203
Redding, CA 96002

FRIANT-KERN CANAL MIDDLE REACH CAPACITY CORRECTION PROJECT

March 25, 2020

This document entitled *Friant-Kern Canal Middle Reach Capacity Correction Project Botanical Survey Report* was prepared by Stantec Consulting Services Inc. (Stantec) for the account of Friant-Water Authority (client). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the client. The opinions in the document are based on conditions and information existing at the time the document was published and do not consider any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by Sarah Tona
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Sarah Tona, Biologist, Stantec

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APPENDICES

Executive Summary

The Friant Water Authority, in coordination with Bureau of Reclamation, proposes to implement the Friant-Kern Canal Middle Reach Capacity Project (Project) in Tulare and Kern counties, California. Stantec Consulting Services Inc. (Stantec) prepared this botanical survey report to document the results of a botanical survey conducted for the Project during March 2020. Based on a desktop resource review and field surveys, the study area contains suitable habitat for 10 special-status plant species. The botanical survey documented 25 invasive plant species in the study area and did not document any special-status plant species.

Acronyms and Abbreviations

Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
FKC	Friant Kern Canal
Project	Friant-Kern Canal Middle Reach Capacity Correction Project
Stantec	Stantec Consulting Services Inc.
USFWS	United States Fish and Wildlife Service

1.0 INTRODUCTION

On behalf of Friant Water Authority, Stantec Consulting Services Inc. (Stantec) conducted a single-visit botanical survey for the Friant-Kern Canal (FKC) Middle Reach Capacity Correction Project (Project) study area located in Tulare and Kern counties, California. The project would consist of restoring the capacity of the 33-mile long Middle Reach canal to store and deliver water. The botanical survey was conducted when many special-status plant species having the potential to occur in the study area were identifiable. This report documents the methods and results of the botanical survey conducted in March 2020.

2.0 PROJECT LOCATION

The study area includes the section of the FKC beginning at Avenue 208 just north of the community of Strathmore in Tulare County, stretching approximately 33 miles south-southwest to Lake Woollomes, approximately 0.5 mile north of Pond Road and to the southeast of the city of Delano in Kern County. The study area is located within the following sections, townships, and ranges (Table 1) of the Mount Diablo Base and Meridian in the *Lindsay, Porterville, Ducor, Sausalito School, Delano East*, and *McFarland* California, U.S. Geological Survey 7.5-minute series topographic quadrangles.

Table 1: Project Ranges, Townships, and Sections

Range	Township	Sections
27 East	20 South	28, 33
	21 South	3, 4, 9, 16, 20, 21, 29, 30, 31
	22 South	6, 7, 18, 19, 30, 31
	23 South	6
26 East	23 South	1, 11, 12, 14, 15, 22, 23, 26, 27, 34
	24 South	3, 9, 10, 15, 16, 21, 22, 28, 33
	25 South	4, 9, 16, 21, 28

3.0 METHODS

Methods used in preparation of this report comprised a review of resource databases, publications, and vegetation community information gathered by Stantec during its preparation of a biological resources assessment for the project. These reviews were followed by a spring-visit, protocol-level field survey for special-status plant species and an assessment of invasive and noxious weed species observed in the study area.

3.1 RESOURCES REVIEW

Prior to conducting field work, Stantec botanists prepared a list of special-status plant species having the potential to occur in the study area using a combination of database searches, resource review, and vegetation mapping review. For the purpose of this evaluation, special-status plant species include plants that are: 1) listed as threatened or endangered under the California Endangered Species Act or the federal Endangered Species Act; 2) proposed for listing as endangered or threatened by the United States Fish and Wildlife Service (USFWS); 3) designated as rare by the California Department of Fish and Wildlife (CDFW); 4) a state or federal candidate species for listing as threatened or endangered; and/or 5) have a California Rare Plant Rank (CRPR) of 1, 2, 3, or 4. Resources reviewed include:

- California Natural Diversity Database (CNDDB) records of the project quadrangles (*Lindsay, Porterville, Ducor, Sausalito School, Delano East*, and *McFarland, California*) and surrounding quadrangles (CDFW 2019a);
- The California Native Plant Society (CNPS) online Inventory of Rare and Endangered Plants (California Native Plant Society 2019) records for the *Lindsay, Porterville, Ducor, Sausalito School, Delano East*, and *McFarland, California* and surrounding quadrangles;
- USFWS list of federally protected species that may occur in the vicinity of the Project (United States Fish and Wildlife Service 2019);
- CDFW publications, including *State and Federally Listed Endangered, Threatened, and Rare Plants of California* (CDFW 2020a) and *Special Vascular Plants, Bryophytes, and Lichens* (CDFW 2020b);
- California floras, including *The Jepson Manual, 2nd Edition* (Baldwin et al. 2012), the Jepson Eflora (University of California 2020);
- The Consortium of California Herbaria records (Consortium of California Herbaria 2020);
- Vegetation community mapping conducted for the Project's biological resources assessment (Stantec 2020); and
- Publications on specific special-status plant species, including Jepson (1892), Keck (1935), Mason (1945), Mathias (1936), Scribner (1899), Standley (1916), Stutz and Chu (1997), Stutz et al. (1997), USFWS (2010), and USFWS (2013).

3.2 BOTANTICAL FIELD SURVEY

The botanical field survey was conducted in general accordance with the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018). This report includes the results of the spring field visit; a survey will be conducted in August 2020 to identify late-season plants and complete the botanical survey. Sarah Tona, Stantec botanist, served as the lead investigator for the botanical survey. Courtney Chaney, Stantec botanist, provided additional field assistance.

Before conducting the survey, Stantec botanists visited several reference sites for special-status plant species with the potential to occur in the study area. For the purposes of this report, reference populations refer to special-status plant populations that were documented in the recent past and recorded in the CNDDB (CDFW 2020). These reference sites helped determine if the spring survey timing was correct and enhanced the botanists' knowledge of each species and their habitat type.

The field survey in the study area was floristic in nature and consisted of identifying each species observed to the taxonomic level necessary to determine whether the plant is a special-status species. Plant taxonomy followed Baldwin et al. (2012), including applicable errata and supplements (Jepson Flora Project 2020). Stantec botanists performed the survey by walking meandering transects through microhabitats with the potential to support special-status plants. Survey intensity was heightened in areas corresponding to habitats with the potential support the special-status plants identified in the pre-field resource review and reference site visits.

3.3 INVASIVE SPECIES DOCUMENTATION

The botanical survey included documenting invasive plant species (i.e., noxious weeds). For the purpose of this survey, invasive plant species are those included on the California Invasive Plant Inventory (Cal-IPC) with ratings of High, Moderate, Limited, or Watch List (Cal-IPC 2020) or considered a noxious weed under the California Department of Food and Agriculture (3 CCR Section 4500).

4.0 RESULTS

The spring-visit botanical field survey was conducted March 16–19, 2020. The field survey was conducted at a time when the early season special-status plant species could be identified if they were present. A complete list of plant species observed in the study area during the botanical survey is provided as Appendix A.

4.1 HABITATS AND SITE CONDITIONS

Stantec botanists identified several habitat communities in the study area, including non-native annual grassland, California buckwheat scrub, allscale saltbush scrub, Fremont cottonwood forest, mulefat thickets, red willow thickets, shining willow groves, smartweed-cocklebur patches, and valley oak woodland. Additional land uses in the study area include urban (residential housing), ruderal (recently and/or regularly disturbed areas), barren (unvegetated or nearly unvegetated areas including canal embankment roads), and open water. Due to the presence of the canal, access roads, and agricultural use, the majority of the study area is altered by human use, disturbed, and contains ruderal and weedy vegetation. Small areas of native microhabitat, including the vegetation communities listed above, occur throughout the study area. Comprehensive descriptions of each habitat type and land use and their location in the study area is provided in the Project's biological resources assessment (Stantec 2020).

Many special-status plant species that have the potential to occur in the study area occur exclusively on or are generally associated with alkaline soils. Stantec identified several soil types in the study area that are slightly or moderately alkaline, according to the region's soil resources report (Natural Resources Conservation Service 2020) and the Natural Resource Conservation Service's soil quality information sheet on pH (Natural Resources Conservation Service 1998). Soil map units in the study area that may be alkaline, or high pH, are provided in Table 2. All other soil map units in the study area have a neutral pH and would not support special-status plant species that require alkaline soils. Based on the soil resources report and soil characteristics observed during the field survey, the soil texture ranges from sandy to sandy loam to loam, with no clay soils present.

Table 2: Alkaline Soil Map Units in the Study Area

Map Unit Name Taxonomy	Map Unit Reference Code	pH	Alkaline
Akers-Akers, saline-Sodic, complex, 0 to 2 percent slopes Calcic Haploxerepts	101	7.9	Moderately Alkaline
Calgro-Calgro, saline-Sodic, complex, 0 to 2 percent slopes Typic Durixerepts	105	7.9	Moderately Alkaline
Centerville clay, 0 to 2 percent slopes Aridic Calcixererts	106	7.5	Slightly Alkaline
Colpien loam, 0 to 2 percent slopes Calcic Pachic Haploxerolls	108	7.5	Slightly Alkaline
Nord fine sandy loam, 0 to 2 percent slopes Cumulic Haploxerolls	130	7.5	Slightly Alkaline
Tagus loam, 0 to 2 percent slopes Calcic Haploxerolls	137	7.6	Slightly Alkaline

Map Unit Name Taxonomy	Map Unit Reference Code	pH	Alkaline
Nord fine sandy loam, 0 to 2 percent slopes Cumulic Haploxerolls	130tw	Well drained	Slightly Alkaline

According to the United States Drought Monitor, the study area region was in a moderate drought at the time of the survey (The National Drought Mitigation Center 2020). This rating is the second lowest of five ratings of drought, meaning it is not considered a severe drought. Reference site visits indicated that several special-status plant species were still present in the region despite the drought, and that the survey timing was correct to identify the species in the study area (see section 4.3).

4.2 SPECIAL-STATUS SPECIES

Based on the review of existing information, species habitat requirements, and habitat characteristics present in the study area, Stantec determined that 10 special-status plant species have the potential to occur in the study area (Table 3). An additional eight regionally occurring federally or state listed species are included in the table; these species do not have the potential to occur in the study area. Each species' characteristics and habitat requirements are described further in the Project's biological resources assessment (Stantec 2020).

No special-status plant species were observed during the botanical survey conducted during March 2020.

Table 3: Special-Status Plant Species with the Potential to Occur in the Study Area

Common Name *Scientific Name*	Listing Status[1] (Fed/State/CRPR)	General Habitat Description	Potential for Occurrence[2]
Earlimart orache *Atriplex cordulata* var. *erecticaulis*	—/—/1B.2	Found in valley and foothill grasslands. **Blooms:** Aug–Sep **Elevation:** 235 to 330 feet	**Low**. The study area is within the known range of this species, and there is a reported CNDDB occurrence within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.
Lost Hills crownscale *Atriplex coronata* var. *vallicola*	—/—/1B.2	Found in chenopod scrub, valley and foothill grassland, and vernal pools. Prefers alkaline soils. **Blooms:** Apr–Sep **Elevation:** 160–2,080 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.

Common Name ***Scientific Name***	**Listing Status[1] (Fed/State/CRPR)**	**General Habitat Description**	**Potential for Occurrence[2]**
Brittlescale *Atriplex depressa*	—/—/1B.2	Found in chenopod scrub, meadows, seeps, playas, and valley and foothill grasslands. Found in alkaline and clay soils. **Blooms:** Apr–Oct **Elevation:** 1–1,050 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.
Lesser saltscale *Atriplex minuscula*	—/—/1B.1	**Found** in chenopod scrub, playas, and valley and foothill grasslands, as well as alkaline or sandy soils. **Blooms:** May–Oct **Elevation:** 50–656 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.
Subtle orache *Atriplex subtilis*	—/—/1B.2	Found in alkaline soils in valley and foothill grasslands. **Blooms:** Jun–Oct **Elevation:** 130–325 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.
Kaweah brodiaea *Brodiaea insignis*	—/E/1B.2	Found in openings in foothill woodland and in granitic or clay soils. **Blooms:** Apr–Jun **Elevation:** 490–4,600 feet	**None**. The study area is outside of the ecological range of this species, and the study area lacks suitable habitat. This species has not been documented to occur on the floor of the San Joaquin Valley. It is known only from the Kaweah and Tule River drainages. There are no reported CNDDB occurrences within 5 miles of the study area.
California jewelflower *Caulanthus californicus*	E/E/1B.1	Found in flat, gentle slopes generally in non–alkaline grassland. Also found in open juniper woodland. **Blooms:** Feb–May **Elevation:** 200–328 feet	**None**. As of 1996, all of the natural occurrences of this species have been extirpated within the San Joaquin Valley. There are historic CNDDB occurrences within 5 miles of the study area dating from the 1930s.

Common Name ***Scientific Name***	**Listing Status[1] (Fed/State/CRPR)**	**General Habitat Description**	**Potential for Occurrence[2]**
Springville clarkia *Clarkia springvillensis*	T/E/1B.2	Found on granitic substrates in chaparral, cismontane woodlands, and valley and foothill grasslands. **Blooms:** Mar–Jul **Elevation:** 800–4,000 feet	**None**. The study area is outside of the ecological range of this species, and the study area lacks suitable habitat. This species has never been documented to occur on the floor of the San Joaquin Valley. There is one CNDDB reported occurrence within 5 miles of the study area in the foothills east of the northern portion of the study area.
Recurved larkspur *Delphinium recurvatum*	—/—/1B.2	Found in chenopod scrub, valley and foothill grassland, and cismontane woodland. Alkaline soils. **Blooms:** Mar–Jun **Elevation:**10–2,600 feet	**Low**. The study area is within the known range of this species, and there is a reported CNDDB occurrence within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.
Kern mallow *Eremalche parryi* ssp. k*ernensis*	E/—/1B.2	Found in southern San Joaquin Valley and adjacent areas growing on eroded hillsides and alkali flats. Typically found in these habitats growing under and around saltbush (*Atriplex spinifera* or *A. polycarpa*) or desert tea (*Ephedra californica*) where shrub cover is less than 25 percent (USFWS 2013). **Blooms:** Mar–May **Elevation:** 230–4,230 feet	**None**. The study area is within the known range of this species. However, based on the field surveys, no suitable habitat is present within the study area. In addition, there are no reported CNDDB occurrences within 5 miles of the study area.
Hoover's eriastrum *Eriastrum hooveri*	—/—/4.2	Found in chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland. **Blooms:** Mar–Jul **Elevation:** 165 to 3,000 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.
Spiny-sepaled button-celery *Eryngium spinosepalum*	—/—/1B.2	Found in vernal pools, swales, and roadside ditches in valley and foothill grasslands. **Blooms:** Apr–Jun **Elevation:** 260–3,200 feet	**Low**. Suitable habitat occurs in the study area in the form of roadside ditches, however the ditches in the study area have a high cover of upland species and there is a low potential for occurrence. There is one reported CNDDB occurrences within 5 miles of the study area.

Common Name *Scientific Name*	**Listing Status[1] (Fed/State/CRPR)**	**General Habitat Description**	**Potential for Occurrence[2]**
Striped adobe-lily *Fritillaria striata*	—/T/1B.1	Found in cismontane woodland and valley and foothill grasslands. Usually found on clay soils. **Blooms:** Feb–Apr **Elevation:**440–4,800 feet	**None**. The study area occurs outside of the contemporarily recognized ecological range of this species, and the study area lacks suitable habitat; there are no adobe clay soils within the study area. Although there are two historic collections of this plant species from the San Joaquin Valley floor dating from the 1920s, these occurrences have been extirpated via agricultural land conversion. There are no reported CNDDB occurrences within 5 miles of the study area.
Munz's tidy-tips *Layia munzii*	—/—/1B.2	Found in chenopod scrub and valley and foothill grasslands. Usually found on alkaline clay soils. **Blooms:** Mar–Apr **Elevation:**490–2,300 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.
San Joaquin woollythreads *Monolopia congdonii*	E/—/1B.2	Found in valley and foothill grassland and chenopod scrub. Sandy soils. **Blooms:** Feb–May **Elevation:** 200–2,600 feet	**None**. The study area is not within the current known range of this species. USFWS considers the species extirpated from Tulare County, and the extant populations in Kern County are over 20 miles south of the study area (USFWS 2010). There are reported CNDDB occurrences within 5 miles of the study area. However, those records are considered extirpated.
Bakersfield cactus *Opuntia basilaris* var. *treleasei*	E/E/1B.1	Found in chenopod scrub, cismontane woodland, and valley and foothill grasslands. Found in sandy or gravelly soils. **Blooms:** Apr–May **Elevation:** 390–4,760 feet	**None**. The study area is outside of the recognized range of this species. There are no reported CNDDB occurrences within 5 miles of the study area. The closest CNDDB reported occurrences are greater than 20 air miles south of the southernmost portion of the study area. In addition, a survey was conducted in October 2019 with negative results.

Common Name *Scientific Name*	**Listing Status[1] (Fed/State/CRPR)**	**General Habitat Description**	**Potential for Occurrence[2]**
San Joaquin adobe sunburst *Pseudobahia peirsonii*	T/E/1B.1	Found in cismontane woodland and valley and foothill grasslands. Found in adobe clay soils. **Blooms:** Feb–Apr **Elevation:** 295–2,625 feet	**None**. The study area is within the known range of this species, and there are reported CNDDB occurrences within 5 miles of the study area. However, there is no suitable habitat (i.e., adobe clay soils) within the study area.
California alkali grass *Puccinellia simplex*	—/—/1B.2	Found in chenopod scrub, meadows and seeps, vernal pools, and valley and foothill grassland. Also found in alkaline soils, vernally mesic soils, sinks, flats, and lake margins. **Blooms:** Mar–May **Elevation:** 7–3,050 feet	**Low**. The study area is within the known range of this species, but there are no reported CNDDB occurrences within 5 miles of the study area. Potential suitable habitat occurs within the study area. However, this habitat is isolated, limited, and of marginal ecological quality.

[1] Federal and State Status Codes: E = Endangered, T = Threatened;
CRPR Codes: List 1B – Plants rare, threatened, or endangered in California and elsewhere. List 2B – Rare or endangered in California, common elsewhere; List 4 – Limited distribution in California.
Extensions: x.1 – Seriously endangered in California; x.2 – Fairly endangered in California.
[2] Potential for Occurrence
Low – The Project is located within the range of the species, and low-quality habitat is present in the study area.
None – The Project is located outside the range of the species, or no habitat is present in the study area.

4.3 REFERENCE POPULATIONS

Stantec botanists visited several reference populations for regionally occurring special-status plants before conducting the botanical survey.

On March 4, 2020, Stantec botanists located more than 100 Kern mallow (*Eremalche parryi* ssp. *kernensis*) individuals in full flower at a reference site near Taft, California. The vegetation community consisted of saltbrush scrub and was dominated by spinescale saltbrush (*Atriplex spinifera*) and cattle spinach (*Atriplex polycarpa*) with an understory of red brome (*Bromus madritensis* ssp*. rubens*) and red-stemmed filaree (*Erodium cicutarium*). The cover of shrubs and herbaceous species was sparse. The area was nearly level (0–1 percent slope) and the substrate was alkaline sandy to sandy loam soils.

On March 16, 2020, Stantec botanists visited a reference site located on the Pixley Preserve that had observations for several special-status plants, including Earlimart orache (*Atriplex cordulata* var. *erecticaulis*), Lost Hills crownscale (*Atriplex coronata* var. *vallicola*), brittlescale (*Atriplex depressa*), subtle orache (*Atriplex subtilis*), recurved larkspur (*Delphinium recurvatum*), and California jewelflower (*Caulanthus californicus*). Stantec botanists located several *Atriplex* species at this site; however, the species would not be identifiable until later in the season when the plants are larger and in flower. They did not re-locate the recurved larkspur or California jewelflower at the site. The habitat consisted of a vernal swale system interspersed with upland hummocks and alkaline loamy soils. The vegetation was dominated by herbaceous cover, including *Atriplex* species subshrubs, long beaked stork's bill (*Erodium* *botrys*), red-stemmed filaree, blue dicks (*Dichelostemma capitatum* ssp. *capitatum*), and Italian ryegrass (*Festuca perennis*).

On March 16, 2020, Stantec botanists visited a reference site approximately 10 miles west of Strathmore that had observations for several special-status plants, including Earlimart orache, subtle orache, California alkali grass (*Puccinellia simplex*), and recurved larkspur. The site was on private property, so the botanists could not access it beyond observations from the road shoulder adjacent to the site. They observed what appeared to be *Delphinium* basal leaves but could not positively identify the species from their viewpoint. Based on the basal leaves observed at the site, it was apparent that the genus *Delphinium* would have been recognizable during the March botanical survey. The vegetation community was dominated by scattered *Atriplex* shrubs on sandy to loamy alkaline soils. The herbaceous cover included scattered foxtail barley (*Hordeum murinum*), and fiddleneck (*Amsinckia* sp.).

On March 17, 2020, Stantec botanists visited a reference site for spiny-sepaled button celery (*Eryngium spinosepalum*) located approximately 4.5 miles northeast of Porterville, California in the Kincade Cove Wildlife Management Area. They did not re-locate the species at the site. The occurrence was located at the toe of a slope in a narrow wet swale in heavy clay soils. The swale was dominated by Italian rye grass, while the adjacent upland habitat was dominated by vetch (*Vicia* sp.), barbed oat grass (*Avena barbata*), and black mustard (*Brassica* sp.).

4.4 INVASIVE SPECIES

Stantec documented 25 invasive plant species in the study area during the botanical survey. These invasive species have a Cal-IPC status of Limited, Moderate, or High or are considered a noxious weed by the California Department of Food and Agriculture (Appendix A). The invasive species were mostly continuous and evenly distributed in the study area, except for certain species that occurred singly or in small patches in microhabitats such as water features. Three of the invasive species documented in the study area have a Cal-IPC rating of High, including Arundo (*Arundo donax*), red brome (*Bromus madritensis* ssp. *rubens*), and tamarix (*Tamarix chinensis*).

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Appendix A PLANT SPECIES OBSERVED IN THE STUDY AREA (MARCH 16–18, 2020)

Appendix A – Plant Species Observed in The Study Area (March 16–18, 2020)

Plant species observed during the March 16–18, 2020 field surveys for the Friant-Kern Canal Middle Reach Capacity Correction Project.

Scientific Name	Common Name	Family	Cal-IPC/CDFA[1]
Acmispon sp.	-	Fabaceae	-
Actinidia deliciosa	fuzzy kiwifruit	Fabaceae	-
Albizia julibrissin	silktree	Fabaceae	-
Amsinckia menziesii	fiddleneck	Boraginaceae	-
Amsinckia tessellata	devil's lettuce	Boraginaceae	-
Artemisia douglasiana	California mugwort	Asteraceae	
Arundo donax	giant reed	Poaceae	High/Noxious
Asclepias eriocarpa	Indian milkweed	Apocynaceae	-
Atriplex polycarpa	cattle spinach	Chenopodiaceae	-
Atriplex serenana var. *serenana*	saltscale	Chenopodiaceae	-
Avena barbata	slim oat	Poaceae	Moderate/-
Avena fatua	wildoats	Poaceae	Moderate/-
Baccharis salicifolia ssp. *salicifolia*	mule fat	Asteraceae	-
Bromus diandrus	ripgut brome	Poaceae	Moderate/-
Bromus hordeaceus	soft chess	Poaceae	Limited/-
Bromus madritensis ssp. *rubens*	foxtail chess	Poaceae	High/-
Camissonia campestris ssp. *campestris*	field sun cup	Onagraceae	-
Capsella bursa-pastoris	shepherd's purse	Brassicaceae	-
Castilleja exserta ssp. *exserta*	purple owl's clover	Orobanchaceae	-
Cercis sp.	redbud	Fabaceae	-
Chenopodium sp.	-	Chenopodiaceae	-
Citrus sp.	-	Rutaceae	
Conium maculatum	poison hemlock	Apiaceae	Moderate/-
Convolvulus arvensis	field bindweed	Convolvulaceae	-
Cynodon dactylon	Bermuda grass	Poaceae	Moderate/-
Cyperus eragrostis	tall cyperus	Cyperaceae	-
Dichelostemma capitatum ssp. *capitatum*	blue dicks	Themidaceae	-
Eleocharis macrostachya	spike rush	Cyperaceae	-
Epilobium sp.	willow herb	Onagraceae	-
Erigeron bonariensis	flax-leaved horseweed	Asteraceae	-
Erigeron sp.	-	Asteraceae	-
Eriogonum fasciculatum	California buckwheat	Polygonaceae	-

Scientific Name	Common Name	Family	Cal-IPC/CDFA[1]
Erodium botrys	big heron bill	Geraniaceae	-
Erodium cicutarium	coastal heron's bill	Geraniaceae	Limited/-
Erodium moschatum	whitestem filaree	Geraniaceae	-
Erythranthe guttata	yellow monkey flower	Phrymaceae	-
Eucalyptus sp.	-	Myrtaceae	-
Euphorbia sp.	spurge	Euphorbiaceae	-
Festuca bromoides	brome fescue	Poaceae	-
Festuca myuros	rattail sixweeks grass	Poaceae	-
Festuca perennis	Italian rye grass	Poaceae	-
Ficus carica	common fig	Moraceae	Moderate/-
Galium sp.	-	Rubiaceae	-
Grevillea robusta	silk oak	Proteaceae	-
Heterotheca sp.	-	Asteraceae	-
Hirschfeldia incana	mustard	Brassicaceae	Moderate/-
Hordeum murinum	foxtail barley	Poaceae	Moderate/-
Juglans hindsii	Northern California black walnut	Juglandaceae	-
Juglans regia	English walnut	Juglandaceae	-
Juncus effusus	common bog rush	Juncaceae	-
Lactuca serriola	prickly lettuce	Asteraceae	-
Lupinus microcarpus var. *densiflorus*	chick lupine	Fabaceae	-
Lupinus succulentus	arroyo lupine	Fabaceae	-
Lythrum hyssopifolia	hyssop loosestrife	Lythraceae	-
Malus sp.	-	Rosaceae	-
Malva parviflora	cheeseweed	Malvaceae	-
Marrubium vulgare	white horehound	Lamiaceae	Limited/-
Matricaria discoidea	pineapple weed	Asteraceae	-
Medicago polymorpha	California burclover	Fabaceae	Limited/-
Medicago sativa	alfalfa	Fabaceae	-
Melilotus indicus	annual yellow sweetclover	Fabaceae	-
Micropus californicus	q tips	Asteraceae	-
Nicotiana glauca	tree tobacco	Solanaceae	Moderate/-
Olea europaea	olive	Oleaceae	Limited/-
Opuntia ficus-indica	tuna	Cactaceae	-
Peritoma arborea	bladderpod	Cleomaceae	-
Persicaria sp.	-	Polygonaceae	-
Phalaris sp.	-	Poaceae	-

Scientific Name	Common Name	Family	Cal-IPC/CDFA[1]
Phoradendron leucarpum ssp. *macrophyllum*	big leaf mistletoe	Viscaceae	-
Pistacia lentiscus	mastic	Anacardiaceae	-
Pistacia vera	pistachio	Anacardiaceae	-
Plagiobothrys canescens	valley popcorn	Boraginaceae	-
Plagiobothrys nothofulvus	rusty haired popcorn flower	Boraginaceae	-
Plantago coronopus	cut leaf plantain	Plantaginaceae	-
Poa compressa	Canada blue grass	Poaceae	-
Polygonum aviculare	prostrate knotweed	Polygonaceae	-
Polypogon monspeliensis	annual beard grass	Poaceae	Limited/-
Populus fremontii ssp. *fremontii*	cottonwood	Salicaceae	-
Prunus dulcis	almond	Rosaceae	-
Punica granatum	pomegranate	Lythraceae	-
Quercus lobata	valley oak	Fagaceae	-
Raphanus raphanistrum	jointed charlock	Brassicaceae	-
Rorippa sp.	yellow cress	Brassicaceae	-
Rumex crispus	curly dock	Polygonaceae	Limited/-
Rumex sp.	-	Polygonaceae	-
Salix babylonica	weeping willow	Salicaceae	-
Salix exigua	narrowleaf willow	Salicaceae	-
Salix laevigata	polished willow	Salicaceae	-
Salix lasiandra	pacific willow	Salicaceae	-
Sambucus nigra ssp. *caerulea*	blue elderberry	Adoxaceae	-
Schoenoplectus acutus var. *occidentalis*	tule	Cyperaceae	-
Senecio vulgaris	common groundsel	Asteraceae	-
Sinapis arvensis	charlock	Brassicaceae	Limited/-
Sisymbrium altissimum	tumble mustard	Brassicaceae	-
Sisymbrium irio	London rocket	Brassicaceae	Moderate/-
Sisymbrium orientale	Indian hedge mustard	Brassicaceae	-
Sonchus asper ssp. *asper*	sow thistle	Asteraceae	-
Sorghum halepense	Johnsongrass	Poaceae	-/Noxious
Spergularia rubra	purple sand spurry	Caryophyllaceae	-
Tamarix chinensis	Chinese tamarisk	Tamaricaceae	High/Noxious
Tribulus terrestris	puncture vine	Zygophyllaceae	Limited/Noxious
Urtica dioica	stinging nettle	Urticaceae	-
Verbascum thapsus	woolly mullein	Scrophulariaceae	Limited/-
Veronica anagallis-aquatica	water speedwell	Plantaginaceae	-

Scientific Name	Common Name	Family	Cal-IPC/CDFA[1]
Veronica peregrina ssp. *xalapensis*	speedwell	Plantaginaceae	-
Vitis vinifera	cultivated grape	Vitaceae	-
Washingtonia robusta	Washington fan palm	Arecaceae	-/Moderate
Xanthium strumarium	cocklebur	Asteraceae	-

Notes:

[1] Ratings

California Invasive Plant Council (Cal-IPC)

High: These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate: These species have substantial and apparent-but generally not severe-ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited: These species are invasive, but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

California Department of Food and Agriculture (CDFA)

Noxious: Listed as a noxious weed under Section 4500

ATTACHMENT E
PLANT LIST

Stantec

Attachment E — Plant List

Plant species observed during the September 30–October 3, 2019 and March 16–18, 2020 field surveys for the Friant-Kern Canal Middle Reach Capacity Correction Project.

Scientific Name	Common Name
Acmispon sp.	-
Actinidia deliciosa	fuzzy kiwifruit
Albizia julibrissin	silktree
Alisma triviale	northern water plantain
Amaranthus albus	tumbleweed
Amaranthus palmeri	Palmer's amaranth
Ambrosia acanthicarpa	annual burrweed
Ammannia robusta	grand ammania
Amsinckia menziesii	fiddleneck
Amsinckia tessellata	devil's lettuce
Artemisia douglasiana	California mugwort
Arundo donax	giant reed
Asclepias eriocarpa	Indian milkweed
Atriplex polycarpa	cattle spinach
Atriplex serenana var. *serenana*	saltscale
Avena barbata	slim oat
Avena fatua	wildoats
Baccharis salicifolia ssp. *salicifolia*	mule fat
Bidens laevis	bur marigold
Bromus diandrus	ripgut brome
Bromus hordeaceus	soft chess
Bromus madritensis ssp. *rubens*	foxtail chess
Camissonia campestris ssp. *campestris*	field sun cup
Capsella bursa-pastoris	shepherd's purse
Castilleja exserta ssp. *exserta*	purple owl's clover
Centromadia pungens ssp. *pungens*	common tarweed
Cercis sp.	redbud
Chenopodium sp.	-
Citrullus colocynthis	colocynth
Citrus sp.	
Conium maculatum	poison hemlock
Convolvulus arvensis	field bindweed
Croton setiger	turkey-mullein
Cynodon dactylon	Bermuda grass

Attachment E — Plant List

Scientific Name	Common Name
Cyperus difformis	variable flatsedge
Cyperus eragrostis	tall cyperus
Cyperus erythrorhizos	red rooted cyperus
Cyperus esculentus	nut grass
Datura wrightii	jimsonweed
Descurainia sophia	herb sophia
Dichelostemma capitatum	blue dicks
Echinochloa colona	jungle rice
Eclipta prostrata	false daisy
Eleocharis macrostachya	spike rush
Epilobium brachycarpum	willow herb
Epilobium ciliatum	slender willow herb
Erigeron bonariensis	flax-leaved horseweed
Erigeron canadensis	Canada horseweed
Eriogonum fasciculatum	California buckwheat
Erodium botrys	big heron bill
Erodium cicutarium	coastal heron's bill
Erodium moschatum	whitestem filaree
Erythranthe guttata	yellow monkey flower
Eucalyptus sp.	-
Euphorbia ocellata ssp. ocellata	valley spurge
Festuca bromoides	brome fescue
Festuca myuros	rattail sixweeks grass
Festuca perennis	Italian rye grass
Ficus carica	common fig
Galium sp.	-
Grevillea robusta	ilk oak
Helianthus annuus	hairy leaved sunflower
Heliotropium curassavicum var. *oculatum*	seaside heliotrope
Heterotheca grandiflora	telegraph weed
Hirschfeldia incana	mustard
Hordeum murinum	foxtail barley
Juglans hindsii	Northern California black walnut
Juglans regia	English walnut
Juncus effusus	common bog rush
Lactuca serriola	prickly lettuce
Leersia oryzoides	rice cutgrass

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Attachment E — Plant List

Scientific Name	Common Name
Leptochloa fusca ssp. *uninervia*	Mexican sprangletop
Lupinus microcarpus var. *densiflorus*	chick lupine
Lupinus succulentus	arroyo lupine
Lythrum hyssopifolia	hyssop loosestrife
Malus sp.	-
Malva parviflora	cheeseweed
Marrubium vulgare	white horehound
Matricaria discoidea	pineapple weed
Medicago polymorpha	California burclover
Medicago sativa	alfalfa
Melilotus indicus	annual yellow sweetclover
Micropus californicus	q tips
Nicotiana glauca	tree tobacco
Nuttallanthus texanus	blue toadflax
Oenothera elata	evening primrose
Olea europaea	olive
Opuntia ficus-indica	tuna
Panicum capillare	old witch grass
Peritoma arborea	bladderpod
Persicaria lapathifolia	common knotweed
Persicaria sp.	-
Phalaris aquatica	harding grass
Phoradendron leucarpum ssp. *macrophyllum*	big leaf mistletoe
Pistacia lentiscus	mastic
Pistacia vera	pistachio
Plagiobothrys canescens	valley popcorn
Plagiobothrys nothofulvus	rusty haired popcorn flower
Plantago coronopus	cut leaf plantain
Poa compressa	Canada blue grass
Polygonum aviculare	prostrate knotweed
Polypogon monspeliensis	annual beard grass
Populus fremontii ssp. *fremontii*	cottonwood
Prunus dulcis	almond
Punica granatum	pomegranate
Quercus lobata	valley oak
Raphanus raphanistrum	jointed charlock
Rorippa curvipes	bluntleaf yellow cress

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Attachment E — Plant List

Scientific Name	Common Name
Rorippa curvisiliqua	curvepod yellow cress
Rumex crispus	curly dock
Rumex sp.	-
Sagittaria sp.	-
Salix babylonica	weeping willow
Salix exigua	narrowleaf willow
Salix laevigata	polished willow
Salix lasiandra	pacific willow
Salsola tragus	Russian thistle
Sambucus nigra ssp. *caerulea*	blue elderberry
Schoenoplectus acutus var. *occidentalis*	tule
Senecio vulgaris	common groundsel
Sinapis arvensis	charlock
Sisymbrium altissimum	tumble mustard
Sisymbrium irio	London rocket
Sisymbrium orientale	Indian hedge mustard
Solanum americanum	American black nightshade
Solanum elaeagnifolium	horse nettle
Sonchus asper ssp. *asper*	sow thistle
Sorghum halepense	Johnsongrass
Spergularia rubra	purple sand spurry
Stachys albens	cobwebby hedge nettle
Stephanomeria virgata	twiggy wreath plant
Tamarix chinensis	Chinese tamarisk
Tribulus terrestris	puncture vine
Trichostema lanceolatum	vinegarweed
Typha latifolia	boradleaf cattail
Urtica dioica	stinging nettle
Verbascum thapsus	woolly mullein
Veronica anagallis-aquatica	water speedwell
Veronica peregrina ssp. *xalapensis*	speedwell
Vitis vinifera	cultivated grape
Washingtonia robusta	Washington fan palm
Xanthium strumarium	cocklebur